UNISYS

TPC Benchmark™ C Full Disclosure Report

Unisys Corporation
Enterprise Systems

Aquanta ES2025 Server

using

Microsoft SQL Server 7.0, Enterprise Edition

on

Microsoft NT Server 4.0, Enterprise Edition

First Edition
September 3rd 1999

Unisys Part Number 4494 8982-000

First Edition – September 1999

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The pricing information in this document is believed to accurately reflect the current prices as of the publication date. However, Unisys Corporation and Microsoft Corporation provide no warranty on the pricing information in this document.

Benchmark results are highly dependent upon workload, specific application requirements, and systems design and implementation. Relative system performance will vary as a result of these and other factors. Therefore, TPC Benchmark C should not be used as a substitute for a specific customer application benchmark when critical capacity planning and/or product evaluation decisions are contemplated.

All performance data contained in this report was obtained in a rigorously controlled environment, and therefore results obtained in other operating environments may vary significantly. Unisys Corporation and Microsoft Corporation do not warrant or represent that a user can or will achieve similar performance expressed in transactions per minute (tpmC) or normalized price/performance ($/tpmC). No warranty of system performance or price/performance is expressed or implied in this report.

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Abstract

Overview

This report documents the methodology and results of the TPC Benchmark C (TPC-C) conducted on the Unisys Corporation Aquanta ES2025 server. The operating system on the server was Microsoft Windows NT Server 4.0, Enterprise Edition. The DBMS used was Microsoft SQL Server 7.0, Enterprise Edition. The operating system on the clients was Microsoft Windows NT Server 4.0. The clients ran Microsoft's Internet Information Server 3.0 and Tuxedo 6.3 CFS for NT.

TPC Benchmark Metrics

The standard TPC Benchmark C metrics, tpmC (transactions per minute), price per tpmC (five year capital cost per measured tpmC), and the availability date are reported as required by the benchmark specification.

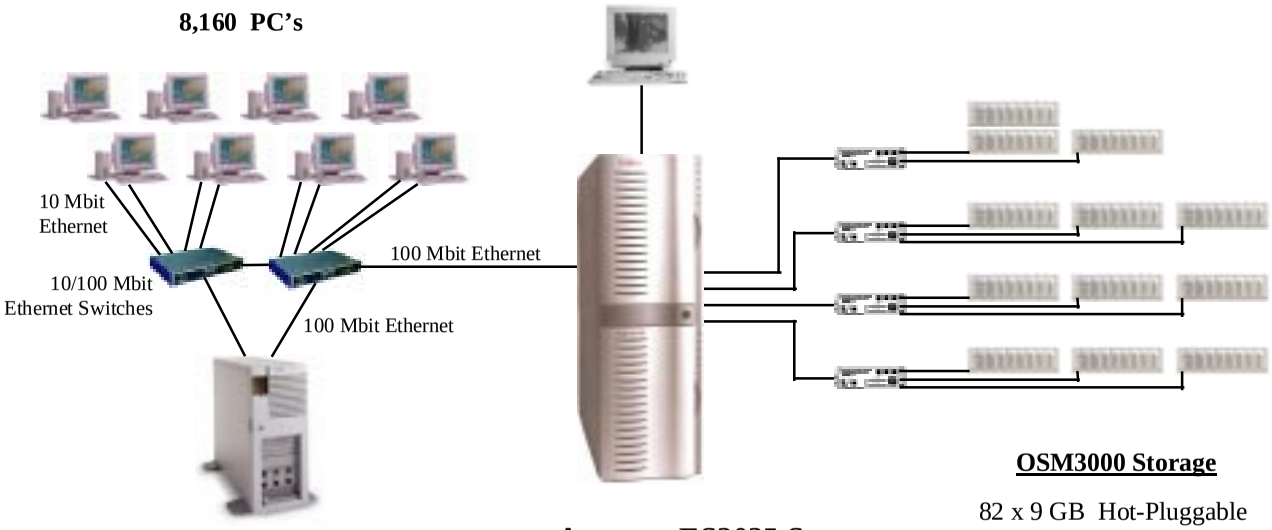
Executive Summary

The following pages contain the executive summary results of the benchmark.

Auditor

The benchmark configuration, environment, and methodology used to produce and validate the test results, along with the pricing model used to calculate the cost per tpmC, were audited by Lorna Livingtree of Performance Metrics, Inc. to verify compliance with the relevant TPC specification.

UNISYS	Aquanta ES2025 Server (2P 550MHz/512KB)			TPC-C Rev. 3.4 Report Date: 3-Sep-1999
Total System Cost	TPC-C Throughput	Price/Performance		Availability Date
$196,642	**10,265.90 tpmC**	**$19.15 per tpmC**		**30-Sep-1999 ***
Processors	Database Manager	Operating System	Other Software	Number of Users
2 Pentium® III Xeon 550 MHz 512KB L2 cache	Microsoft SQL Server 7.0, Enterprise Edition	Microsoft NT Server 4.0, Enterprise Edition	Microsoft IIS 3.0 Tuxedo 6.3 CFS	**8,160**



NetServer LC3 Client

Aquanta ES2025 Server

1 Inbuilt SCSI Controller
1 x 4 GB Hot-Pluggable Internal SCSI Disk
4 x SCSI RAID Controllers
1 Inbuilt 100 Mbit NIC

OSM3000 Storage

82 x 9 GB Hot-Pluggable External SCSI Disks

System Components	Server		Clients	
	Quantity	Type	Quantity	Type
Processors	2	550 MHz Pentium® III Xeon with 512KB Level 2 Cache	1	2 x 450MHz Pentium® II with 512KB Level 2 Cache
Memory	1	1024 MB	1	384 MB
Disk Controllers	4 1	SCSI RAID Inbuilt SCSI	1	Inbuilt SCSI
Disk Drives	1 82	4.24 GB 8.54 GB	1	3.97 GB
Total Storage		704.68 GB		3.97 GB
CD-ROM / Tape	1	SCSI CD-ROM Drive	1	CD-ROM Drive

* All Components Available Now Except MS SQL Server EE 7.0, SP2

Unisys Corporation	Aquanta ES2025 Server (2P 550MHz/512KB)						TPC-C Rev 3.4 3-Sep-1999
Description	Style	Third Party Brand	Pricing	Unit Price	Qty.	Extended Price	5 Years Maint.
Server Hardware							
SYS: Aquanta ES2025, w/ CDRom, 0 Proc, 0MB Mem	ES202151-GZN		1	$2,726	1	$2,726	$2,432
PROC: 550MHz Pentium III Xeon /512 Cache & VRM	XEO3550-512		1	$1,437	2	$2,874	$816
UPGRD: CPU Voltage Regulator Module	ES202151-XEU		1	$24	1	$24	
POWER: AC P/S 400W Tower	DSA400-PWR		1	$258	2	$516	$240
MEM: 256 MB Memory Upgrade	DIM10072-256		1	$848	4	$3,392	$960
CTRL: RAID 3-Ch PCI	RAD5003-P64		1	$1,400	4	$5,600	$1,920
MEM: 32MB Cache & Battery BU	RAD5323-MEB		1	$479	4	$1,916	$672
DISK: 4GB Drive, Ultra SCSI SCA	HDS417-W		1	$442	1	$442	$216
MONITOR:15-inch Color	EVG2100-P		1	$221	1	$221	
KEYBD: 104 Key Spacesaver	PCK104-SKB		1	$26	1	$26	
MOUSE: 2 Button PS2	PWM1-PS2		1	$15	1	$15	
					Subtotal	**$17,752**	**$7,256**
Storage Hardware							
DISK: 9GB Drive, 10K SCSI LVD, SCA	OSD9205-W45		1	$618	82	$50,676	spared
DISK: 9GB Drive, 10K SCSI LVD, SCA 10% spares	OSD9205-W45		1	$618	9		$5,562
CAB: Disk, 8 SCA w/ I/F cards, 0 Disks, 3U	OSM310300-L05		1	$2,118	12	$25,416	$11,520
CBL: SCSI 68-pin VHD Conn's, 5 meter	CBL134-5		1	$142	11	$1,562	
CBL: SCSI 68-pin VHD Conn's, 0.5 meter	CBL134-CAT		1	$69	1	$69	
ACC: Deskside Pedestal	OSM3000-DSK		1	$26	12	$312	
					Subtotal	**$78,035**	**$17,082**
Server Software							
Microsoft NT Server 4.0, Enterprise Edition, incl 25 CALs		Microsoft	2	$3,999	1	$3,999	$0
Microsoft SQL Server 7.0, Enterprise Edtion, unlimited user license		Microsoft	2	$28,999	1	$28,999	$10,475
					Subtotal	**$32,998**	**$10,475**
Client Hardware							
SYS: NetServer LC3, w/1 450MHz Proc & CDROM, 0MB Mem	D7029-AV		1	$1,660	1	$1,660	$1,635
PROC:1x450MHz Pentium II/512KB Cache UPG	D7032-AV		1	$993	1	$993	$360
MEM: 64 MB SDRAM Memory Upgrade	D6097-AV		1	$145	2	$290	
MEM: 128 MB SDRAM Memory Upgrade	D6098-AV		1	$255	2	$510	
DISK: 4GB SCSI 3.5 Internal	D4910-AV		1	$303	1	$303	$408
ETHERNET: 10/100TX Mbit/sec, PCI 32-bit	D5013-AV		1	$68	2	$136	
MONITOR:15-inch Color	EVG2100-P		1	$221	1	$221	
					Subtotal	**$4,113**	**$2,403**
Client Software							
Microsoft Windows NT Server 4.0, incl 5 CALs		Microsoft	2	$809	1	$809	$0
Microsoft Visual C++ Professional 6.0		Microsoft	2	$549	1	$549	$0
TUXEDO Core Functional Services 6.3 for NT		BEA	3	$3,000	1	$3,000	$2,400
					Subtotal	**$4,358**	**$2,400**
User Connectivity							
Ethernet Switch, 8-Port 100TX TrueFast + 10% spares	NX-SW8	Netlux	4	$229	4	$916	spared
Ethernet Hub, 8-Port 10Base-T (8+1 ports) + 10% spares	Z85094	General	5	$27	1127	$30,429	spared
					Subtotal	**$31,345**	**$0**
					Total	**$168,601**	**$39,616**
Unisys Service Pre-Pay Discount							**($4,193)**
Western Micro discount			1			**($7,382)**	

Notes:

1. HW Maintenance - First 36 months that are included in Unisys warranty are upgraded to service level: Standard Performance-Gold. Last 24 months are also at service level: Standard Performance-Gold.
2. All Microsoft maintenance is covered by the maintenance cost of Microsoft SQL Server.
3. 10% or minimum 2 spares are added in place of onsite service (products have a five year return-to-vendor warranty)
4. Pricing: 1 = Western Micro, 2 = Microsoft, 3 = BEA, 4 = Netlux, 5 = Software House Int'l

Five Year Cost of Ownership	**$196,642**
TPC-C Throughput	**10,265.90**
$/tpmC	**$19.15**

The benchmark results and test methodology were audited by Lorna Livingtree of Performance Metrics, Inc.

Prices used in TPC benchmarks reflect the actual prices a customer would pay for a one-time purchase of the stated components. Individually negotiated discounts are not permitted. Special prices based on assumption about past or future purchases are not permitted. All discounts reflect standard pricing policies for the listed components. For complete details, see the pricing sections of the TPC benchmarks specifications. If you find that the stated prices are not available according to these terms, please inform the TPC at pricing@tpc.org. Thank You.

NUMERICAL QUANTITIES SUMMARY
for
Unisys Aquanta ES2025 Server

MQTh, Computed Maximum Qualified Throughput: **10,265.90**
% throughput difference, reported & reproducibility runs: 0.13%

Transaction Mix

New Order	44.82%
Payment	43.03%
Delivery	4.03%
Stock-Level	4.06%
Order-Status	4.06%

Response Times

Transaction	Average	Maximum	90th %ile
New-Order	0.32	3.91	0.40
Payment	0.18	3.82	0.21
Delivery	0.12	0.63	0.13
Stock-Level	1.32	4.56	2.46
Order Status	0.22	1.18	0.26
Menu	0.11	3.08	0.12
Delivery (Deferred)	0.50	1.63	0.70

Response time delay added for emulated components (seconds)

RT Response time	0.1
Menu Response time	0.1

Keying/Think Time Times (seconds)

Transaction	Minimum	Average	Maximum
New-Order	18.00/0	18.01/12	18.02/120.3
Payment	3.00/0	3/12.02	3.01/120.3
Delivery	2.00/0	2/5.07	2/50.6
Stock-Level	2.00/0	2/5.08	2.01/50.6
Order-Status	2.00/0	2/10.05	2/100.71

Test Duration

Ramp up time	31 minutes
Measurement interval (M)	30 minutes
Transactions (all types) completed during measurement interval	687,149
Ramp-down time	79 minutes

Checkpointing:

Number of checkpoints	1
Checkpoint interval	30 minutes

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Figures

Tables

Document Structure

The TPC Benchmark C Standard Specification requires test sponsors to publish, submit to the TPC, and make available to the public, a full disclosure report for any result to be considered compliant with the specification. The required contents of the full disclosure report are specified in Clause 8.

This report is submitted to satisfy the specification's requirement for full disclosure. It documents the compliance of the benchmark implementation and execution reported for the Unisys Corporation Aquanta ES2025 Server using Microsoft SQL Server 7.0, Enterprise Edition, on Microsoft Windows NT 4.0, Enterprise Edition.

TPC Benchmark C Overview

The TPC Benchmark™ C Standard Specification Revision 3.4 was developed by the Transaction Processing Performance Council (TPC). It is the intent of the TPC to develop a suite of benchmarks to measure the performance of computer systems executing a wide range of applications. Unisys and Microsoft Corporations are active participants in the TPC to define and develop such a suite of benchmarks.

TPC Benchmark™ C (TPC-C) is an OLTP workload. It is a mixture of read-only and update intensive transactions that simulate the activities found in complex OLTP application environments. It does so by exercising a breadth of system components associated with such environments, which are characterized by:

- The simultaneous execution of multiple transaction types that span a breadth of complexity.
- On-line and deferred transaction execution modes.
- Multiple on-line terminal sessions.
- Moderate system and application execution time.
- Significant disk input/output.
- Transaction integrity (ACID properties).
- Non-uniform distribution of data access through primary and secondary keys.
- Databases consisting of many tables with a wide variety of sizes, attributes, and relationships.
- Contention on data access and update.

The performance metric reported by TPC-C is a "business throughput" measuring the number of orders processed per minute. Multiple transactions are used to simulate the business activity of processing an order, and each transaction is subject to a response time constraint. The performance metric for this benchmark is expressed in transactions-per-minute-C (tpmC). To be compliant with the TPC-C standard, all references to tpmC results must include the tpmC rate, the associated price-per-tpmC, and the availability date of the priced configuration.

Despite the fact that this benchmark offers a rich environment that emulates many OLTP environments, this benchmark does not reflect the entire range of OLTP requirements. In addition, the extent to which a customer can achieve the results reported by a vendor is highly dependent on how closely TPC-C approximates the customer application. The relative performance of systems derived from this benchmark does not necessarily hold for other workloads or environments. Extrapolations to any other environment are not recommended.

0. General Items

0.1. Order and Titles

The order and titles of sections in the Test Sponsor's Full Disclosure report must correspond with the order and titles of sections from the TPC-C standard specification (i.e., this document). The intent is to make it as easy as possible for readers to compare and contrast material in different Full Disclosure reports.

The order and titles of the sections in this report correspond with those from the TPC-C standard specification.

0.2. Executive Summary Statement

The TPC Executive Summary Statement must be included near the beginning of the Full Disclosure report.

The TPC Executive Summary Statement is included near the beginning of this report.

0.3. Numerical Quantities Summary

The numerical quantities listed below must be summarized near the beginning of the Full Disclosure Report :

- *measurement interval in minutes,*
- *number of checkpoints in the measurement interval,*
- *checkpoint interval in minutes,*
- *number of transactions (all types) completed within the measurement interval,*
- *computed Maximum Qualified Throughput in tpmC,*
- *percentage difference between reported throughput and throughput obtained in reproducibility run,*
- *ninetieth percentile, average and maximum response times for the New-Order, Payment, Order-Status, Stock-Level, Delivery (deferred and interactive) and Menu transactions,*
- *time in seconds added to response time to compensate for delays associated with emulated components,*
- *percentage of transaction mix for each transaction type.*

These numerical quantities are summarized near the beginning of this report.

0.4. Application Code Disclosure

The applicable program (as defined in Clause 2.1.7) must be disclosed. This includes, but is not limited to, the code implementing the five transactions and the terminal input and output functions.

Appendix A contains the client application code used in this TPC-C benchmark. Appendix B contains the SQL stored procedures which implement the TPC-C transactions.

0.5. Benchmark Sponsor

A statement identifying the benchmark sponsor(s) and other participating companies must be provided.

This TPC benchmark C was sponsored by Unisys Corporation. The benchmark test was developed by Microsoft and Unisys. The benchmark was conducted at Unisys, Mission Viejo, California.

0.6. Parameter Settings

Settings must be provided for all customer-tunable parameters and options which have been changed from the defaults found in actual products, including but not limited to:

- *Data Base tuning options*
- *Recovery/commit options*
- *Consistency/locking options*
- *Operating system and application configuration parameters*

Appendix C contains the configuration and system parameters used in running these TPC-C tests. It also contains all the client and server OS and SQL Server tunable parameters.

0.7. Configuration Diagrams

Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:

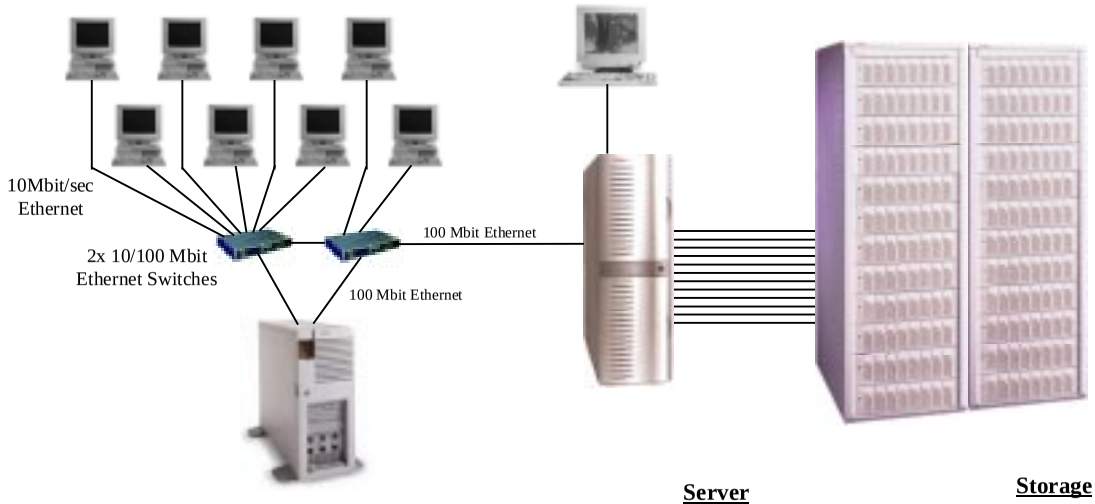
- *Number and type of processors.*
- *Size of allocated memory, and any specific mapping/partitioning of memory unique to the test.*
- *Number and type of disk units (and controllers, if applicable).*
- *Number of channels or bus connections to disk units, including their protocol type.*
- *Number of LAN (e.g., Ethernet) connections, including routers, workstations, terminals, etc., that were physically used in the test or are incorporated into the pricing structure (see Clause 8.1.8).*
- *Type and the run-time execution location of software components (e.g., DBMS, client processes, transaction monitors, software drivers, etc.).*

The Remote Terminal Emulator (RTE) software used for these TPC-C tests is proprietary to Unisys. The benchmarked configuration of the RTE and Aquanta ES2025 server is illustrated in Figure 0.1. Tables 4.3, 4.4 and 4.5 contain a detailed explanation of the disk configuration.

The priced configuration for the Aquanta ES2025 server is shown in Figure 0.2.

Figure 0.1: Benchmarked Configuration

Aquanta ES2025 Server - Benchmarked Configuration



8 RTEs
emulating 8,160 users
8 LANs w/ 1020 users each

Client
NetServer LC3
2x 450MHz Pentium® II CPU,
512 KB L2 cache,
384 MB memory,
1 x 3.97GB disk,
2 PCI Fast Ethernet adapters

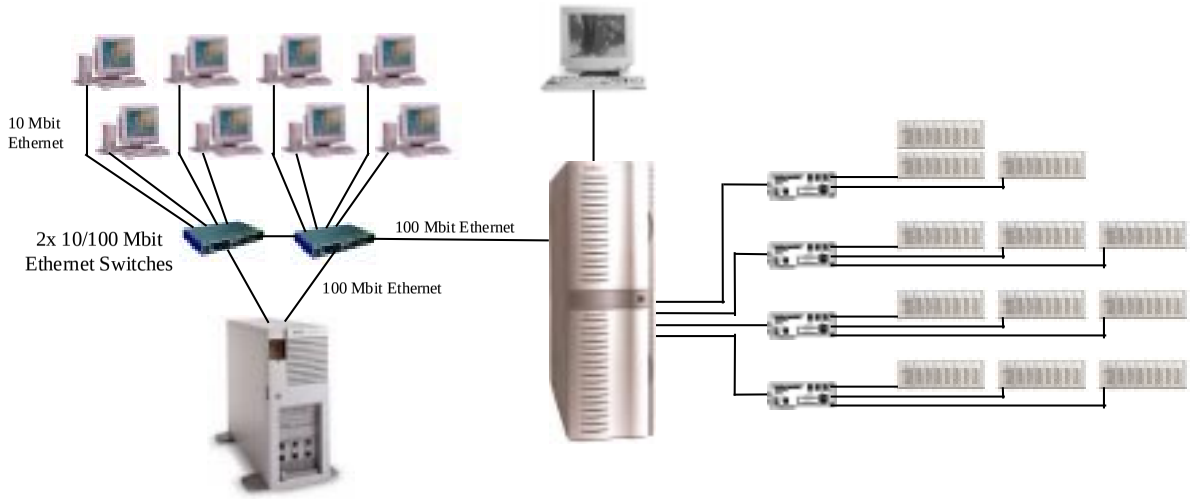
Server
Aquanta ES2025
2x Pentium® III Xeon 550MHz CPUs,
512KB L2 cache per CPU,
1 GB memory,
1 Internal SCSI controller,
1 Internal Fast Ethernet adapter,
1 x 8.54 GB internal SCSI disk,
4 PCI SCSI RAID controllers

Storage
OSM3000 SCSI Disks
76 x 8.54 GB data,
6 x 8.54 GB log,
8 x 8.54 GB unused,
14 x 8.54 GB backup

Figure 0.2: Priced Configuration

Aquanta ES2025 Server - Priced Configuration

8,160 PC's



Client
NetServer LC3
2x 450MHz Pentium® II CPU,
512 KB L2 cache,
384 MB memory,
1 x 3.97GB disk,
2 PCI Fast Ethernet adapters

Server
Aquanta ES2025
2x Pentium® III Xeon 550MHz CPUs,
512 KB L2 cache per CPU,
1 GB memory,
1 Internal SCSI controller,
1 Internal Fast Ethernet adapter,
1 x 4.24 GB internal SCSI disk,
4 PCI SCSI RAID controllers

Storage
OSM3000 SCSI Disks
76 x 8.54 GB data,
6 x 8.54 GB log

1. Clause 1: Logical Database Design

1.1. Table Definitions

Listings must be provided for all table definition statements and all other statements used to setup the data base.

Appendix B contains the SQL definitions of all the required database files, filegroups, tables, indexes and stored procedures, plus a listing of the program used to load the database and establish the required initial populations of each table.

1.2. Physical Organization of the Database

The physical organization of tables and indices, within the data base, must be disclosed.

The disk space was allocated to SQL Server according to the data in Tables 4.3, 4.4 and 4.5. The SQL definitions are contained in Appendix B.

1.3. Insert and/or Delete Operations

It must be ascertained that insert and/or delete operations to any of the tables can occur concurrently with the TPC-C transaction mix. Furthermore, any restriction in the SUT data base implementation that precludes inserts beyond the limits defined in Clause 1.4.11 must be disclosed. This includes the maximum number of rows that can be inserted and the maximum key value for these new rows.

There were no restrictions on insert and/or delete operations to any of the tables.

1.4. Partitioning

While there are few restrictions placed upon horizontal or vertical partitioning of tables and rows in the TPC-C benchmark, any such partitioning must be disclosed.

Partitioning was not used for any table in this implementation.

1.5. Replication, Duplication or Additions

Replication of tables, if used, must be disclosed.

Additional and/or duplicate attributes in any table must be disclosed along with a statement on the impact on performance.

No replications, duplications or additional attributes were used in this implementation.

2. Clause 2: Transaction & Terminal Profiles

2.1. Random Number Generation

The method of verification for the random number generation must be disclosed.

The drivers used the Unisys RTE program, which was independently audited. The initial population of the database was performed by the loader program from V4.01 of the Microsoft TPC-C toolkit, which was also independently audited. Furthermore, the auditor sampled various initial and runtime distributions produced by this implementation to verify correctness.

2.2. Input/Output Screen Layout

The actual layout of the terminal input/output screens must be disclosed.

The screen layouts are based on those in Clauses 2.4.3, 2.5.3, 2.6.3, 2.7.3. and 2.8.3 of the TPC Benchmark C Standard Specification. There are some minor differences in appearance due to the use of a web client implementation.

2.3. Priced Terminal Feature Verification

The method used to verify that the emulated terminals provide all the features described in Clause 2.2.2.4 must be explained. Although not specifically priced, the type and model of the terminals used for the demonstration in 8.1.3.3 must be disclosed and commercially available (including supporting software and maintenance).

This was verified by the auditor.

2.4. Presentation Managers or Intelligent Terminal

Any usage of presentation managers or intelligent terminals must be explained.

Application code running on the client implemented the TPC-C user interface. A listing of this code is included in Appendix A. No presentation manager was used on the client, as screen manipulation and data input/output was handled for each user by the Microsoft Internet Explorer web browser running on each user PC.

2.5. Transaction Statistics

The percentage of New-Order transactions that were rolled back as a result of an unused item number must be disclosed.

The number of items per order entered by New-Order transactions must be disclosed.

The percentage of home and remote Payment transactions must be disclosed.

The percentage of Payment and Order-Status transactions that used non-primary key (C_LAST) access to the database must be disclosed.

The percentage of Delivery transactions that were skipped as a result of an insufficient number of rows in the NEW-ORDER table must be disclosed.

The mix (i.e., percentages) of transaction types seen by the SUT must be disclosed.

Table 5.4 in Section 5 contains all these statistics.

2.6. Queuing Mechanism of Delivery

The queuing mechanism used to defer execution of the Delivery transaction must be disclosed.

Tuxedo provides the queue for delivery servers. The client application process posts delivery transactions to the delivery queue using a Tuxedo asynchronous call with the TPNoReply option. Upon return from this call, the client application provides a 'delivery queued' response to the user. Delivery servers independently retrieve messages from their queue, submit them to the data base for processing, and log the result to a file upon completion. The source code for this delivery process is included in Appendix A.

3. Clause 3: Transaction & System Properties

3.1. Transaction System Properties (ACID)

The results of the ACID tests must be disclosed along with a description of how the ACID requirements were met. This includes disclosing which case was followed for the execution of Isolation Test 7.

The TPC Benchmark C Standard Specification defines a set of transaction processing system properties that a system under test (SUT) must support during the execution of the benchmark. Those properties are Atomicity, Consistency, Isolation, and Durability (ACID).

This section defines each of these properties, describes the steps taken to ensure that they were present during the test and describes a series of tests done to demonstrate compliance with the specification. All ACID property tests were executed successfully.

3.2. Atomicity

The system under test must guarantee that data base transactions are atomic; the system will either perform all individual operations on the data, or will assure that no partially-completed operations leave any effects on the data.

3.2.1. Completed Transaction

Perform the Payment transaction for a randomly selected warehouse, district, and customer (by customer number) and verify that the records in the CUSTOMER, DISTRICT, and WAREHOUSE tables have been changed appropriately.

The balances from a randomly selected warehouse, district, and customer row were retrieved by customer number from a script. A Payment transaction was submitted with the same warehouse, district and customer identifiers for a known amount. After completion of the Payment transaction, the balances of the selected warehouse, district, and customer were again retrieved to verify that the changes had been made correctly.

3.2.2. Aborted Transactions

Perform the Payment transaction for a randomly selected warehouse, district, and customer (by customer number) and substitute a ROLLBACK of the transaction for the COMMIT of the transaction. Verify that the records in the CUSTOMER, DISTRICT, and WAREHOUSE tables have NOT been changed.

The balances from a randomly selected warehouse, district, and customer row were retrieved by customer number from a script. A Payment transaction was submitted with the same warehouse, district and customer identifiers that issued a ROLLBACK command rather than a COMMIT. After the transaction completed, the balances of the selected warehouse, district, and customer were again retrieved to verify that no changes had been made to the database.

3.3. Consistency

Consistency is the property of the application that requires any execution of a data base transaction to take the data base from one consistent state to another, assuming that the data base is initially in a consistent state.

The benchmark specification requires explicit demonstration of the following four consistency conditions:

1. The sum of the district balances in a warehouse is equal to the warehouse balance;
2. For each district, the next order id minus one is equal to maximum order id in the ORDER table and equal to the maximum new order id in the NEW ORDER table;
3. For each district, the maximum order id minus minimum order id in the ORDER table plus one equals the number of rows in the NEW-ORDER table for that district;
4. For each district, the sum of the order line counts in the ORDER table equals the number of rows in the ORDER-LINE table for that district;

In order to demonstrate this consistency, the following steps were taken:

1. Prior to the start of a benchmark run, the consistency of the database was verified by testing successfully conditions 1-4 described above with a script.
2. A run under full user load was executed for over 10 minutes with a checkpoint during the run.
3. After completion of that test, the consistency of the database was again verified by successfully testing using the same consistency script as in step 1.

3.4. Isolation

Sufficient conditions must be enabled at either the system or application level to ensure the required isolation defined above (clause 3.4.1) is obtained.

The benchmark specification defines seven required tests to be performed to demonstrate that required levels of transaction isolation are met. These tests, described in Clauses 3.4.2.1 - 3.4.2.7, were all performed from a script and verified by the auditor. In Isolation Test 7, Case A was observed. In addition, the phantom tests and stock level tests were executed and verified to be successful.

3.5. Durability

The tested system must guarantee durability: the ability to preserve the effects of committed transactions and insure data base consistency after recovery from any one of the failures listed in Clause 3.5.3.

Three durability tests were executed to satisfy the requirements of the specification. The test for loss of memory and instantaneous interruption was combined and performed with a fully scaled database with all emulated users. The loss of log and loss of data tests were performed on the same system, using a ten warehouse database with 100 emulated users. To the best of our knowledge, these tests prove that the fully scaled configuration used for the throughput test would also meet all durability tests.

3.5.1. Loss of Log Disk and Loss of Data Disk

The following steps were taken (using a ten warehouse database on the same system) to demonstrate durability in the case of loss of a log disk and of a data disk. Two extra log disks were used on the existing log controller. Two separate data disks were used on each of the other three existing data controllers.

1. The database was backed up to extra disks on a dump device.
2. The D_NEXT_O_ID fields for all rows in the district table were summed up to determine the initial count of orders present in the database.
3. The RTE was started with 100 users. On the driver systems, committed and rolled back New-Order transactions were recorded in a "success" file.
4. After five minutes of running at steady state, a hot-pluggable log disk was removed from the disk cabinet, with no effect on NT or SQL server.
5. After 5 additional minutes of operation, a hot-pluggable data disk was removed from the disk cabinet.
6. NT and SQL Server encountered IO errors due to the missing disk and recorded these errors in the NT event log and SQL Server error log, respectively. The RTEs also recorded errors.
7. First, the RTEs and clients were stopped, then SQL Server was used to take a dump of the transaction log to the dump device.
8. Next, SQL server was shutdown, then restarted, and scripts were executed to drop the database and all its devices. Then, SQL Server was shutdown again and the SUT shutdown.
9. A data disk was inserted in the disk cabinet to replace the one removed. The RAID controller was used to recreate the stripe set containing the new data disk. (The missing log drive was not replaced.)
10. The SUT was restarted, and Disk Administrator was used to assign the proper drive letter to the new volume. SQL Server was then restarted and a new (empty) database created as part of the restore database process. That process loaded the initial database into the new database, but did not perform any recovery. Next the transaction log was restored, followed by transaction recovery. The latter step restored all committed transactions to the database.
11. Consistency condition 3 of Clause 3.3.2.3 was executed to verify database consistency.
12. Step 2 was repeated to determine the total number of orders. This number was subtracted from the count obtained previously in Step 2 to determine the number of additional orders added to the database.
13. The contents of the "success" files on the drivers were sampled to verify that the records in the "success" file for committed New-Order transactions had corresponding records in the ORDER. Moreover, the counts were matched with those obtained in step 12.

3.5.2. Instantaneous Interruption and Loss of Memory

Instantaneous interruption and loss of memory tests were combined because the loss of power erased the contents of memory. This failure was induced by removing the primary power to the System Under Test while the benchmark was executing.

1. The D_NEXT_O_ID fields for all rows in the district table were summed up to determine the initial count of orders present in the database (count1).
2. On the driver systems, committed and rolled back New-Order transaction were recorded in a "success" file.
3. The benchmark was executed at full load with all emulated users for a minimum of 10 minutes.
4. The system's primary power was then turned off.
5. After transaction failures were noted by the RTEs, the RTEs and clients were shutdown.
6. Power was restored to the SUT, the system rebooted, SQL Server was restarted, and automatic database recovery was performed. The database recovery used the transaction log to reapply all committed transactions and rollback any (in progress) uncommitted transactions, so that the database disks were correct.
7. After recovery finished, Consistency Condition of Clause 3.3.2.3 (no gaps in NO_O_ID) was executed to verify that the database was consistent..

8. Next, samples of the contents of the “success” file from the drivers were compared against corresponding rows of the ORDER table to verify that records in the “success” file for committed New-Order transactions had corresponding records in the ORDER table.
9. Finally, step 1 was repeated to determine the total number of orders (count2). Count2 minus count1 was not less than the number of committed New-Order records in the “success” file.

4. Clause 4: Scaling & Database Population

4.1. Initial Cardinality of Tables

The Cardinality (e.g., the number of rows) of each table, as it existed at the start of the benchmark run, must be disclosed. If the database was over-scaled and inactive rows of the WAREHOUSE table were deleted (see Clause 4.2.2 and the Auditor's attestation letter) the cardinality of the WAREHOUSE table as initially configured and the number of rows deleted must be disclosed.

The TPC-C database for this test was configured with 816 warehouses. The cardinality of each table in the database is listed in Table 4.1

Table 4.1: Initial Cardinality of Database Table

Table	Occurrences
Warehouse	816
District	8,160
Customer	24,480,000
History	24,480,000
Order	24,480,000
New-Order	7,344,000
Order Line	244,803,773
Stock	81,600,000
Item	100,000

No rows were deleted from the warehouse table before executing the measurement runs.

4.2. Constant Values

The following values were used as the constant C input values to the NURand function during Build and Run time for this implementation.

Table 4.2: Constant C for NURand

Function	Value
C_LAST (Build)	123
C_LAST (Run)	208

4.3. Database Layout

The distribution of tables and logs across all media must be explicitly depicted for the tested and priced systems.

Tables 4.3, 4.4 and 4.5 list the distribution of the database over 76 disks and the transaction log over 3 mirrored pairs of 9GB disks for the benchmark configuration. In addition, there was one disk containing Windows NT Enterprise Edition and SQL Server Enterprise Edition code and the Master database plus the paging file. The 10 warehouse durability database used 8 extra disks which were not active during the benchmark and were excluded from the priced configuration. Backup used another 14 disks which also were not active during the benchmark and were excluded from the priced configuration. Except for those items, the tested and priced disk configurations were identical.

4.4. DBMS: Data Model and DBMS Interface/Access Language

A statement must be provided that describes:

1. *The data model implemented by the DBMS used (e.g., relational, network, hierarchical).*

2. *The database interface (e.g., embedded, call level) and access language (e.g., SQL, DL/1, COBOL, read/write) used to implement the TPC-C transactions. If more than one interface/access language is used to implement TPC-C, each interface/access language must be described and a list of which interface/access language is used with which transaction type must be disclosed.*

Microsoft SQL Server 7.0, Enterprise Edition is a relational DBMS.

The client software interfaced to SQL Server through Stored Procedures invoked through Remote Procedure Calls embedded in the C application code. Specifically, DBLIB and TCP/IP sockets were used.

4.5. DBMS Partitions/Replications

The mapping of database partitions/replications must be explicitly described.

No table partitioning or replication was done.

4.6. DBMS Space Requirements

Details of the 180 day space computation along with proof that the database is configured to sustain 8 hours of growth for dynamic tables (Order, Order-line, and History) must be disclosed (see Clause 4.2.3).

Appendix E lists the space requirements for the 180-day space as well as the logical log space for eight hours.

Table 4.3: Disk Cage Configuration

Disk Cage Configuration										
Adapter	**Channel**	**Id**	**Id**	**Id**	**Id**	**Id**	**Id**	**Id**	**Id**	**Rack #**
1	**0**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	empty	empty	1
	1	**0**	**1**	**2**	**3**	**4**	**5**	**6**		
		9GB	9GB	9GB	9GB	9GB	9GB	empty		2
		8	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	empty	empty	3
	2	**0**	**1**	**2**	**3**	**4**	**5**	**6**		
		9GB	9GB	9GB	9GB	9GB	9GB	9GB		*
		8	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	empty	*
2	**0**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	4
	1	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	5
	2	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	6
3	**0**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	7
	1	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	8
	2	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	9
4	**0**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	10
	1	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	11
	2	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	
		9GB	9GB	9GB	9GB	9GB	9GB	9GB	9GB	12

Table 4.4: RAID Adapter Disk Configuration

RAID Adapter Disk Configuration						
Adapter	ID	Channel 0	Channel 1	Channel 2	RAID Configuration	Drive Letters
1	0		C0	A0	Configure Packs A-B as RAID 5 (backup)	G:
	1		C1	A1		
	2		C2	A2	Configure Packs C-D as RAID 0 (data)	H:, I:
	3		C3	A3		
	4		C4	A4		
	5		H0	A5		
	6			A6		
	8	E0	D0	B0	Configure Packs E-G as RAID 10 (log)	L:
	9	E1	D1	B1		
	10	F0	D2	B2		
	11	F1	D3	B3		
	12	G0	D4	B4		
	13	G1	H1	B5	Configure Pack H as RAID 1 (log tpcc10)	W:
	14			B6		
	15					
2	8	A0	B2	C4	Configure Packs A-B as RAID 0 (data)	J:, K:
	9	A1	B3	D0		
	10	A2	B4	D1		
	11	A3	B5	D2		
	12	A4	C0	D3	Configure Packs C-D as RAID 0 (data)	M:, N:
	13	A5	C1	D4		
	14	B0	C2	E0	Configure Pack E as RAID 0 (data tpcc10)	X:
	15	B1	C3	E1		
3	8	A0	B2	C4	Configure Packs A-B as RAID 0 (data)	O:, P;
	9	A1	B3	D0		
	10	A2	B4	D1		
	11	A3	B5	D2		
	12	A4	C0	D3	Configure Packs C-D as RAID 0 (data)	Q:, R:
	13	A5	C1	D4		
	14	B0	C2	E0	Configure Pack E as RAID 0 (data tpcc10)	Y:
	15	B1	C3	E1		
4	8	A0	B2	C4	Configure Packs A-B as RAID 0 (data)	S:, T:
	9	A1	B3	D0		
	10	A2	B4	D1		
	11	A3	B5	D2		
	12	A4	C0	D3	Configure Packs C-D as RAID 0 (data)	U:, V:
	13	A5	C1	D4		
	14	B0	C2	E0	Configure Pack E as RAID 0 (data tpcc10)	Z:
	15	B1	C3	E1		

Table 4.5: Disk Administrator Configuration

Disk Administrator Configuration			
Disk 0 8676 MB	C: FAT 2047 MB	D: NTFS 2996 MB	 free space 3632 MB
Disk 1 104976 MB	G: Backup NTFS 104976 MB		 free space 0 MB
Disk 2 87480 MB	H: unknown 6805 MB	I: unknown 3405 MB	 free space 77270 MB
Disk 3 26244 MB	L: unknown 25200 MB		 free space 1044 MB
Disk 4 8748 MB	W: (log tpcc10) unknown 1005 MB		 free space 7743 MB
Disk 5 104976 MB	J: unknown 6805 MB	K: unknown 3405 MB	 free space 94766 MB
Disk 6 87480 MB	M: unknown 6805 MB	N: unknown 3405 MB	 free space 77270 MB
Disk 7 17496 MB	X: (data tpcc10) unknown 1005 MB		 free space 16491 MB
Disk 8 104976 MB	O: unknown 6805 MB	P: unknown 3405 MB	 free space 94766 MB
Disk 9 87480 MB	Q: unknown 6805 MB	R: unknown 3405 MB	 free space 77270 MB
Disk 10 17496 MB	Y: (data tpcc10) unknown 1005 MB		 free space 16491 MB
Disk 11 104976 MB	S: unknown 6805 MB	T: unknown 3405 MB	 free space 94766 MB
Disk 12 87480 MB	U: unknown 6805 MB	V: unknown 3405 MB	 free space 77270 MB
Disk 13 17496 MB	Z: (data tpcc10) unknown 1005 MB		 free space 16491 MB
CD-ROM 0	F:		

5. Clause 5: Performance Metrics & Response Time

5.1. Measured Throughput (tpmC)

Measured tpmC must be reported.

The measured tpmC was 10,265.90.

5.2. Response Times

Ninetieth percentile, maximum and average response times must be reported for all transaction types as well as for the Menu response time.

Table 5.1: Response Time Data

Transaction	Average	Maximum	90th %ile
New-Order	0.32	3.91	0.40
Payment	0.18	3.82	0.21
Delivery	0.12	0.63	0.13
Stock-Level	1.32	4.56	2.46
Order Status	0.22	1.18	0.26
Menu	0.11	3.08	0.12
Delivery (Deferred)	0.50	1.63	0.70

5.3. Keying and Think Times

The minimum, the average, and the maximum keying and think times must be reported for each transaction type.

Table 5.2: Keying Times

Transaction	Minimum	Average	Maximum
New-Order	18.00	18.01	18.02
Payment	3.00	3.00	3.01
Delivery	2.00	2.00	2.00
Stock-Level	2.00	2.00	2.01
Order Status	2.00	2.00	2.00

Table 5.3: Think Times

Transaction	Minimum	Average	Maximum
New-Order	0.00	12.00	120.30
Payment	0.00	12.02	120.30
Delivery	0.00	5.07	50.60
Stock-Level	0.00	5.08	50.60
Order Status	0.00	10.05	100.71

5.4. Response Time Frequency Distribution Curves

Response Time frequency distribution curves (see Clause 5.6.1) must be reported for each transaction type.

Figure 5.1: New Order Response Time Distribution

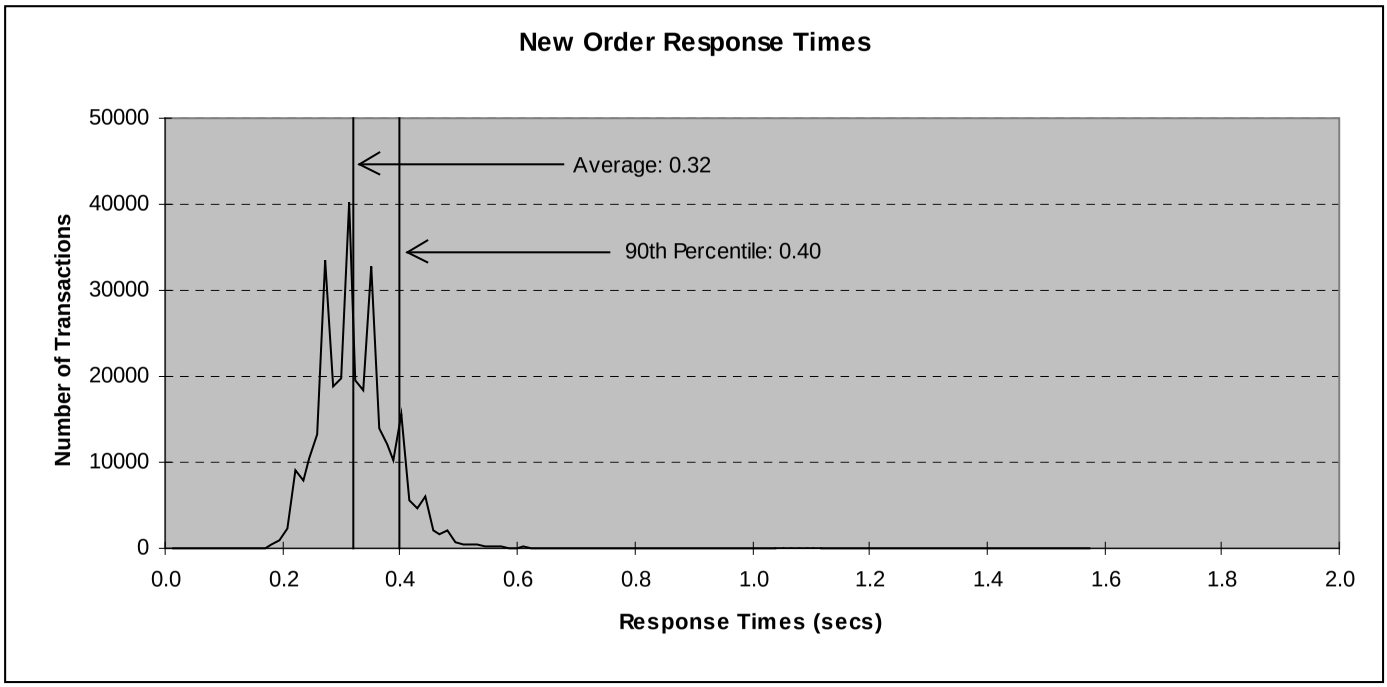


Figure 5.2: Payment Response Time Distribution

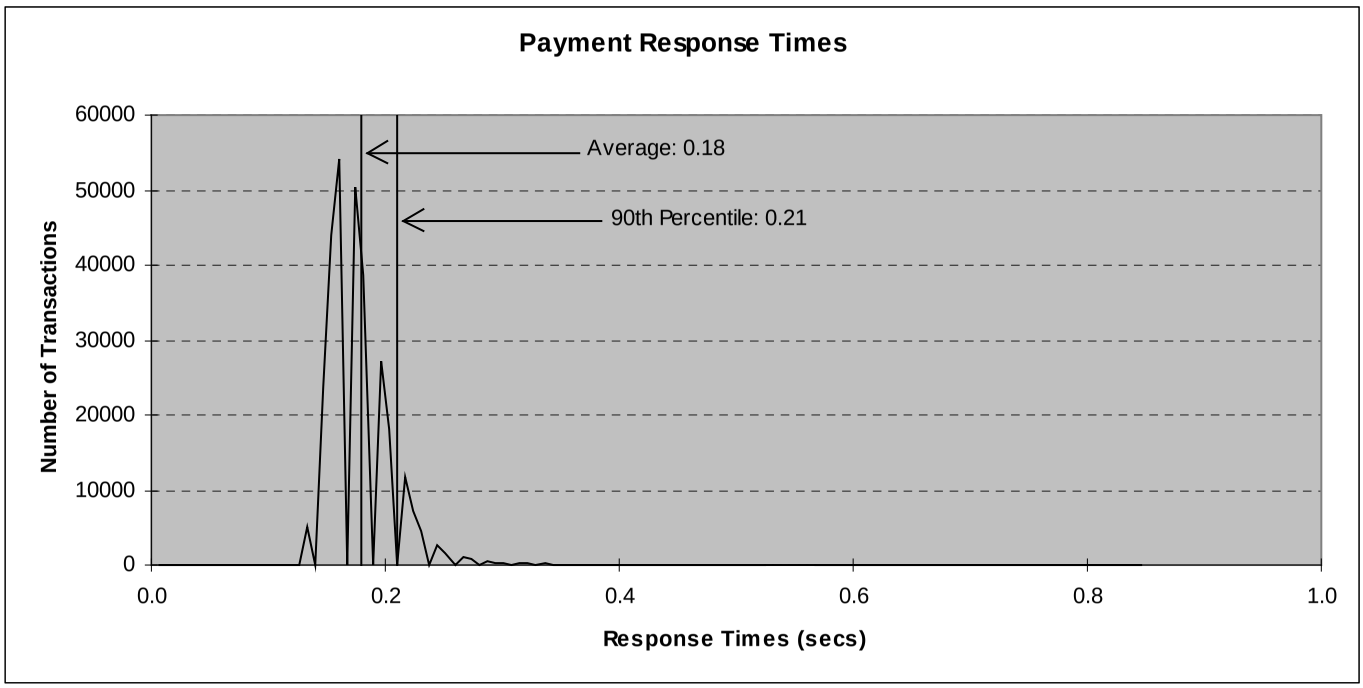


Figure 5.3: Order Status Response Time Distribution

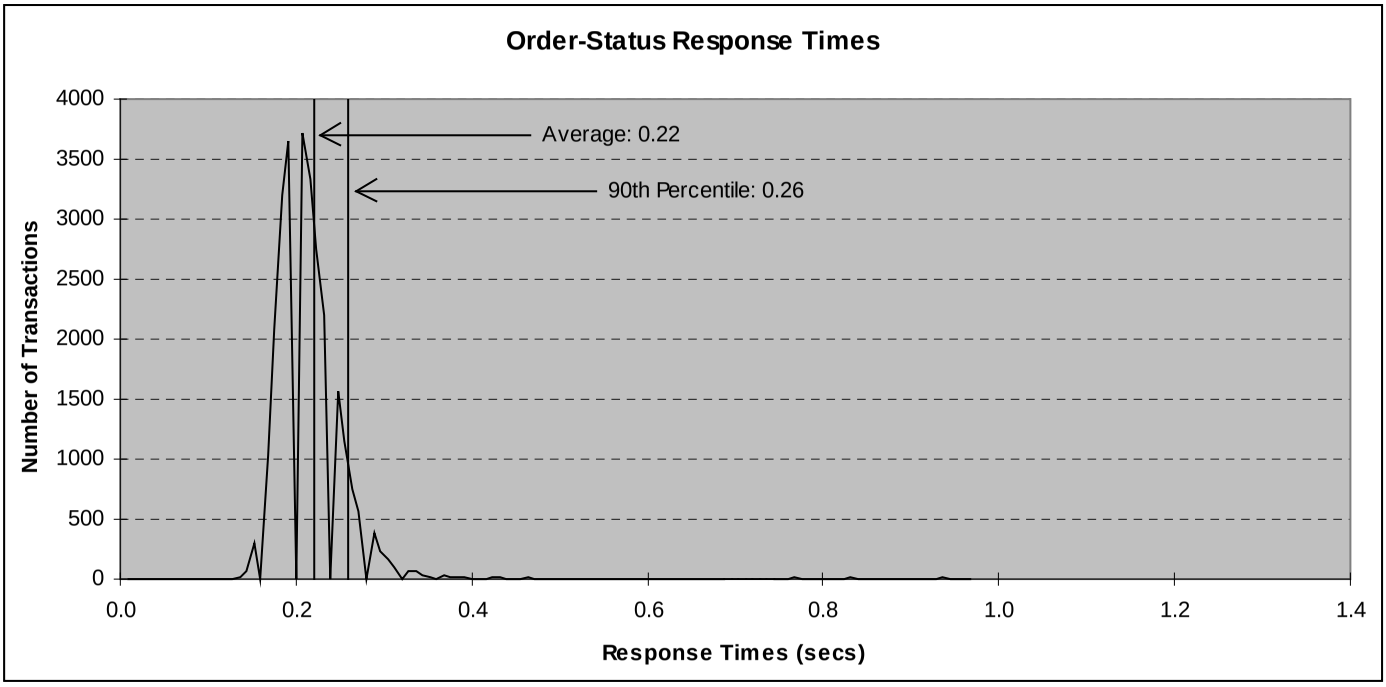


Figure 5.4: Delivery Response Time Distribution

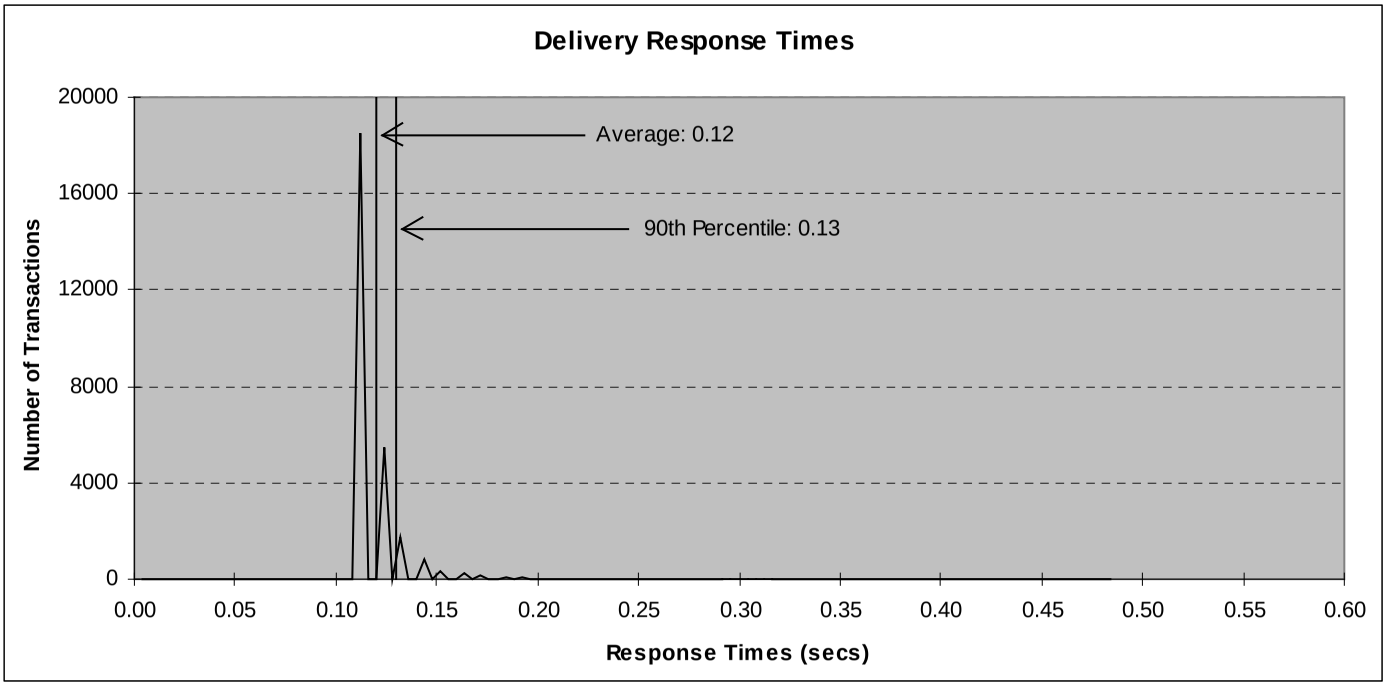
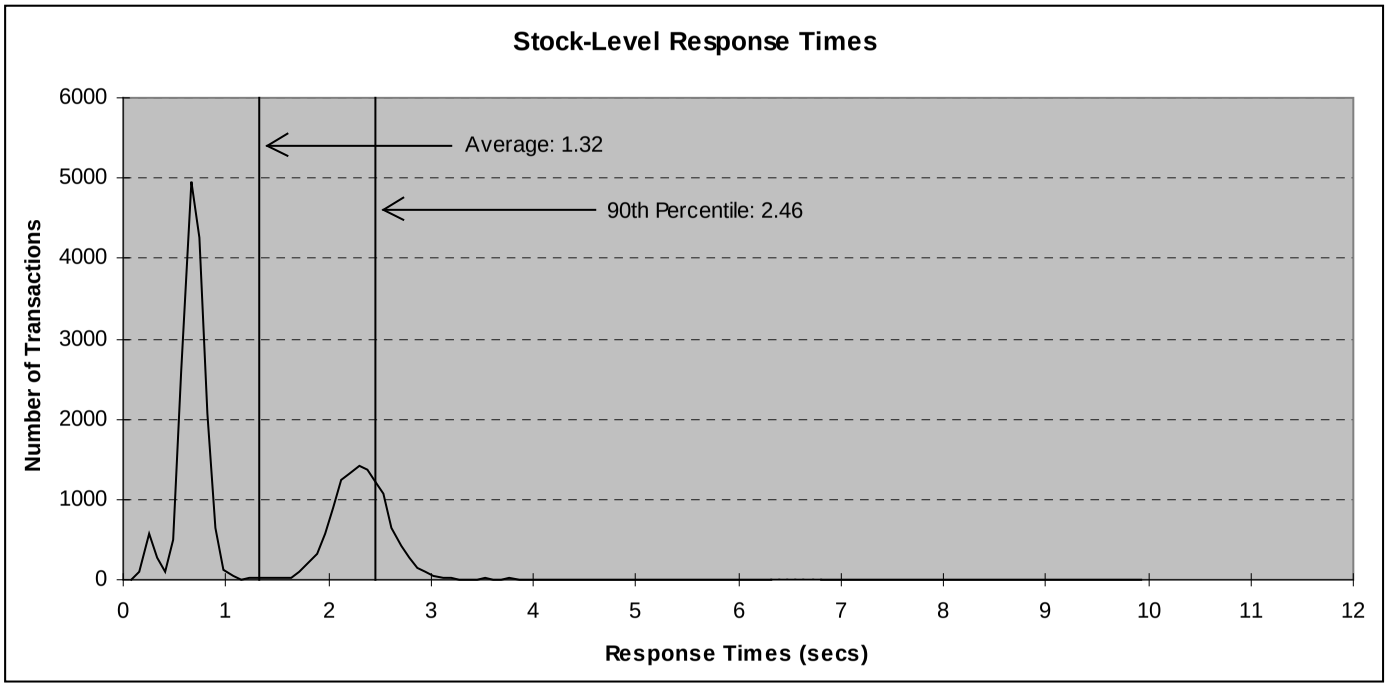


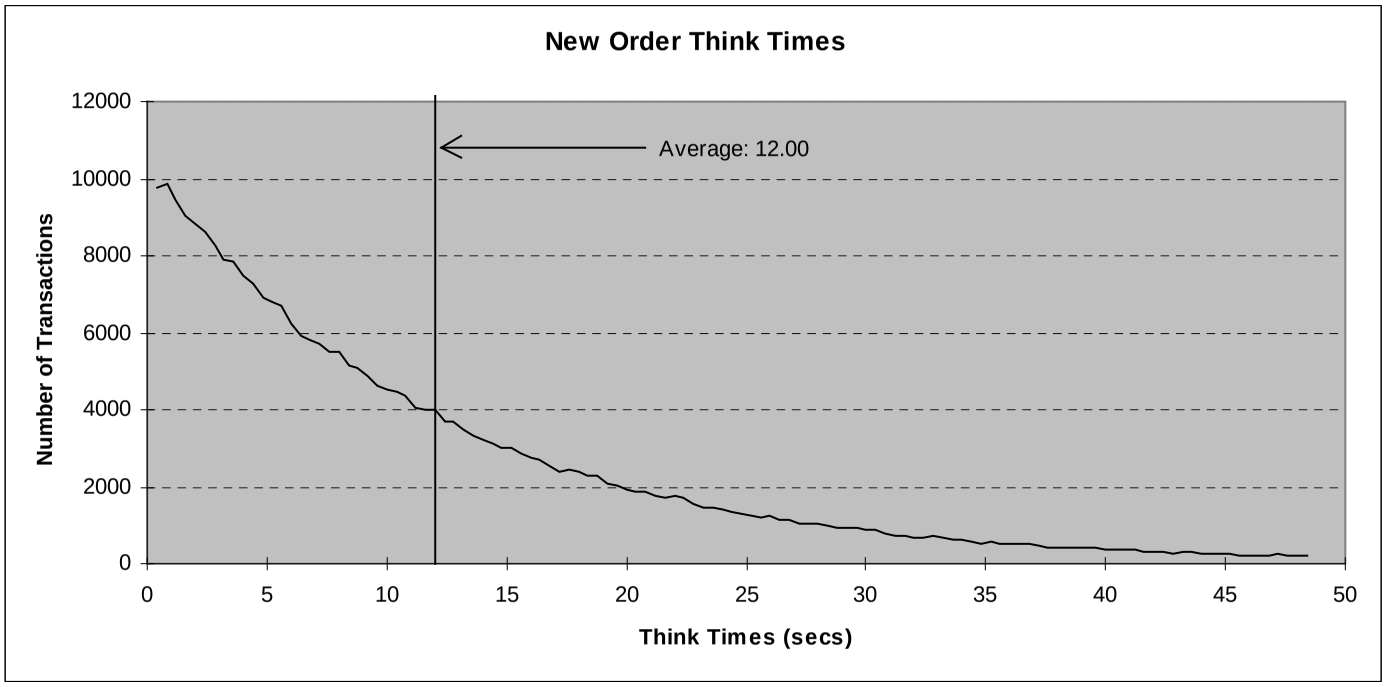
Figure 5.5: Stock Level Response Time Distribution



5.5. New Order Think Time Frequency Distribution Curve

Think Time frequency distribution curve (see Clause 5.6.3) must be reported for the New-Order transaction.

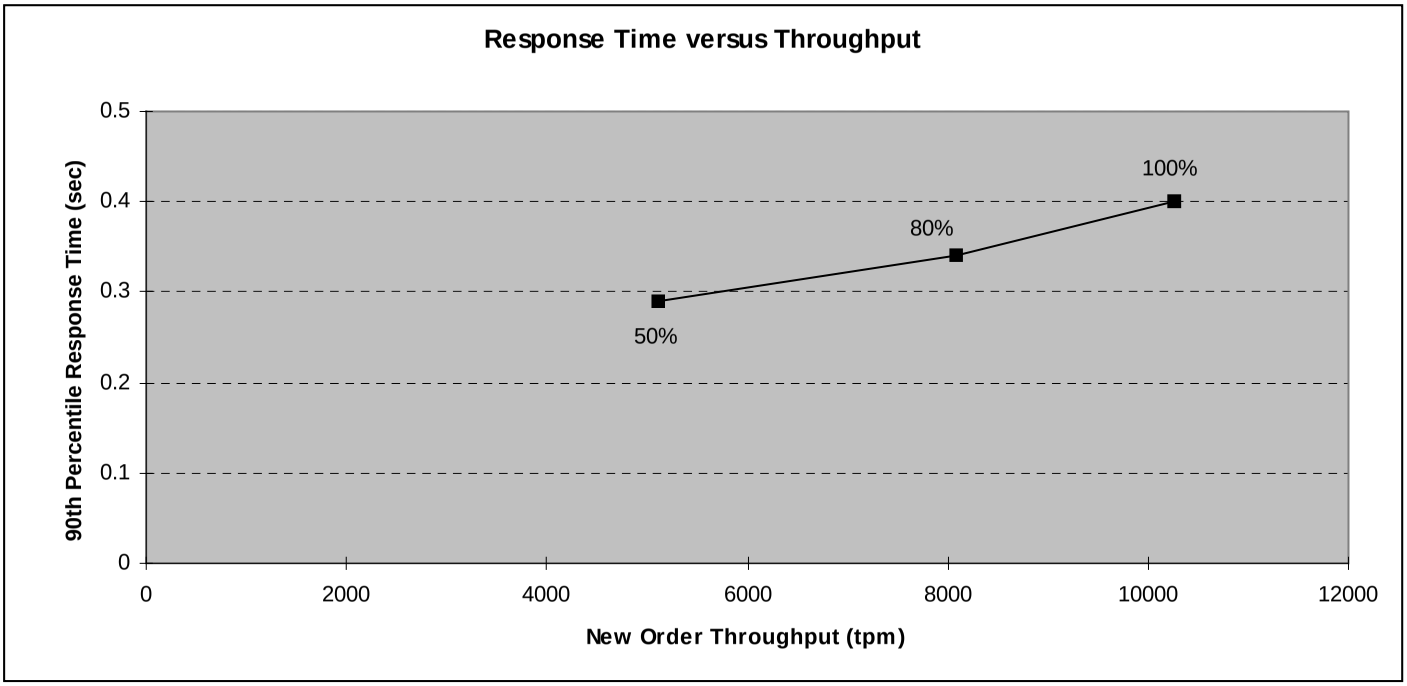
Figure 5.6: New Order Think Time Distribution



5.6. Response Time versus Throughput Performance Curve

The performance curve for response times versus throughput (Clause 5.6.2) must be reported for the New-Order transaction

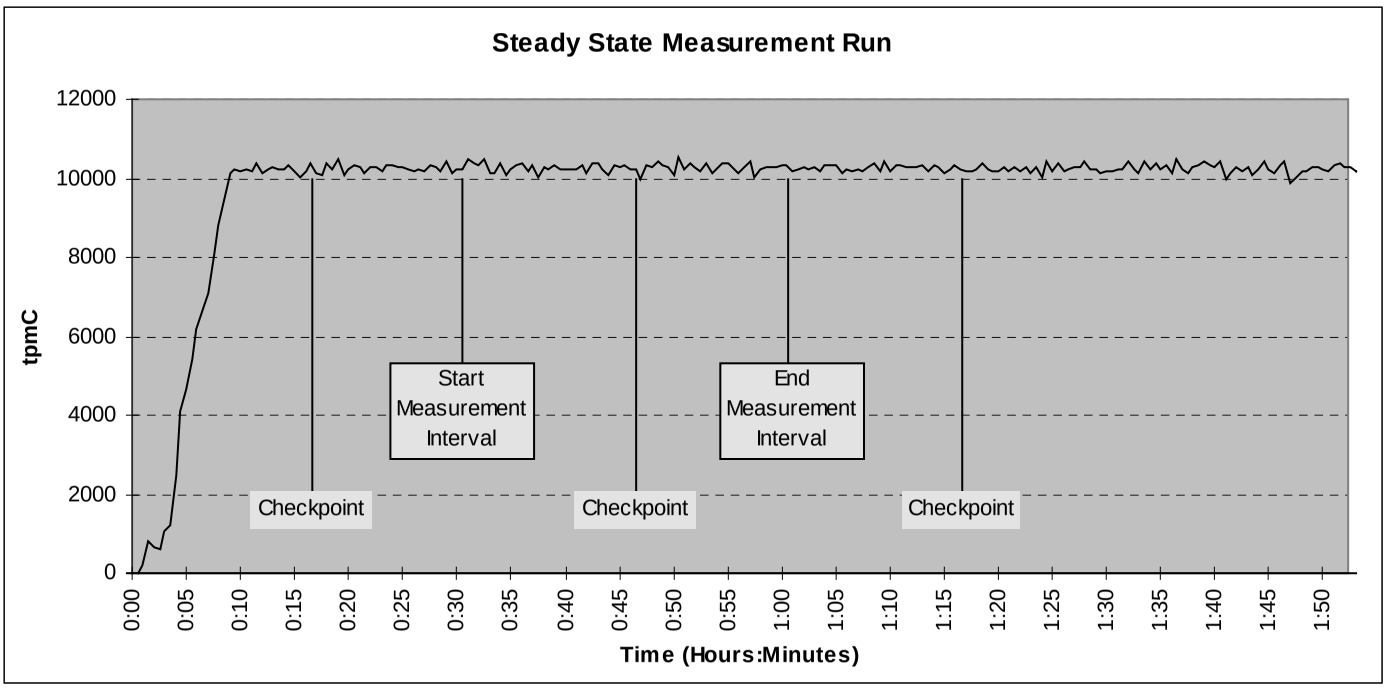
Figure 5.7: Response Time versus Throughput



5.7. New-Order Throughput vs. Time

A graph of throughput versus elapsed time (Clause 5.6.5) must be reported for the New-Order transaction.

Figure 5.8: Throughput (tpmC) versus Time



5.8. Determination of "Steady State"

The method used to determine that the SUT had reached a steady state prior to commencing the measurement interval (see Clause 5.5) must be described.

The transaction throughput rate (tpmC) and response time were relatively constant after the initial 'ramp up' period. The throughput and response time behavior were determined by examining data reported for each 30-second interval over the duration of the benchmark. Ramp-up and steady state are discernible in the graph presented in Figure 5.8.

5.9. Work Performed During Steady State

A description of how the work normally performed during a sustained test (for example checkpointing, writing redo/undo log records, etc.) actually occurred during the measurement interval must be reported.

The RTE selects a transaction type from the menu and prepares to request the appropriate blank form. A timestamp is taken before the form request is sent and after the response is returned. The difference between the two is saved off as the menu response time. The RTE then generates input data for the transaction to create a completed form and waits the appropriate key time. A timestamp is taken before the completed form is sent and after the response is returned. The difference between these two is saved off as the transaction response time. Both response times are padded with a 0.1 second delay per spec to account for the web browser delay. The appropriate transaction data and response times are logged and the RTE waits the required think time interval before repeating the process. Each RTE driver maintains its own log file. Log file contents are consolidated for the reports.

The RTE emulates web browsers (not terminals) in this client-server implementation. The RTE sends and receives HTML formatted data using HTTP through Ethernet LANs to a client application running on the client machine. The client application processes the request, sends the transaction to a Tuxedo TPC-C application server queue, waits for the transaction response (except for delivery), and returns an appropriately formatted HTML form back to the (emulated) web browser (RTE). The Tuxedo TPC-C application server retrieves a message from its queue, invokes request processing via a stored procedure on the database server using Microsoft SQL Server DBLIB and RPC through sockets over another Ethernet LAN, accepts the response, and returns a result to the client application (via Tuxedo). For delivery transactions, the client application does not wait for the Tuxedo TPC-C delivery server to respond. Each delivery server logs its results to its own file. The delivery report files are consolidated for reports.

To perform checkpoints at specific intervals, SQL Server's checkpoint interval was set to the maximum allowable value and a utility was written to schedule checkpoints at parameter-specified intervals and record the start and end time of each checkpoint. The checkpoint script was started manually on one of the client machines after the RTE had all users logged in and sending transactions and a steady state had been achieved. Using this information, the positioning of the checkpoint within the measurement interval was verified to be clear of the guard zones.

At each checkpoint, SQL Server wrote to disk all database pages in memory that had been updated but not yet physically written to the disk. Upon completion of the checkpoint, SQL Server also wrote records to the transaction log indicating that a checkpoint had completed.

5.10. Reproducibility

A description of the method used to determine the reproducibility of the measurement results must be reported.

In a repeat test, carried out in the same manner as the primary test, a throughput of 10,252.47 tpmC was achieved on the same database during a 30-minute, steady state run. All required transaction statistics were met. See the Auditor's attestation letter for details.

5.11. Measurement Interval Duration

A statement of the duration of the measurement interval for the reported Maximum Qualified Throughput (tpmC) must be included.

The measurement interval was 30 minutes.

5.12. Regulation of Transaction Mix

The method of regulation of the transaction mix (e.g. card decks or weighted random distribution) must be described. If weighted distribution is used and the RTE adjusts the weights associated with each transaction type, the maximum adjustments to the weight from the initial value must be disclosed.

The RTE was given a weighed random distribution which could not be adjusted during the run.

5.13. Transaction Statistics

The percentage of the total mix for each transaction type must be disclosed.

The percentage of New-Order transactions rolled back as a result of invalid item number must be disclosed.

The average number of order-lines entered per New-Order transaction must be disclosed.

The percentage of remote order-lines entered per New-Order transaction must be disclosed.

The percentage of remote Payment transactions must be disclosed.

The percentage of customer selections by customer last name in the Payment and Order-Status transactions must be disclosed.

The percentage of Delivery transactions skipped due to there being fewer than necessary orders in the New-Order table must be disclosed.

Table 5.4 shows this information.

Table 5.4: Transaction Statistics

Transaction Type	Statistics	Value
New Order	Rolledback transactions	0.99%
	Home warehouse	99.01%
	Remote warehouse	0.99%
	Average Items per Order	10.00
Payment	Home warehouse	84.94%
	Remote warehouse	15.06%
	Non-primary key access	59.98%
Order Status	Non-primary key access	60.06%
Delivery	Skipped transactions (Interactive)	0
	Skipped transaction counts (Deferred)	0
	Skipped District counts (Deferred)	0
Transaction Mix	New Order	44.82%
	Payment	43.03%
	Delivery	4.03%
	Stock-Level	4.06%
	Order-Status	4.06%

5.14. Checkpoint Statistics

The number of checkpoints in the measurement interval, the time in seconds from the start of the measurement interval to the first checkpoint, and the Checkpoint Interval must be disclosed.

There is one checkpoint in the measurement interval. The checkpoint starts 965 seconds into the measurement interval. The checkpoint interval is 30 minutes (from the start of one to the start of the next) and a checkpoint lasts approximately 0.4 minutes. In conformance with Clause 5.2.2 there is no checkpoint within a span of 7.5 minutes before or after the beginning or end of the measurement interval.

6. Clause 6: SUT, Driver & Communications Definition

6.1. Remote Terminal Emulator (RTE) Description

The RTE input parameters, code fragments, functions, etc. used to generate each transaction input field must be disclosed.

The RTE used is proprietary to Unisys. Appendix D contains the profile used as input to this RTE.

6.2. Emulated Components

It must be demonstrated that the functionality and performance of the components being emulated in the Driver System are equivalent to that of the priced system.

There were no emulated components in the benchmark configuration other than the emulated web browsers on the users' PCs.

6.3. Functional Diagrams

A complete functional diagram of both benchmark and the configuration of the proposed (target) system must be disclosed. A detailed list of all hardware and software functionality being performed on the Driver System and its interface to the SUT must be disclosed.

Section 0.7 describes and shows functional diagrams of the benchmarked and priced systems.

6.4. Network Configuration

The network configuration of both the tested and proposed (target) services which are being represented and a thorough explanation of exactly which parts are being replaced with the Driver System must be disclosed.

Figures 0.1 and 0.2 in Section 0.7 also diagram the network configurations of the benchmark and configured systems and represent the RTEs connected via LAN replacing the user PCs that are directly connected via LAN.

6.5. Network Bandwidth

The bandwidth of the network(s) used in the tested/priced configuration must be disclosed.

Ethernet local area networks (LAN) are used in the priced and tested configurations. The database server (SUT) contains a single inbuilt 10/100 megabit per second LAN adapter. This LAN segment runs at 100 megabits per second in both the priced and tested configurations. The client contains two 10/100 megabit per second LAN adapters. Both LAN segments run at 100 megabits per second in the priced and tested configurations. Eight user LAN segments run at 10 megabits per second in both the priced and tested configurations. Two eight port 10/100 megabit per second switches were concatenated and used to connect the client to users and the database server. In the priced configuration, the client is connected to workstations (PCs running web browsers). In the tested configuration, the client is connected to RTE driver systems emulating web browsers.

6.6. Operator Intervention

If the configuration requires operator intervention (see Clause 6.6.6), the mechanism and the frequency of this intervention must be disclosed.

No operator intervention was required to sustain eight hours of operation at the reported throughput.

7. Clause 7: Pricing

7.1. Pricing

A detailed list of hardware and software used in the priced system must be reported. Each separately orderable item must have vendor part number, description, and release/revision level, and either general availability status or committed delivery date. If package-pricing is used, vendor part number of the package and a description uniquely identifying each of the components of the package must be disclosed. Pricing source(s) and effective date(s) must also be reported.

The total 5-year price of the entire configuration must be reported, including: hardware, software, and maintenance charges. Separate component pricing is recommended. The basis of all discounts used must be disclosed.

System pricing should include subtotals for the following components: Server Hardware, Server Software, Client Hardware, Client Software, and Network Components used for terminal connection (see Clause 7.2.2.3). Clause 6.1 describes the Server and Client components.

System pricing must include line item indication where non-sponsoring companies' brands are used. System pricing must also include line item indication of third party pricing.

A detailed list of hardware and software components along with their part numbers and prices are given in the Executive Summary near the beginning of this document.

7.1.1. System Pricing

Each priced configuration consists of an integrated system package, additional options, and components. Prices for all products are US list prices. A three year warranty is standard with this class of Unisys server products.

7.1.2. Maintenance Pricing

The five year support pricing for Unisys Corporation Open Business Server products is based on a 36-month warranty on hardware, upgraded to service level Performance-Gold, plus an additional 24 months of support at service level Performance-Gold. Microsoft and BEA support pricing is based on 5 years of annual support costs.

Unisys Corporation Standard Performance-Gold Support: four hour maximum response, onsite support for hardware provides service from 8:00 A.M. to 5:00 P.M., Monday through Friday. Service requests made as late as 5:00 P.M. will receive a response the same day.

Server disks are covered by Western Micro's 5 year, seven day return-to-factory warranty, and appropriate spares are included in the priced configuration. Netlux and Sofware House provide 5 year, seven day return-to-factory warranties, and appropriate spares are included in the priced configuration.

7.1.3. Discounts

Unisys provides a standard pre-pay discount for maintenance service of the client, server and storage components of the priced configuration.

Western Micro provides a standard dollar-volume discount to the client, server and storage components of the priced configuration.

7.2. Availability

The committed delivery date for general availability (availability date) of products used in the price calculation must be reported. When the priced system includes products with different availability dates, the reported availability date for the priced system must be the date at which all components are committed to be available.

The hardware, software and support/maintenance products priced in this benchmark are detailed on page vi.

Microsoft SQL Server 7.0, Enterprise Edition SP2 will be available by September 30, 1999. All other components are available now.

7.3. Measured tpmC, Pricing, Price/Performance, and Availability Date

A statement of the measured tpmC as well as the respective calculations for the 5-year pricing, price/performance (price/tpmC), and the availability date must be included.

The measured tpmC, plus pricing calculations, price/performance, and availability are shown on pages v and vi.

7.4. Country-Specific Pricing

Additional Clause 7 related items may be included in the Full Disclosure Report for each country specific priced configuration. Country specific pricing is subject to Clause 7.1.7.

None.

7.5. Usage Pricing

For any usage pricing, the sponsor must disclose:

- *Usage level at which the component was priced.*
- *A statement of the company policy allowing such pricing.*

The component pricing based on usage is shown below:

- One (1) Microsoft Windows NT Server 4.0, Enterprise Edition license
- One (1) Microsoft SQL Server 7.0, Enterprise Edition license
- One (1) Microsoft Windows NT Server 4.0 License
- One (1) Microsoft Visual C++ Professional 6.0
- One (1) BEA Tuxedo 6.3 CFS for NT licenses

Microsoft SQL Server & Internet Information Server and BEA Tuxedo were priced for an unlimited number of users.

8. Clause 8 : Full Disclosure Availability

8.1. Availability

The Full Disclosure Report must be readily available to the public at a reasonable charge, similar to charges for similar documents by that test sponsor.

Copies of this Full Disclosure Report may be downloaded from the Transaction Processing Performance Council web site at www.tpc.org or obtained by contacting:

TPC Benchmark Administrator
Systems Analysis, Modeling & Measurement Group
Unisys Corporation, M/S 262
25725 Jeronimo Road
Mission Viejo, CA 92691
USA

9. *Clause 9 : Audit*

9.1. Auditor's Report

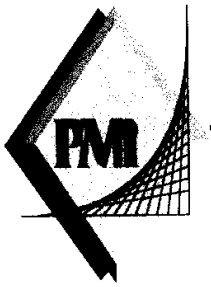
The auditor's name, address, phone number and a copy of the auditor's attestation letter indicating compliance must be included in the Full Disclosure Report.

This implementation of the TPC Benchmark C on the Unisys Aquanta ES2025 Server was audited by Lorna Livingtree, a TPC certified auditor of:

Performance Metrics, Inc.
137 Yankton St. Suite 101
Folsom, CA 95630

Phone: (916) 985-1131
Fax: (916) 985-1185
e-mail: Lorna@PerfMetrics.com

The attestation letter is shown on the next 2 pages.



PERFORMANCE METRICS INC.
TPC Certified Auditors

September 3, 1999

Mr. Jerrold Buggert
Director of Modeling and Measurement
Unisys Corporation
25725 Jeronimo Road
Mission Viejo, CA 92691

I have verified the TPC Benchmark™ C client/server for the following configuration:

Platform: Unisys Aquanta ES2025 Server
Database Manager: Microsoft SQL Server Enterprise Edition 7.0
Operating System: Microsoft Windows NT Enterprise Edition 4.0
Transaction Monitor: Tuxedo 6.3 CFS

Server: Aquanta ES2025				
CPU's	Memory	Disks	90% Response	TpmC
2 Pentium III Xeon @ 550 Mhz	Main: 1024 MB Cache: 512 KB	1 @ 4.24 GB 104 @ 8.54 GB	0. 40 sec	10,265.90
1 Client: NetServer LC3				
2 Pentium II @ 450 Mhz	Main: 384 MB Cache: 512 KB	1 @ 3.97GB	na	na

In my opinion, these performance results were produced in compliance with the TPC requirements for the benchmark. The following attributes of the benchmark were given special attention:

- The transactions were correctly implemented.
- The database files were properly sized and populated.
- The database was properly scaled for 816 warehouses.
- The ACID properties were successfully demonstrated.

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(916) 985-1131 fax: (916) 985-1185 email: Lorna@PerfMetrics.com

- The durability data and log loss tests were performed on a 10 warehouse database.
- Input data was generated according to the specified percentages.
- Eight hours of mirrored log space was present on the tested system.
- Eight hours of growth space for the dynamic tables were present on the tested system.
- The data for the 180 day space calculations was verified.
- The steady state portion of the test was 30 minutes.
- One checkpoint was taken before the measured interval.
- One checkpoint was taken during the measured interval.
- The checkpoints were verified to be clear of the guard zone.
- There were 8,160 users active during the measurement.
- Each emulated user started with a different random number seed.
- The NURand constants used for loading and running were verified as compliant.
- The system pricing was checked for major components and maintenance.
- Third party quotes were verified for compliance.

Auditor Notes:

There were 105 disk drives present on the measured system. It was clearly demonstrated and documented that 22 disks were unused for the TPC-C workload and present only for backup purposes. Only 83 disks were priced.

Sincerely,

Lorna Livingtree

Lorna Livingtree
Auditor

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Appendix A - Client/Server Source

CLIENT MAKEFILE

```
# Microsoft Developer Studio Generated NMAKE File, Format Version 4.20
# ** DO NOT EDIT **

# TARGTYPE "Win32 (x86) Dynamic-Link Library" 0x0102

!IF "$(CFG)" == ""
CFG=tpcc - Win32 Debug
!MESSAGE No configuration specified.  Defaulting to tpcc - Win32 Debug.
!ENDIF

!IF "$(CFG)" != "tpcc - Win32 Release" && "$(CFG)" != "tpcc - Win32 Debug"
!MESSAGE Invalid configuration "$(CFG)" specified.
!MESSAGE You can specify a configuration when running NMAKE on this
makefile
!MESSAGE by defining the macro CFG on the command line.  For example:
!MESSAGE
!MESSAGE NMAKE /f "tpcc.mak" CFG="tpcc - Win32 Debug"
!MESSAGE
!MESSAGE Possible choices for configuration are:
!MESSAGE
!MESSAGE "tpcc - Win32 Release" (based on "Win32 (x86) Dynamic-Link
Library")
!MESSAGE "tpcc - Win32 Debug" (based on "Win32 (x86) Dynamic-Link
Library")
!MESSAGE
!ERROR An invalid configuration is specified.
!ENDIF

!IF "$(OS)" == "Windows_NT"
NULL=
!ELSE
NULL=nul
!ENDIF
################################################################################
######
# Begin Project
# PROP Target_Last_Scanned "tpcc - Win32 Release"
CPP=cl.exe
RSC=rc.exe
MTL=mktyplib.exe

!IF  "$(CFG)" == "tpcc - Win32 Release"

# PROP BASE Use_MFC 0
# PROP BASE Use_Debug_Libraries 0
# PROP BASE Output_Dir "Release"
# PROP BASE Intermediate_Dir "Release"
# PROP BASE Target_Dir ""
# PROP Use_MFC 0
# PROP Use_Debug_Libraries 0
# PROP Output_Dir "Release"
# PROP Intermediate_Dir "Release"
# PROP Target_Dir ""
OUTDIR=.\Release
INTDIR=.\Release

ALL : "$(OUTDIR)\tpcc.dll"

CLEAN :
       -@erase "$(INTDIR)\diagio.obj"
       -@erase "$(INTDIR)\term.obj"
       -@erase "$(INTDIR)\timesupp.obj"
       -@erase "$(INTDIR)\tmon.obj"
       -@erase "$(INTDIR)\TPCC.OBJ"
       -@erase "$(INTDIR)\tpcchandler.obj"
       -@erase "$(OUTDIR)\tpcc.dll"
       -@erase "$(OUTDIR)\tpcc.exp"
       -@erase "$(OUTDIR)\tpcc.lib"

"$(OUTDIR)" :
    if not exist "$(OUTDIR)/$(NULL)" mkdir "$(OUTDIR)"

# ADD BASE CPP /nologo /MT /W3 /GX /O2 /D "WIN32" /D "NDEBUG" /D
"_WINDOWS" /YX /c
# ADD CPP /nologo /MT /W3 /GX /O2 /D "WIN32" /D "NDEBUG" /D "_WINDOWS" /YX
/c
CPP_PROJ=/nologo /MT /W3 /GX /O2 /D "WIN32" /D "NDEBUG" /D "_WINDOWS"\
 /Fp"$(INTDIR)/tpcc.pch" /YX /Fo"$(INTDIR)/" /c
CPP_OBJS=.\Release/
CPP_SBRS=.\.
# ADD BASE MTL /nologo /D "NDEBUG" /win32
# ADD MTL /nologo /D "NDEBUG" /win32
MTL_PROJ=/nologo /D "NDEBUG" /win32
# ADD BASE RSC /l 0x409 /d "NDEBUG"
# ADD RSC /l 0x409 /d "NDEBUG"
BSC32=bscmake.exe
# ADD BASE BSC32 /nologo
# ADD BSC32 /nologo
BSC32_FLAGS=/nologo /o"$(OUTDIR)/tpcc.bsc"
BSC32_SBRS= \

LINK32=link.exe
# ADD BASE LINK32 kernel32.lib user32.lib gdi32.lib winspool.lib
comdlg32.lib advapi32.lib shell32.lib ole32.lib oleaut32.lib uuid.lib
odbc32.lib odbccp32.lib /nologo /subsystem:windows /dll /machine:I386
# ADD LINK32 kernel32.lib user32.lib gdi32.lib winspool.lib comdlg32.lib
advapi32.lib shell32.lib ole32.lib oleaut32.lib uuid.lib odbc32.lib
odbccp32.lib libtux.lib libbuft.lib libtux2.lib libfml.lib libfml32.lib
libgp.lib /nologo /subsystem:windows /dll /machine:I386
# SUBTRACT LINK32 /verbose /nodefaultlib
LINK32_FLAGS=kernel32.lib user32.lib gdi32.lib winspool.lib comdlg32.lib\
 advapi32.lib shell32.lib ole32.lib oleaut32.lib uuid.lib odbc32.lib\
 odbccp32.lib libtux.lib libbuft.lib libtux2.lib libfml.lib libfml32.lib\
 libgp.lib /nologo /subsystem:windows /dll /incremental:no\
 /pdb:"$(OUTDIR)/tpcc.pdb" /machine:I386 /def:".\tpcc.def"\
 /out:"$(OUTDIR)/tpcc.dll" /implib:"$(OUTDIR)/tpcc.lib"
DEF_FILE= \
```

```
        ".\tpcc.def"
LINK32_OBJS= \
        "$(INTDIR)\diagio.obj" \
        "$(INTDIR)\term.obj" \
        "$(INTDIR)\timesupp.obj" \
        "$(INTDIR)\tmon.obj" \
        "$(INTDIR)\TPCC.OBJ" \
        "$(INTDIR)\tpcchandler.obj"

"$(OUTDIR)\tpcc.dll" : "$(OUTDIR)" $(DEF_FILE) $(LINK32_OBJS)
    $(LINK32) @<<
  $(LINK32_FLAGS) $(LINK32_OBJS)
<<

!ELSEIF  "$(CFG)" == "tpcc - Win32 Debug"

# PROP BASE Use_MFC 0
# PROP BASE Use_Debug_Libraries 1
# PROP BASE Output_Dir "Debug"
# PROP BASE Intermediate_Dir "Debug"
# PROP BASE Target_Dir ""
# PROP Use_MFC 0
# PROP Use_Debug_Libraries 1
# PROP Output_Dir "Debug"
# PROP Intermediate_Dir "Debug"
# PROP Target_Dir ""
OUTDIR=.\Debug
INTDIR=.\Debug

ALL : "$(OUTDIR)\tpcc.dll"

CLEAN :
        -@erase "$(INTDIR)\diagio.obj"
        -@erase "$(INTDIR)\term.obj"
        -@erase "$(INTDIR)\timesupp.obj"
        -@erase "$(INTDIR)\tmon.obj"
        -@erase "$(INTDIR)\TPCC.OBJ"
        -@erase "$(INTDIR)\tpcchandler.obj"
        -@erase "$(INTDIR)\vc40.idb"
        -@erase "$(INTDIR)\vc40.pdb"
        -@erase "$(OUTDIR)\tpcc.dll"
        -@erase "$(OUTDIR)\tpcc.exp"
        -@erase "$(OUTDIR)\tpcc.ilk"
        -@erase "$(OUTDIR)\tpcc.lib"
        -@erase "$(OUTDIR)\tpcc.pdb"

"$(OUTDIR)" :
    if not exist "$(OUTDIR)/$(NULL)" mkdir "$(OUTDIR)"

# ADD BASE CPP /nologo /MTd /W3 /Gm /GX /Zi /Od /D "WIN32" /D "_DEBUG" /D
"_WINDOWS" /YX /c
# ADD CPP /nologo /MT /W3 /Gm /GX /Zi /Od /D "WIN32" /D "_DEBUG" /D
"_WINDOWS" /YX /c
CPP_PROJ=/nologo /MT /W3 /Gm /GX /Zi /Od /D "WIN32" /D "_DEBUG" /D
"_WINDOWS"\
 /Fp"$(INTDIR)/tpcc.pch" /YX /Fo"$(INTDIR)/" /Fd"$(INTDIR)/" /c
CPP_OBJS=.\Debug/
CPP_SBRS=.\.
# ADD BASE MTL /nologo /D "_DEBUG" /win32
# ADD MTL /nologo /D "_DEBUG" /win32
MTL_PROJ=/nologo /D "_DEBUG" /win32
# ADD BASE RSC /l 0x409 /d "_DEBUG"
# ADD RSC /l 0x409 /d "_DEBUG"
BSC32=bscmake.exe
# ADD BASE BSC32 /nologo
# ADD BSC32 /nologo
BSC32_FLAGS=/nologo /o"$(OUTDIR)/tpcc.bsc"
BSC32_SBRS= \

LINK32=link.exe
# ADD BASE LINK32 kernel32.lib user32.lib gdi32.lib winspool.lib
comdlg32.lib advapi32.lib shell32.lib ole32.lib oleaut32.lib uuid.lib
odbc32.lib odbccp32.lib /nologo /subsystem:windows /dll /debug
/machine:I386
# ADD LINK32 kernel32.lib user32.lib gdi32.lib winspool.lib comdlg32.lib
advapi32.lib shell32.lib ole32.lib oleaut32.lib uuid.lib odbc32.lib
odbccp32.lib libtux.lib libbuft.lib libtux2.lib libfml.lib libfml32.lib
libgp.lib /nologo /subsystem:windows /dll /debug /machine:I386
# SUBTRACT LINK32 /verbose /nodefaultlib
LINK32_FLAGS=kernel32.lib user32.lib gdi32.lib winspool.lib comdlg32.lib\
 advapi32.lib shell32.lib ole32.lib oleaut32.lib uuid.lib odbc32.lib\
 odbccp32.lib libtux.lib libbuft.lib libtux2.lib libfml.lib libfml32.lib\
 libgp.lib /nologo /subsystem:windows /dll /incremental:yes\
 /pdb:"$(OUTDIR)/tpcc.pdb" /debug /machine:I386 /def:".\tpcc.def"\
 /out:"$(OUTDIR)/tpcc.dll" /implib:"$(OUTDIR)/tpcc.lib"
DEF_FILE= \
        ".\tpcc.def"
LINK32_OBJS= \
        "$(INTDIR)\diagio.obj" \
        "$(INTDIR)\term.obj" \
        "$(INTDIR)\timesupp.obj" \
        "$(INTDIR)\tmon.obj" \
        "$(INTDIR)\TPCC.OBJ" \
        "$(INTDIR)\tpcchandler.obj"

"$(OUTDIR)\tpcc.dll" : "$(OUTDIR)" $(DEF_FILE) $(LINK32_OBJS)
    $(LINK32) @<<
  $(LINK32_FLAGS) $(LINK32_OBJS)
<<

!ENDIF

.c{$(CPP_OBJS)}.obj:
   $(CPP) $(CPP_PROJ) $<

.cpp{$(CPP_OBJS)}.obj:
   $(CPP) $(CPP_PROJ) $<

.cxx{$(CPP_OBJS)}.obj:
   $(CPP) $(CPP_PROJ) $<

.c{$(CPP_SBRS)}.sbr:
   $(CPP) $(CPP_PROJ) $<

.cpp{$(CPP_SBRS)}.sbr:
   $(CPP) $(CPP_PROJ) $<

.cxx{$(CPP_SBRS)}.sbr:
   $(CPP) $(CPP_PROJ) $<

################################################################################
######
```

```
# Begin Target

# Name "tpcc - Win32 Release"
# Name "tpcc - Win32 Debug"

!IF  "$(CFG)" == "tpcc - Win32 Release"

!ELSEIF  "$(CFG)" == "tpcc - Win32 Debug"

!ENDIF

################################################################################
######
# Begin Source File

SOURCE=.\term.c
DEP_CPP_TERM_=\
        ".\diagio.h"\
        ".\term.h"\
        ".\timesupp.h"\


"$(INTDIR)\term.obj" : $(SOURCE) $(DEP_CPP_TERM_) "$(INTDIR)"


# End Source File
################################################################################
######
# Begin Source File

SOURCE=.\timesupp.c
DEP_CPP_TIMES=\
        ".\timesupp.h"\


"$(INTDIR)\timesupp.obj" : $(SOURCE) $(DEP_CPP_TIMES) "$(INTDIR)"


# End Source File
################################################################################
######
# Begin Source File

SOURCE=.\TPCC.C
DEP_CPP_TPCC_=\
        ".\diagio.h"\
        ".\term.h"\
        ".\tmon.h"\
        ".\tpcc.h"\
        ".\tpcchandler.h"\


"$(INTDIR)\TPCC.OBJ" : $(SOURCE) $(DEP_CPP_TPCC_) "$(INTDIR)"


# End Source File
################################################################################
######
# Begin Source File

SOURCE=.\tpcchandler.c

DEP_CPP_TPCCH=\
        ".\diagio.h"\
        ".\term.h"\
        ".\tmon.h"\
        ".\tpcc.h"\
        ".\tpcchandler.h"\


"$(INTDIR)\tpcchandler.obj" : $(SOURCE) $(DEP_CPP_TPCCH) "$(INTDIR)"


# End Source File
################################################################################
######
# Begin Source File

SOURCE=.\tpcc.def

!IF  "$(CFG)" == "tpcc - Win32 Release"

!ELSEIF  "$(CFG)" == "tpcc - Win32 Debug"

!ENDIF

# End Source File
################################################################################
######
# Begin Source File

SOURCE=.\tmon.c
DEP_CPP_TMON_=\
        ".\tmon.h"\
        {$(INCLUDE)}"\atmi.h"\
        {$(INCLUDE)}"\sys\types.h"\
        {$(INCLUDE)}"\tmenv.h"\


"$(INTDIR)\tmon.obj" : $(SOURCE) $(DEP_CPP_TMON_) "$(INTDIR)"


# End Source File
################################################################################
######
# Begin Source File

SOURCE=.\diagio.c
DEP_CPP_DIAGI=\
        ".\diagio.h"\


"$(INTDIR)\diagio.obj" : $(SOURCE) $(DEP_CPP_DIAGI) "$(INTDIR)"


# End Source File
# End Target
# End Project
################################################################################
######
```

tpcc.def

```
EXPORTS
   GetExtensionVersion
   HttpExtensionProc
```

tpcc.h

```
// tpcc.h

#include <time.h>

// TPCCHandler return codes
#define TPCCSEND 1
#define TPCCSENDEND 2
#define TPCCENDNOW 3

// TPCC Service return codes
#define SVC_BADITEMID 1
#define SVC_NOERROR 0
#define SVCERR_DEADLOCK -1
#define SVCERR_NOCUSTOMER -2
#define SVCERR_NOORDERS -3
#define SVCERR_DBLIB -4

// Min/Max transaction data definitions
#define MIN_DId 1
#define MAX_DId 10
#define MIN_OL 5
#define MAX_OL 15
#define MIN_QUANTITY 1
#define MAX_QUANTITY 10
#define MIN_ITEM_ID 1
#define MAX_ITEM_ID 100000
#define MIN_CUST_ID 1
#define MAX_CUST_ID 3000
#define MIN_CARRIER 1
#define MAX_CARRIER 10
#define MIN_THRESHOLD 10
#define MAX_THRESHOLD 20

// pTPCC->iStatusId codes
#define INVALID_IID              1
#define STATUS_OK                0
#define ERR_CMD_UNKNOWN          -10
#define ERRTXT_CMD_UNKNOWN       "Unrecognized Command"
#define ERR_ALREADY_LOGGEDIN     -11
#define ERRTXT_ALREADY_LOGGEDIN  "Already Logged In"
#define ERR_TERMID               -12
#define ERRTXT_TERMID            "TermId or SyncId in Error"
#define ERR_FORM_UNKNOWN         -13
#define ERRTXT_FORM_UNKNOWN      "Unrecognized FormId"
#define ERR_WID_INVALID          -14
#define ERR_DID_INVALID          -15
#define ERR_MISSING_KEY          -16
#define ERR_NOT_NUMERIC          -17
#define ERR_THRESHOLD_RANGE      -18
#define ERR_EMBEDDED_EMPTY_OL    -19
#define ERR_QUANTITY_INVALID     -20
#define ERR_OL_INVALID           -21
#define ERR_OL_COUNT             -22
#define ERR_TM_INTERFACE         -23
#define ERR_SERVICE_RSLT         -24
#define ERR_INPUT_TOOLONG        -25
#define ERR_IDANDNAME_EMPTY      -26
#define ERR_IDANDNAME_ENTERED    -27
#define ERR_AMOUNT_BADFORM       -28
#define ERR_AMOUNT_INVALID       -29
#define ERR_CARRIER_INVALID      -30
#define ERR_TERM_ALLOC           -31

#define STATUS_LEN 200
#define NAME_LEN 16
#define ADDR_LEN 20
#define STATE_LEN 2
#define ZIP_LEN 9

#define MAX_MSG_SZ  5000
#define CTEXT "Content-length: "
#define HTTPHdr "Connection: keep-alive\r\nContent-type: text/html\r\n" \
                "Content-length:     \r\n\r\n"

typedef struct
{
   int year;
   int quarter;
   int month;
   int dayofyear;
   int day;
   int week;
   int weekday;
   int hour;
   int minute;
   int second;
   int millisecond;
} DBDATEREC;

typedef struct
{
   short ol_supply_w_id;
   long ol_i_id;
   char ol_i_name[25];
   short ol_quantity;
   char ol_brand_generic[2];
   double ol_i_price;
   double ol_amount;
   short ol_stock;
} OL_NEW_ORDER_DATA;

typedef struct
{
   short w_id;
   short d_id;
   long        c_id;
   short o_ol_cnt;
   char c_last[NAME_LEN + 1];
   char c_credit[3];
   double c_discount;
   double w_tax;
   double d_tax;
   long o_id;
```

```
   short o_commit_flag;
   DBDATEREC o_entry_d;
   short o_all_local;
   double total_amount;
   char execution_status[STATUS_LEN];
   OL_NEW_ORDER_DATA Ol[MAX_OL];
} NEW_ORDER_DATA;

typedef struct
{
   short w_id;
   short d_id;
   long c_id;
   short c_d_id;
   short c_w_id;
   double h_amount;
   DBDATEREC h_date;
   char w_street_1[ADDR_LEN + 1];
   char w_street_2[ADDR_LEN + 1];
   char w_city[ADDR_LEN + 1];
   char w_state[STATE_LEN + 1];
   char w_zip[ZIP_LEN + 1];
   char d_street_1[ADDR_LEN + 1];
   char d_street_2[ADDR_LEN + 1];
   char d_city[ADDR_LEN + 1];
   char d_state[STATE_LEN + 1];
   char d_zip[ZIP_LEN + 1];
   char c_first[NAME_LEN + 1];
   char c_middle[3];
   char c_last[NAME_LEN + 1];
   char c_street_1[ADDR_LEN + 1];
   char c_street_2[ADDR_LEN + 1];
   char c_city[ADDR_LEN + 1];
   char c_state[STATE_LEN + 1];
   char c_zip[ZIP_LEN + 1];
   char c_phone[16];
   DBDATEREC c_since;
   char c_credit[3];
   double c_credit_lim;
   double c_discount;
   double c_balance;
   char c_data[200+1];
   char execution_status[STATUS_LEN];
} PAYMENT_DATA;

typedef struct
{
   long ol_i_id;
   short ol_supply_w_id;
   short ol_quantity;
   double ol_amount;
   DBDATEREC ol_delivery_d;
} OL_ORDER_STATUS_DATA;

typedef struct
{
   short w_id;
   short d_id;
   long c_id;
   char c_first[NAME_LEN + 1];
   char c_middle[3];
   char c_last[NAME_LEN + 1];
   double c_balance;
   long o_id;
   DBDATEREC o_entry_d;
   short o_carrier_id;
   OL_ORDER_STATUS_DATA OlOrderStatusData[MAX_OL];
   short o_ol_cnt;
   char execution_status[STATUS_LEN];
} ORDER_STATUS_DATA;

typedef struct
{
   short w_id;
   short o_carrier_id;
   long o_id[10];
   int iComplete;
   SYSTEMTIME QTime;                // time delivery was queued
   SYSTEMTIME EndTime;              // time delivery completed
   char execution_status[STATUS_LEN];
} DELIVERY_DATA;

typedef struct
{
   short w_id;
   short d_id;
   short thresh_hold;
   long low_stock;
   char execution_status[STATUS_LEN];
} STOCK_LEVEL_DATA;

typedef struct
{
   LPVOID ConnID;                   // Active Connection Id
   SHORT sWId;                      // TPCC WareHouse Id
   SHORT sDId;                      // TPCC District Id
   INT  iSyncId;                    // TPCC Sync Id
   INT  iTermId;                    // TPCC Term Id
   UINT uFormId;                    // TPCC Form Id
   INT  iStatusId;                  // TPCC Status Id
   CHAR ErrTxt[500];                // Error text
   CHAR szWork[200];                // Thread work area
   CHAR szHeader[100];              // HTTP work area
   CHAR * RecvMsg;                  // HTML message from ECB
   CHAR SendMsg[MAX_MSG_SZ];        // HTML work area
   TMON_STATE tsTMon;               // TMon Interface
} TPCC_STATE;
```

tpcc.c

```
// tpcc.c
//
// Copyright Unisys, 1997
//
#include <windows.h>
#include <stdio.h>
#include <malloc.h>
#include <stdlib.h>
#include <string.h>
#include <winreg.h>
#include <httpext.h>
```

```
#include "tmon.h"
#include "diagio.h"
#include "term.h"
#include "tpcchandler.h"

#define EXTN_VERSION MAKELONG(HSE_VERSION_MINOR,HSE_VERSION_MAJOR)
#define TLS_NULL 0xFFFFFFFF
DWORD dwTlsInx;
CHAR * pTitle = "IIS TPCC DLL";
CRITICAL_SECTION csDllMain;

// Diagnostic logging settings
BOOL bEventLog = TRUE;
BOOL bConsole = FALSE;
UINT uDiagLevel = DIAG_INFO;

// TMon Interface Settings
INT iTMMaxMsg = 0;

// Term Interface Settings
INT iMaxTerms = 3000;

static CHAR * szTPCCError =
   HTTPHdr "<HTML>"
   "<HEAD><TITLE>Welcome To TPC-C</TITLE></HEAD><BODY>"
   "<B>TPCC Extension Error (TPCC Array Not Allocated)</B><BR>"
   "</BODY></HTML>";

static CHAR * szTMInitError =
   HTTPHdr "<HTML>"
   "<HEAD><TITLE>Welcome To TPC-C</TITLE></HEAD><BODY>"
   "<B>TPCC Extension Error (TMInit Failed)</B><BR>"
   "</BODY></HTML>";
INT iHHdrLen = 0;
INT iCTextLen = 0;

BOOL ThreadAttach(TPCC_STATE * pTPCC,CHAR * pDiag);
VOID ThreadDetach(TPCC_STATE * pTPCC);
VOID SendResponse(EXTENSION_CONTROL_BLOCK * pECB,CHAR * pMsg,CHAR *
pWork);
BOOL ReadRegistry(VOID);

//====================================================================
//
// Function name: DllMain
//
//====================================================================
BOOL APIENTRY DllMain(HANDLE hInst, ULONG ul_reason_for_call,
                      LPVOID lpReserved)
{
   TPCC_STATE * pTPCC = NULL;
   CHAR szDiag[MAX_DIAG_SZ];
   UINT iTMMaxSz =0;
   switch(ul_reason_for_call)
   {
      case DLL_PROCESS_ATTACH:
         // Process initialization

         InitializeCriticalSection(&csDllMain);
         ReadRegistry();
         DiagIoInit(pTitle,bConsole,bEventLog,uDiagLevel);
         sprintf(szDiag,
            "EventLog = %d, Console = %d, DiagLevel = %d\n"
            "MaxTerms = %d\n",
            bEventLog,bConsole,uDiagLevel,iMaxTerms);
         DiagIoWrite(szDiag,DIAG_FORCE);
         dwTlsInx = TlsAlloc();
         if (dwTlsInx == TLS_NULL)
         {
            sprintf(szDiag,"PAttach(%ld): Tls Alloc Failed (%ld)\n",
               GetCurrentThreadId(),GetLastError);
            DiagIoWrite(szDiag,DIAG_ERROR);
            return(FALSE);
         };
         if (TermInit(iMaxTerms))
            return(FALSE);
         iTMMaxSz = max(iTMMaxSz,sizeof(NEW_ORDER_DATA));
         iTMMaxSz = max(iTMMaxSz,sizeof(PAYMENT_DATA));
         iTMMaxSz = max(iTMMaxSz,sizeof(ORDER_STATUS_DATA));
         iTMMaxSz = max(iTMMaxSz,sizeof(DELIVERY_DATA));
         iTMMaxSz = max(iTMMaxSz,sizeof(STOCK_LEVEL_DATA));
         iTMMaxSz += 10;
         TMonInit(iTMMaxSz);
         iHHdrLen = strlen(HTTPHdr);
         iCTextLen = strlen(CTEXT);
         break;
      case DLL_THREAD_ATTACH:
         // Move ThreadAttach call to HttpExt since the DllMain call
         // for Thread Attach did not reliably come before the first
         // call to HttpExtProc.
         break;
               case DLL_THREAD_DETACH:
         ThreadDetach(pTPCC);
                     break;
               case DLL_PROCESS_DETACH:
         ThreadDetach(pTPCC);
         DeleteCriticalSection(&csDllMain);
         TMonTerm();
         TermTerm();
         TlsFree(dwTlsInx);
         dwTlsInx = TLS_NULL;
         DiagIoTerm();
                     break;
       };
       return TRUE;
};   // DllMain

//====================================================================
//
// Function name: ThreadAttach
//
// Result:
//    FALSE Thread state structure initialized
//    TRUE  Thread state structure initialization failure
//
//====================================================================
BOOL ThreadAttach(TPCC_STATE * pTPCC,CHAR * pDiag)
{
   BOOL bRslt;
   UINT uLabelNoOp;
   EnterCriticalSection(&csDllMain);
```

```
   __try
   {
      pTPCC = (TPCC_STATE *) calloc(1,sizeof(TPCC_STATE));
      if (pTPCC == NULL)
      {
         sprintf(pDiag,"ThrAtt(%ld): pTPCC Alloc Failed (%ld)\n",
            GetCurrentThreadId(),GetLastError);
         DiagIoWrite(pDiag,DIAG_ERROR);
         bRslt = TRUE;
         goto TAttachXit;
      };
      TlsSetValue(dwTlsInx,pTPCC);
      pTPCC->tsTMon.pTMData = NULL;
      pTPCC->tsTMon.pszErrTxt = pTPCC->ErrTxt;
      if (TMInit(&pTPCC->tsTMon))
      {
         sprintf(pDiag,"ThrAtt(%ld): TMInit %s\n",
            GetCurrentThreadId(),pTPCC->ErrTxt);
         DiagIoWrite(pDiag,DIAG_ERROR);
         bRslt = TRUE;
         goto TAttachXit;
      };
      bRslt = FALSE;
TAttachXit:
      uLabelNoOp = 0;
   }
   __finally
   {
      LeaveCriticalSection(&csDllMain);
   };

   return(bRslt);

};   // ThreadAttach

//============================================================================
//
// Function name: ThreadDetach
//
//============================================================================
VOID ThreadDetach(TPCC_STATE * pTPCC)
{
   EnterCriticalSection(&csDllMain);
   __try
   {
      pTPCC = TlsGetValue(dwTlsInx);
      if (pTPCC != NULL)
      {
         TMDone(&pTPCC->tsTMon);
         free(pTPCC);
         pTPCC = NULL;
         TlsSetValue(dwTlsInx,pTPCC);
      };
   }
   __finally
   {
      LeaveCriticalSection(&csDllMain);
   };
};   // ThreadDetach

//============================================================================
//
// Function name: GetExtensionVersion
//
//============================================================================
BOOL WINAPI GetExtensionVersion(HSE_VERSION_INFO *pVersion)
{
   pVersion->dwExtensionVersion = EXTN_VERSION;
   strncpy(pVersion->lpszExtensionDesc,pTitle,HSE_MAX_EXT_DLL_NAME_LEN);
   return TRUE;
};   // GetExtensionVersion

//============================================================================
//
// Function name: HttpExtensionProc
//
//
// Returns:
//    HSE_STATUS_SUCCESS               send msg, drop connection
//    HSE_STATUS_SUCCESS_AND_KEEP_CONN       send msg, keep connection
//
//============================================================================
DWORD WINAPI HttpExtensionProc(EXTENSION_CONTROL_BLOCK * pECB)
{
   TPCC_STATE * pTPCC;
   DWORD dwRslt = HSE_STATUS_SUCCESS;
   UINT uRslt;

   pTPCC = TlsGetValue(dwTlsInx);
   if (pTPCC == NULL)
   {
      CHAR szWork[200];
      ThreadAttach(pTPCC,szWork);
      pTPCC = TlsGetValue(dwTlsInx);
      if (pTPCC == NULL)
      {
         SendResponse(pECB,szTPCCError,szWork);
         goto HttpXit;
      };
   };
   if (pTPCC->tsTMon.pTMData == NULL)
      SendResponse(pECB,szTMInitError,pTPCC->szHeader);
   TPCCClear(pTPCC);
   pTPCC->ConnID = pECB->ConnID;
   pTPCC->RecvMsg = pECB->lpszQueryString;
   uRslt = TPCCHandler(pTPCC);
   switch (uRslt)
   {
      case TPCCSEND:
         SendResponse(pECB,pTPCC->SendMsg,pTPCC->szHeader);
         dwRslt = HSE_STATUS_SUCCESS_AND_KEEP_CONN;
         break;
      case TPCCSENDEND:
         SendResponse(pECB,pTPCC->SendMsg,pTPCC->szHeader);
         break;
      case TPCCENDNOW:
      default:
         break;
   };   // switch (TPCCHandler result)

HttpXit:
```

```
        return(dwRslt);

};   // HttpExtensionProc

//====================================================================
//
// Function name: SendResponse
//
//====================================================================
VOID SendResponse(EXTENSION_CONTROL_BLOCK * pECB,CHAR * pMsg,CHAR * pWork)
{
   DWORD dwMsgBytes;
   CHAR * pCL;
   dwMsgBytes = strlen(pMsg);
   pCL=strstr(pMsg,CTEXT);
   dwMsgBytes -= iHHdrLen;
   sprintf(pWork,"%4ld",dwMsgBytes);
   pCL += iCTextLen;
   strncpy(pCL,pWork,4);
   (*pECB->ServerSupportFunction)
      (pECB->ConnID,
      HSE_REQ_SEND_RESPONSE_HEADER,
      NULL,
      &dwMsgBytes,
      (LPDWORD)pMsg);
};   // SendResponse

//====================================================================
//
// Function name: ReadRegistry
//
//    Sets global operational parameters from registry if they exist.
//    Otherwise, compiled in defaults apply.
//
// Result:
//    FALSE    Registry entry found
//    TRUE     Registry entry does not exist
//
//====================================================================
BOOL ReadRegistry(VOID)
{
   HKEY hkTPCC;
   DWORD       dwMax;
   DWORD       dwRT;
   INT i;
   CHAR szValue[100];
   if (RegOpenKeyEx(HKEY_LOCAL_MACHINE,"SOFTWARE\\Unisys\\TPCC",0,
      KEY_READ, &hkTPCC) != ERROR_SUCCESS )
      return(TRUE);
   dwMax = sizeof(szValue);
   if (RegQueryValueEx(hkTPCC,"EVENTLOG",0,&dwRT,szValue,&dwMax)
      == ERROR_SUCCESS)
   {
      if (abs(atoi(szValue) == 0))
         bEventLog = FALSE;
      else
         bEventLog = TRUE;
   };
   dwMax = sizeof(szValue);
   if (RegQueryValueEx(hkTPCC,"CONSOLE",0,&dwRT,szValue,&dwMax)
      == ERROR_SUCCESS )
   {
      if (abs(atoi(szValue) == 0))
         bConsole = FALSE;
      else
         bConsole = TRUE;
   };
   dwMax = sizeof(szValue);
   if (RegQueryValueEx(hkTPCC,"DIAGLEVEL",0,&dwRT,szValue,&dwMax)
      == ERROR_SUCCESS )
   {
      i = atoi(szValue);
      if (i < DIAG_FORCE)
         i = DIAG_FORCE;
      else
      if (i > DIAG_INFO)
         i = DIAG_INFO;
      uDiagLevel = i;
   };
   dwMax = sizeof(szValue);
   if (RegQueryValueEx(hkTPCC,"MAXTERMS",0,&dwRT,szValue,&dwMax)
      == ERROR_SUCCESS )
   {
      iMaxTerms = abs(atoi(szValue));
   };
   RegCloseKey(hkTPCC);
   return(FALSE);
};   // ReadRegistry
```

tpcchandler.h

```
// tpcchandler.h

#include "tpcc.h"

BOOL TPCCClear(TPCC_STATE * pTPCC);
UINT TPCCHandler(TPCC_STATE * pTPCC);
```

tpcchandler.c

```
// tpcchandler.c
//
// Copyright Unisys, 1997
//
#include <windows.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>

#include "tmon.h"
#include "diagio.h"
#include "tpcchandler.h"
#include "term.h"

// pTPCC->iFormId - TPCC forms enumeration.
#define FORM_NULL        0
#define FORM_LOGON       1
#define FORM_MENU        2
#define FORM_NEWORDER    3
```

```
#define FORM_PAYMENT     4
#define FORM_DELIVERY    5
#define FORM_ORDERSTATUS 6
#define FORM_STOCKLEVEL  7
#define FORM_EXIT        8
#define FORM_MAX         9

// CMD= HTML Command Enumeration and Name
#define CMD_NULL               0
#define CMD_PROCESS            1
#define CMD_NEWORDER_FORM      2
#define CMD_PAYMENT_FORM       3
#define CMD_DELIVERY_FORM      4
#define CMD_ORDERSTATUS_FORM   5
#define CMD_STOCKLEVEL_FORM    6
#define CMD_EXIT               7
#define CMD_SUBMIT             8
#define CMD_MENU_FORM          9
#define CMD_MAX                10

static CHAR * szCmds[] =
{
   "Unknown",
   "Process",
   "..NewOrder..",
   "..Payment..",
   "..Delivery..",
   "..Order-Status..",
   "..Stock-Level..",
   "..Exit..",
   "Submit",
   "Menu"
};

static CHAR * szFormLogin =
   HTTPHdr "<HTML>"
   "<HEAD><TITLE>Welcome To TPC-C</TITLE></HEAD><BODY>"
   "Please Identify your Warehouse and District for this session.<BR>"
   "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
   "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
   "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"1\">"
   "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"-2\">"
   "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"0\">"
   "Warehouse ID <INPUT NAME=\"w_id\" SIZE=4><BR>"
   "District ID <INPUT NAME=\"d_id\" SIZE=2><BR>"
   "<HR>"
   "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"Submit\">"
   "</FORM>";

static CHAR * szMenuList =
   "<INPUT TYPE=\"submit\" NAME=\"CMD\" VALUE=\"..NewOrder..\">"
   "<INPUT TYPE=\"submit\" NAME=\"CMD\"VALUE=\"..Payment..\">"
   "<INPUT TYPE=\"submit\" NAME=\"CMD\"VALUE=\"..Delivery..\">"
   "<INPUT TYPE=\"submit\" NAME=\"CMD\"VALUE=\"..Order-Status..\">"
   "<INPUT TYPE=\"submit\" NAME=\"CMD\"VALUE=\"..Stock-Level..\">"
   "<INPUT TYPE=\"submit\" NAME=\"CMD\"VALUE=\"..Exit..\">";

static CHAR * HTMLTrailer =
   "</BODY></HTML>";

static CHAR * TERMIDTOKEN = "TERMID=";
static CHAR * SYNCIDTOKEN = "SYNCID=";
static CHAR * FORMIDTOKEN = "FORMID=";
static CHAR * STATUSIDTOKEN = "STATUSID=";
static CHAR * CMDTOKEN = "CMD=";
static CHAR * NEWORDER_SERVICE = "NEWORDER";
static CHAR * PAYMENT_SERVICE = "PAYMENT";
static CHAR * ORDERSTATUS_SERVICE = "ORDERSTS";
static CHAR * DELIVERY_SERVICE = "DELIVERY";
static CHAR * STOCKLEVEL_SERVICE = "STOCKLVL";
static CHAR * ZIPPIC = "XXXXX-XXXX";

BOOL ProcessLogin(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
BOOL ProcessForm(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
BOOL ProcessNewOrder(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
BOOL ProcessPayment(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
BOOL ProcessDelivery(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
BOOL ProcessOrderStatus(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
BOOL ProcessStockLevel(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatLogin(CHAR * pMsg,CHAR * pAddText);
BOOL GetHidden(CHAR * pMsg,UINT * uFormId,INT * iSyncId,INT * iTermId);
BOOL GetCmd(CHAR * pMsg,CHAR * pWork,UINT uLen);
BOOL GetLongKey(LONG * lRslt,CHAR * pHTML,CHAR * pKey,TPCC_STATE * pTPCC);
BOOL GetIntKey(INT * iRslt,CHAR * pHTML,CHAR * pKey,TPCC_STATE * pTPCC);
BOOL GetShortKey(SHORT * sRslt,CHAR * pHTML,CHAR * pKey,TPCC_STATE *
pTPCC);
BOOL GetStringKey(CHAR * szRslt,CHAR * pHTML,CHAR * pKey,
                  TPCC_STATE * pTPCC,UINT uMax);
BOOL GetAmountKey(DOUBLE * dRslt,CHAR * pHTML,CHAR * pKey,
                  TPCC_STATE * pTPCC);
BOOL GetKeyValue(CHAR * pHTML,CHAR * pKey,CHAR * pValue,UINT uMax);
VOID FormatLogin(CHAR * pOut,CHAR * pAddText);
VOID FormatMenu(CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatNewOrder(CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatPayment(CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatDelivery(CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatOrderStatus(CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatStockLevel(CHAR * pOut,TPCC_STATE * pTPCC);
VOID FormatFormHdr(CHAR * pOut,CHAR * pTitle,TPCC_STATE * pTPCC);
VOID FormatRespHdr(CHAR * pOut,CHAR * pTitle,TPCC_STATE * pTPCC);
VOID FormatHTMLString(CHAR * pOut,CHAR * pIn,UINT uLen);
VOID FormatString(CHAR * pOut,CHAR * pPic,CHAR * pIn);
VOID UtilStrCpy(CHAR * pDest,CHAR * pSrc,INT n);
BOOL CheckNumeric(CHAR * pNum);

//============================================================================
//
// Function name: TPCCClear
//
//============================================================================
BOOL TPCCClear(TPCC_STATE * pTPCC)
{
   pTPCC->ConnID = 0;
   pTPCC->sWId = 0;
   pTPCC->sDId = 0;
   pTPCC->iSyncId = 0;
   pTPCC->iTermId = -2;
   pTPCC->uFormId = FORM_NULL;
   pTPCC->iStatusId = 0;
   pTPCC->tsTMon.lTMDataLen = 0;
   strcpy(pTPCC->ErrTxt,"");
   return(FALSE);
```

```
};   // TPCCClear

//============================================================================
//
// Function name: TPCCHandler
//
//============================================================================
UINT TPCCHandler(TPCC_STATE * pTPCC)
{
   INT iSyncId;
   INT iTermId;
   UINT uCmdId;
   UINT uRslt = TPCCSENDEND;  // default error handling
   TERM_STATE * pTerm;

   pTPCC->iStatusId = STATUS_OK;
   if (GetHidden(pTPCC->RecvMsg,&pTPCC->uFormId,&iSyncId,&iTermId))
   {
      uRslt = TPCCSEND;
      FormatLogin(pTPCC->SendMsg,pTPCC->ErrTxt);
      goto HdlrXit;
   };
   if (iTermId > 0)
   {
      pTerm = TermGet(iTermId);
      if (pTerm == NULL)
      {
         uRslt = TPCCSEND;
         strcpy(pTPCC->ErrTxt,"Invalid Term Id");
         FormatLogin(pTPCC->SendMsg,pTPCC->ErrTxt);
         goto HdlrXit;
      };
      if (pTerm->ConnID != pTPCC->ConnID)
      {
         uRslt = TPCCSEND;
         strcpy(pTPCC->ErrTxt,"TermId vs ConnId Mismatch");
         FormatLogin(pTPCC->SendMsg,pTPCC->ErrTxt);
         goto HdlrXit;
      };
      pTPCC->sWId = pTerm->sWId;
      pTPCC->sDId = pTerm->sDId;
      pTPCC->iSyncId = pTerm->iSyncId;
      pTPCC->iTermId = pTerm->iTermId;
   };
   uCmdId = GetCmd(pTPCC->RecvMsg,pTPCC->szWork,sizeof(pTPCC->szWork));
   // Except for Submit(log in), sWId must already be set
   if (pTPCC->sWId == 0 && uCmdId != CMD_SUBMIT)
   {
      strcpy(pTPCC->ErrTxt,"Must log in first!");
      FormatLogin(pTPCC->SendMsg,pTPCC->ErrTxt);
      uRslt = TPCCSEND;
      goto HdlrXit;
   };
   // Check for multiple log in attempts
   if (pTPCC->sWId != 0 && uCmdId == CMD_SUBMIT)
   {
      strcpy(pTPCC->ErrTxt,ERRTXT_ALREADY_LOGGEDIN);
      pTPCC->iStatusId = ERR_ALREADY_LOGGEDIN;
      FormatMenu(pTPCC->SendMsg,pTPCC);
      uRslt = TPCCSEND;
      goto HdlrXit;
   };
   // If not logging in, validate hidden fields
   if (uCmdId != CMD_SUBMIT)
   {
      if (iTermId != pTPCC->iTermId || iTermId != iSyncId)
      {
         sprintf(pTPCC->ErrTxt,"%s: Received %ld, %ld (%ld)",
            ERRTXT_TERMID,iTermId,iSyncId,pTPCC->iTermId);
         pTPCC->iStatusId = ERR_TERMID;
         FormatMenu(pTPCC->SendMsg,pTPCC);
         goto HdlrXit;
      };
   };
   // Process the command
   switch (uCmdId)
   {
      case CMD_SUBMIT:
         ProcessLogin(pTPCC->RecvMsg,pTPCC->SendMsg,pTPCC);
         break;
      case CMD_MENU_FORM:
         FormatMenu(pTPCC->SendMsg,pTPCC);
         break;
      case CMD_PROCESS:
         ProcessForm(pTPCC->RecvMsg,pTPCC->SendMsg,pTPCC);
         break;
      case CMD_NEWORDER_FORM:
         FormatNewOrder(pTPCC->SendMsg,pTPCC);
         break;
      case CMD_PAYMENT_FORM:
         FormatPayment(pTPCC->SendMsg,pTPCC);
         break;
      case CMD_DELIVERY_FORM:
         FormatDelivery(pTPCC->SendMsg,pTPCC);
         break;
      case CMD_ORDERSTATUS_FORM:
         FormatOrderStatus(pTPCC->SendMsg,pTPCC);
         break;
      case CMD_STOCKLEVEL_FORM:
         FormatStockLevel(pTPCC->SendMsg,pTPCC);
         break;
      case CMD_EXIT:
         TermFree(pTPCC->iTermId);
         strcpy(pTPCC->ErrTxt,"Logged Off");
         FormatLogin(pTPCC->SendMsg,pTPCC->ErrTxt);
         goto HdlrXit;
      default:
         strcpy(pTPCC->ErrTxt,ERRTXT_CMD_UNKNOWN);
         pTPCC->iStatusId = ERR_CMD_UNKNOWN;
         if (pTPCC->sWId == 0)
            FormatLogin(pTPCC->SendMsg,pTPCC->ErrTxt);
         else
            FormatMenu(pTPCC->SendMsg,pTPCC);
         break;
   };   // switch (uCmdId)

   uRslt = TPCCSEND;

HdlrXit:

   return(uRslt);
```

```
};   // TPCCHandler

//============================================================================
//
// Function name: ProcessLogin
//
//    ProcessLogin extracts WId and DId from the incoming form.  Assumes
//    log in has not previously completed (sWId == 0 already verified).
//
//    Result:
//       FALSE - log in successful, sWId and sDId set in pTPCC,
//               pOut contains menu.
//       TRUE - log in failed, pOut contains log in form with
//              error message.
//
//============================================================================
BOOL ProcessLogin(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   SHORT sWId;
   SHORT sDId;
   TERM_STATE * pTerm;

   if (GetShortKey(&sWId,pIn,"w_id",pTPCC))
   {
     FormatLogin(pOut,pTPCC->ErrTxt);
     return(TRUE);
   };
   if (sWId < 1)
   {
      sprintf(pTPCC->ErrTxt,"Warehouse Id (%d) Invalid",sWId);
      pTPCC->iStatusId = ERR_WID_INVALID;
      FormatLogin(pOut,pTPCC->ErrTxt);
      return(TRUE);
   };
   if (GetShortKey(&sDId,pIn,"d_id",pTPCC))
   {
     FormatLogin(pOut,pTPCC->ErrTxt);
     return(TRUE);
   };
   if (sDId < MIN_DId || sDId > MAX_DId)
   {
      sprintf(pTPCC->ErrTxt,"DId Out of Range(%ld,%ld) - %ld",
         MIN_DId,MAX_DId,sDId);
      pTPCC->iStatusId = ERR_DID_INVALID;
      FormatLogin(pOut,pTPCC->ErrTxt);
      return(TRUE);
   };
   pTerm = TermAlloc();
   if (pTerm == NULL)
   {
      sprintf(pTPCC->ErrTxt,"Unable to Allocate Terminal Entry");
      pTPCC->iStatusId = ERR_TERM_ALLOC;
      FormatLogin(pOut,pTPCC->ErrTxt);
      return(TRUE);
   };
   pTerm->ConnID = pTPCC->ConnID;
   pTerm->iSyncId = pTerm->iTermId;
   pTerm->sWId = abs(sWId);
   pTerm->sDId = abs(sDId);
   pTPCC->iTermId = pTerm->iTermId;
   pTPCC->iSyncId = pTerm->iSyncId;
   pTPCC->sWId = pTerm->sWId;
   pTPCC->sDId = pTerm->sDId;
   FormatMenu(pOut,pTPCC);
   return(FALSE);
};   // ProcessLogin

//============================================================================
//
// Function name: ProcessForm
//
//    ProcessForm uses pTPCC->uFormId to determine which form input is
//    present and ready for processing.  Actual processing is done by
//    the form specific routine.
//
//    Result:
//       FALSE - form processed, pOut contains response.
//       TRUE - error processing form input, pOut contains reason.
//
//============================================================================
BOOL ProcessForm(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   switch (pTPCC->uFormId )
   {
      case FORM_NEWORDER:
               return(ProcessNewOrder(pIn,pOut,pTPCC));
      case FORM_PAYMENT:
               return(ProcessPayment(pIn,pOut,pTPCC));
      case FORM_DELIVERY:
               return(ProcessDelivery(pIn,pOut,pTPCC));
      case FORM_ORDERSTATUS:
               return(ProcessOrderStatus(pIn,pOut,pTPCC));
      case FORM_STOCKLEVEL:
               return(ProcessStockLevel(pIn,pOut,pTPCC));
      default:
         sprintf(pTPCC->ErrTxt,"%s (%ld)",
            ERRTXT_FORM_UNKNOWN,pTPCC->uFormId);
         pTPCC->iStatusId = ERR_FORM_UNKNOWN;
         FormatMenu(pOut,pTPCC);
         break;
      }
   return(TRUE);
};   // ProcessForm

//============================================================================
//
// Function name: ProcessNewOrder
//
//    ProcessNewOrder extracts the input data fields from pIn, processes
//    the data, and returns a response in pOut.
//
//    Result:
//       FALSE - NewOrder processed successfully.
//       TRUE - NewOrder processing failed.
//
//============================================================================
BOOL ProcessNewOrder(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   NEW_ORDER_DATA * pnod;
   TMON_STATE * pTMon;
   CHAR szKey[20];
   CHAR szCredit[14];
```

```
CHAR * ptr;
UINT u;
BOOL bDone = FALSE;
BOOL bTMRslt;
BOOL bTPRslt;
INT iTPRslt;

pTMon = &pTPCC->tsTMon;
pTMon->lTMDataLen = sizeof(NEW_ORDER_DATA);
memset(pTMon->pTMData,0,pTMon->lTMDataLen);
pnod = (NEW_ORDER_DATA *) pTMon->pTMData;
pnod->w_id = pTPCC->sWId;
if (GetShortKey(&pnod->d_id,pIn,"DID*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (pnod->d_id < MIN_DId || pnod->d_id > MAX_DId)
{
   sprintf(pTPCC->ErrTxt,"DId Out of Range(%ld,%ld) - %ld",
      MIN_DId,MAX_DId,pnod->d_id);
   pTPCC->iStatusId = ERR_DID_INVALID;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
if (GetLongKey(&pnod->c_id,pIn,"CID*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
pnod->o_ol_cnt = 0;
ptr = pIn;
for(u=0; u < MAX_OL; u++)
{
   sprintf(szKey,"SP%2.2d*",u);
   ptr = strstr(ptr,szKey);
   if (GetShortKey(&pnod->Ol[u].ol_supply_w_id,ptr,szKey,pTPCC))
   {
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   sprintf(szKey,"IID%2.2d*",u);
   if (GetLongKey(&pnod->Ol[u].ol_i_id,ptr,szKey,pTPCC))
   {
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   sprintf(szKey,"Qty%2.2d*",u);
   if (GetShortKey(&pnod->Ol[u].ol_quantity,ptr,szKey,pTPCC))
   {
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   if (pnod->Ol[u].ol_i_id != 0)
   {
      // Check for prior blank lines
      if (bDone)
      {
         strcat(pTPCC->ErrTxt,"Embedded Empty Order Lines");
         pTPCC->iStatusId = ERR_EMBEDDED_EMPTY_OL;
         FormatMenu(pOut,pTPCC);
         return(TRUE);
      };
      if (pnod->Ol[u].ol_supply_w_id < 1)
      {
         sprintf(pTPCC->ErrTxt,
            "Order Line %ld Contains Invalid WId %d",
            u,pnod->Ol[u].ol_supply_w_id);
         pTPCC->iStatusId = ERR_WID_INVALID;
         FormatMenu(pOut,pTPCC);
         return(TRUE);
      };
      if (pnod->Ol[u].ol_quantity < MIN_QUANTITY ||
          pnod->Ol[u].ol_quantity > MAX_QUANTITY)
      {
         sprintf(pTPCC->ErrTxt,
            "Order Line %ld Contains Invalid Qty %d",
            u,pnod->Ol[u].ol_quantity);
         pTPCC->iStatusId = ERR_QUANTITY_INVALID;
         FormatMenu(pOut,pTPCC);
         return(TRUE);
      };
      pnod->o_ol_cnt++;
   }   // if (ol_i_id !=0)
   else
   {
      if (pnod->Ol[u].ol_supply_w_id != 0)
      {
         sprintf(pTPCC->ErrTxt,
            "Order Line %ld WId Supplied with No Item",u);
         pTPCC->iStatusId = ERR_OL_INVALID;
         FormatMenu(pOut,pTPCC);
         return(TRUE);
      };
      if (pnod->Ol[u].ol_quantity != 0)
      {
         sprintf(pTPCC->ErrTxt,
            "Order Line %ld Qty Supplied with No Item",u);
         pTPCC->iStatusId = ERR_OL_INVALID;
         FormatMenu(pOut,pTPCC);
         return(TRUE);
      };
      bDone = TRUE;
   };   // empty order line
};   // for (u < MAX_OL)

if (pnod->o_ol_cnt < MIN_OL)
{
   sprintf(pTPCC->ErrTxt,"Too Few Order Lines %d",pnod->o_ol_cnt);
   pTPCC->iStatusId = ERR_OL_COUNT;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
bTMRslt = TMTran(NEWORDER_SERVICE,pTMon,&bTPRslt,&iTPRslt);
pnod = (NEW_ORDER_DATA *) pTMon->pTMData;
if (bTMRslt)
{
   pTPCC->iStatusId = ERR_TM_INTERFACE;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
// Exclude invalid item id case
```

```
   if (bTPRslt && iTPRslt < SVC_NOERROR)
   {
      sprintf(pTPCC->ErrTxt,
         "New Order Service Returned Error(%ld): %s",
         iTPRslt,pnod->execution_status);
      pTPCC->iStatusId = ERR_SERVICE_RSLT;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   if (iTPRslt == SVC_BADITEMID)
      pTPCC->iStatusId = INVALID_IID;

   FormatRespHdr(pOut,"TPC-C New Order",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                  New Order<BR>"
      "Warehouse: %4.4d   District: %2.2d                          ",
      pnod->w_id,pnod->d_id);
   if (!bTPRslt)
     {
      sprintf(pOut + strlen(pOut),
         "Date: %2.2d-%2.2d-%4.4d %2.2d:%2.2d:%2.2d <BR>",
         pnod->o_entry_d.day,pnod->o_entry_d.month,
         pnod->o_entry_d.year,pnod->o_entry_d.hour,
         pnod->o_entry_d.minute,pnod->o_entry_d.second);
   }
   else
   {
      sprintf(pOut + strlen(pOut),"Date:<BR>");
   };
   FormatHTMLString(pTPCC->szWork,pnod->c_last,NAME_LEN);
   FormatHTMLString(szCredit,pnod->c_credit,2);
   sprintf(pOut + strlen(pOut),
      "Customer:  %4.4d   Name: %s   Credit: %s   ",
      pnod->c_id,pTPCC->szWork,szCredit);
   if (!bTPRslt)
   {
      sprintf(pOut + strlen(pOut),
         "%%Disc: %5.2f            <BR>",pnod->c_discount * 100);
      sprintf(pOut + strlen(pOut),
         "Order Number: %8.8d  Number of Lines: %2.2d        W_tax: %5.2f
D_tax: %5.2f  <BR><BR>",
         pnod->o_id,pnod->o_ol_cnt,pnod->w_tax * 100,pnod->d_tax * 100);
      strcat(pOut," Supp_W  Item_Id  Item Name                  Qty  Stock
B/G  Price    Amount<BR>");
      for (u = 0; u < (UINT) pnod->o_ol_cnt; u++)
      {
         FormatHTMLString(pTPCC->szWork,pnod->Ol[u].ol_i_name,24);
         sprintf(pOut + strlen(pOut),
            "  %4.4d   %6.6d   %s  %2.2d    %3.3d    %1.1s   $%6.2f
$%7.2f  <BR>",
            pnod->Ol[u].ol_supply_w_id,pnod->Ol[u].ol_i_id,
            pTPCC->szWork,pnod->Ol[u].ol_quantity,pnod->Ol[u].ol_stock,
            pnod->Ol[u].ol_brand_generic,pnod->Ol[u].ol_i_price,
            pnod->Ol[u].ol_amount );
      }
   }   // if (!bTPRslt)
   else
   {
      strcat(pOut,"%Disc:<BR>");
      sprintf(pOut + strlen(pOut),
         "Order Number: %8.8d  Number of Lines:              W_tax:
D_tax:<BR><BR>",
         pnod->o_id);
      strcat(pOut,
         " Supp_W  Item_Id  Item Name                  Qty  Stock  B/G
Price    Amount<BR>");
      u = 0;
   };
   for(; u < MAX_OL; u++)
      strcat(pOut,"<BR>");
   if (!bTPRslt)
   {
      sprintf(pOut + strlen(pOut),
         "Execution Status: %24.24s                   Total:  $%8.2f  ",
         pnod->execution_status,pnod->total_amount);
   }
   else
   {
      sprintf(pOut + strlen(pOut),
         "Execution Status: %24.24s                   Total:",
         pnod->execution_status);
   };
   sprintf(pOut + strlen(pOut),
      "</PRE><HR><BR>%s</FORM>%s",szMenuList,HTMLTrailer);

   return(FALSE);

};   // ProcessNewOrder

//============================================================================
//
// Function name: ProcessPayment
//
//    ProcessPayment extracts the input data fields from pIn, processes
//    the data, and returns a response in pOut.
//
//    Result:
//       FALSE - Payment processed successfully.
//       TRUE - Payment processing failed.
//
//============================================================================
BOOL ProcessPayment(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   PAYMENT_DATA * ppd;
   TMON_STATE * pTMon;
   BOOL bTMRslt;
   BOOL bTPRslt;
   INT iTPRslt;
   CHAR * pCredit;
   INT iCDLines;
   CHAR szWork2[60];
   CHAR szWork3[60];
   CHAR szWork4[60];
   CHAR szZip1[20];
   CHAR szZip2[20];
   INT i;

   pTMon = &pTPCC->tsTMon;
   pTMon->lTMDataLen = sizeof(PAYMENT_DATA);
   memset(pTMon->pTMData,0,pTMon->lTMDataLen);
   ppd = (PAYMENT_DATA *) pTMon->pTMData;
```

```
ppd->w_id = pTPCC->sWId;
// Get and validate DId
if (GetShortKey(&ppd->d_id,pIn,"DID*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (ppd->d_id < MIN_DId || ppd->d_id > MAX_DId)
{
   sprintf(pTPCC->ErrTxt,"DId Out of Range(%ld,%ld) - %ld",
      MIN_DId,MAX_DId,ppd->d_id);
   pTPCC->iStatusId = ERR_DID_INVALID;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
// Get and validate customer Id and name
if (GetLongKey(&ppd->c_id,pIn,"CID*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (GetStringKey(ppd->c_last,pIn,"CLT*",pTPCC,NAME_LEN))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (ppd->c_id == 0 && ppd->c_last[0] == 0)
{
   strcpy(pTPCC->ErrTxt,"Error - Customer Id and Name Empty");
   pTPCC->iStatusId = ERR_IDANDNAME_EMPTY;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
if (ppd->c_id != 0 && ppd->c_last[0] != 0)
{
   strcpy(pTPCC->ErrTxt,
      "Error - Specify Customer Id or Name, not Both");
   pTPCC->iStatusId = ERR_IDANDNAME_ENTERED;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
// Get and validate customer DId
if (GetShortKey(&ppd->c_d_id,pIn,"CDI*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (ppd->c_d_id < MIN_DId || ppd->c_d_id > MAX_DId)
{
   sprintf(pTPCC->ErrTxt,"Cust DId Out of Range(%ld,%ld) - %ld",
      MIN_DId,MAX_DId,ppd->d_id);
   pTPCC->iStatusId = ERR_DID_INVALID;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
// Get and validate customer WId
if (GetShortKey(&ppd->c_w_id,pIn,"CWI*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (ppd->c_w_id < 1)
{
   sprintf(pTPCC->ErrTxt,
      "Payment Contains Invalid Customer WId %d",
      ppd->c_w_id);
   pTPCC->iStatusId = ERR_WID_INVALID;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
// Get and validate amount
if (GetAmountKey(&ppd->h_amount,pIn,"HAM*",pTPCC))
{
  FormatMenu(pOut,pTPCC);
  return(TRUE);
};
if (ppd->h_amount <= 0)
{
   sprintf(pTPCC->ErrTxt,
      "Payment Amount Negative or Missing");
   pTPCC->iStatusId = ERR_AMOUNT_INVALID;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
bTMRslt = TMTran(PAYMENT_SERVICE,pTMon,&bTPRslt,&iTPRslt);
ppd = (PAYMENT_DATA *) pTMon->pTMData;
if (bTMRslt)
{
   pTPCC->iStatusId = ERR_TM_INTERFACE;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
if (bTPRslt)
{
   sprintf(pTPCC->ErrTxt,
      "Payment Service Returned Error(%ld): %s",
      iTPRslt,ppd->execution_status);
   pTPCC->iStatusId = ERR_SERVICE_RSLT;
   FormatMenu(pOut,pTPCC);
   return(TRUE);
};
FormatRespHdr(pOut,"TPC-C Payment",pTPCC);
sprintf(pOut + strlen(pOut),
       "<PRE>                                   Payment<BR>"
   "Date: %2.2d-%2.2d-%4.4d %2.2d:%2.2d:%2.2d <BR><BR>"
   "Warehouse: %4.4d"
   "                         District: %2.2d<BR>",
      ppd->h_date.day,ppd->h_date.month,
   ppd->h_date.year,ppd->h_date.hour,
   ppd->h_date.minute,ppd->h_date.second,
   ppd->w_id,ppd->d_id);

FormatHTMLString(szWork2,ppd->w_street_1,ADDR_LEN);
FormatHTMLString(szWork3,ppd->d_street_1,ADDR_LEN);
sprintf(pOut + strlen(pOut),
   "%s                      %s<BR>",szWork2,szWork3);
FormatHTMLString(szWork2,ppd->w_street_2,ADDR_LEN);
FormatHTMLString(szWork3,ppd->d_street_2,ADDR_LEN);
sprintf(pOut + strlen(pOut),
   "%s                      %s<BR>",szWork2,szWork3);
FormatHTMLString(pTPCC->szWork,ppd->w_city,ADDR_LEN);
FormatHTMLString(szWork2,ppd->d_city,ADDR_LEN);
```

```
   FormatHTMLString(szWork3,ppd->w_state,STATE_LEN);
   FormatHTMLString(szWork4,ppd->d_state,STATE_LEN);
   FormatString(szZip1,ZIPPIC,ppd->w_zip);
   FormatString(szZip2,ZIPPIC,ppd->d_zip);
   sprintf(pOut +  strlen(pOut),
      "%s %s %10.10s       %s %s %10.10s<BR><BR>",
      pTPCC->szWork,szWork3,szZip1,szWork2,szWork4,szZip2);
   FormatHTMLString(szWork2,ppd->c_first,NAME_LEN);
   FormatHTMLString(szWork3,ppd->c_middle,2);
   FormatHTMLString(szWork4,ppd->c_last,NAME_LEN);
   sprintf(pOut + strlen(pOut),
      "Customer: %4.4d  Cust-Warehouse: %4.4d  Cust-District: %2.2d<BR>"
      "Name:   %s %s %s     Since:  %2.2d-%2.2d-%4.4d<BR>",
      ppd->c_id,ppd->c_w_id,ppd->c_d_id,
      szWork2,szWork3,szWork4,
      ppd->c_since.day,ppd->c_since.month,ppd->c_since.year);
   FormatHTMLString(pTPCC->szWork,ppd->c_street_1,ADDR_LEN);
   FormatHTMLString(szWork2,ppd->c_credit,2);
   FormatHTMLString(szWork3,ppd->c_street_2,ADDR_LEN);
   sprintf(pOut + strlen(pOut),
      "        %s                     Credit: %s<BR>"
      "        %s                     %%Disc:  %5.2f<BR>",
      pTPCC->szWork,szWork2,szWork3,ppd->c_discount * 100);
   FormatHTMLString(szWork2,ppd->c_city,ADDR_LEN);
   FormatHTMLString(szWork3,ppd->c_state,STATE_LEN);
   FormatString(szZip1,ZIPPIC,ppd->c_zip);
   FormatString(szWork4,"XXXXXX-XXX-XXX-XXXX",ppd->c_phone);
   sprintf(pOut + strlen(pOut),
      "        %s %s %10.10s       Phone:  %-19.19s<BR><BR>"
      "Amount Paid:          $%7.2f      New Cust Balance: $%14.2f<BR>"
      "Credit Limit:   $%13.2f<BR><BR>",
      szWork2,szWork3,szZip1,szWork4,
      ppd->h_amount,ppd->c_balance,ppd->c_credit_lim);
   pCredit = ppd->c_credit;
   if (*pCredit == 'B' && *(pCredit + 1) == 'C')
   {
      pCredit = ppd->c_data;
      iCDLines = strlen(pCredit) / 50;
      for(i = 0; i < 4; i++, pCredit += 50)
      {
         if (i <= iCDLines)
            UtilStrCpy(szWork2,pCredit,50);
         else
            szWork2[0] = 0;
         FormatHTMLString(szWork3,szWork2,50);
         if (!i)
            sprintf(pOut + strlen(pOut),
               "Cust-Data: %s<BR>",szWork3);
         else
            sprintf(pOut + strlen(pOut),
               "           %s<BR>",szWork3);
      };
   }
   else
      strcat(pOut,"Cust-Data: <BR><BR><BR><BR>");
   sprintf(pOut + strlen(pOut),
      "</PRE><HR><BR>%s</FORM>%s",szMenuList,HTMLTrailer);

   return(FALSE);

};   // ProcessPayment
```

```
//======================================================================
//
// Function name: ProcessDelivery
//
//    ProcessDelivery extracts the input data fields from pIn, processes
//    the data, and returns a response in pOut.
//
//    Result:
//       FALSE - Delivery processed successfully.
//       TRUE - Delivery processing failed.
//
//======================================================================
BOOL ProcessDelivery(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   DELIVERY_DATA * pdd;
   TMON_STATE * pTMon;
   BOOL bTMRslt;

   pTMon = &pTPCC->tsTMon;
   pTMon->lTMDataLen = sizeof(DELIVERY_DATA);
   memset(pTMon->pTMData,0,pTMon->lTMDataLen);
   pdd = (DELIVERY_DATA *) pTMon->pTMData;
   pdd->w_id = pTPCC->sWId;
   // Get and validate carrier id
   if (GetShortKey(&pdd->o_carrier_id,pIn,"OCD*",pTPCC))
   {
     FormatMenu(pOut,pTPCC);
     return(TRUE);
   };
   if (pdd->o_carrier_id < MIN_CARRIER ||
       pdd->o_carrier_id > MAX_CARRIER)
   {
      sprintf(pTPCC->ErrTxt,"Carrier Id Out of Range(%ld,%ld) - %ld",
         MIN_CARRIER,MAX_CARRIER,pdd->o_carrier_id);
      pTPCC->iStatusId = ERR_CARRIER_INVALID;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   GetLocalTime(&pdd->QTime);
   bTMRslt = TMPost(DELIVERY_SERVICE,pTMon);
   if (bTMRslt)
   {
      pTPCC->iStatusId = ERR_TM_INTERFACE;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   strcpy(pdd->execution_status,"Delivery has been queued.");
   FormatRespHdr(pOut,"TPC-C Delivery",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                  Delivery<BR>"
      "Warehouse: %4.4d<BR><BR>"
      "Carrier Number: %2.2d<BR><BR>"
      "Execution Status: %25.25s<BR>",
      pdd->w_id,pdd->o_carrier_id,pdd->execution_status);
   sprintf(pOut + strlen(pOut),
      "</PRE><HR><BR>%s</FORM>%s",szMenuList,HTMLTrailer);

   return(FALSE);

};   // ProcessDelivery
```

```
//=========================================================================
//
// Function name: ProcessOrderStatus
//
//    ProcessOrderStatus extracts the input data fields from pIn,
//    processes the data, and returns a response in pOut.
//
//    Result:
//       FALSE - OrderStatus processed successfully.
//       TRUE - OrderStatus processing failed.
//
//=========================================================================
BOOL ProcessOrderStatus(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   ORDER_STATUS_DATA * posd;
   TMON_STATE * pTMon;
   INT i;
   CHAR szWork2[50];
   CHAR szWork3[50];
   BOOL bTMRslt;
   BOOL bTPRslt;
   INT iTPRslt;

   pTMon = &pTPCC->tsTMon;
   pTMon->lTMDataLen = sizeof(ORDER_STATUS_DATA);
   memset(pTMon->pTMData,0,pTMon->lTMDataLen);
   posd = (ORDER_STATUS_DATA *) pTMon->pTMData;
   posd->w_id = pTPCC->sWId;
   if (GetShortKey(&posd->d_id,pIn,"DID*",pTPCC))
   {
     FormatMenu(pOut,pTPCC);
     return(TRUE);
   };
   if (posd->d_id < MIN_DId || posd->d_id > MAX_DId)
   {
      sprintf(pTPCC->ErrTxt,"DId Out of Range(%ld,%ld) - %ld",
         MIN_DId,MAX_DId,posd->d_id);
      pTPCC->iStatusId = ERR_DID_INVALID;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   if (GetLongKey(&posd->c_id,pIn,"CID*",pTPCC))
   {
     FormatMenu(pOut,pTPCC);
     return(TRUE);
   };
   if (GetStringKey(posd->c_last,pIn,"CLT*",pTPCC,NAME_LEN))
   {
     FormatMenu(pOut,pTPCC);
     return(TRUE);
   };
   if (posd->c_id == 0 && posd->c_last[0] == 0)
   {
      strcpy(pTPCC->ErrTxt,"Error - Customer Id and Name Empty");
      pTPCC->iStatusId = ERR_IDANDNAME_EMPTY;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   if (posd->c_id != 0 && posd->c_last[0] != 0)
   {
      strcpy(pTPCC->ErrTxt,
         "Error - Specify Customer Id or Name, not Both");
      pTPCC->iStatusId = ERR_IDANDNAME_ENTERED;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   bTMRslt = TMTran(ORDERSTATUS_SERVICE,pTMon,&bTPRslt,&iTPRslt);
   posd = (ORDER_STATUS_DATA *) pTMon->pTMData;
   if (bTMRslt)
   {
      pTPCC->iStatusId = ERR_TM_INTERFACE;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   if (bTPRslt)
   {
      sprintf(pTPCC->ErrTxt,
         "Order Status Service Returned Error(%ld): %s",
         iTPRslt,posd->execution_status);
      pTPCC->iStatusId = ERR_SERVICE_RSLT;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   FormatRespHdr(pOut,"TPC-C Order-Status",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                Order-Status<BR>"
      "Warehouse: %4.4d   District: %2.2d<BR>",
      posd->w_id,posd->d_id);
   FormatHTMLString(pTPCC->szWork,posd->c_first,NAME_LEN);
   FormatHTMLString(szWork2,posd->c_middle,2);
   FormatHTMLString(szWork3,posd->c_last,NAME_LEN);
   sprintf(pOut + strlen(pOut),
      "Customer: %4.4d   Name: %s %s %s<BR>"
      "Cust-Balance: $%9.2f<BR><BR>",
      posd->c_id,pTPCC->szWork,szWork2,szWork3,posd->c_balance);
   sprintf(pOut + strlen(pOut),
      "Order-Number: %8.8d   Entry-Date: %2.2d-%2.2d-%4.4d
%2.2d:%2.2d:%2.2d   Carrier-Number: %2.2d<BR>"
      "Supply-W     Item-Id    Qty     Amount      Delivery-Date<BR>",
      posd->o_id,posd->o_entry_d.day,posd->o_entry_d.month,
      posd->o_entry_d.year,posd->o_entry_d.hour,
      posd->o_entry_d.minute,posd->o_entry_d.second,
      posd->o_carrier_id);
   for(i = 0; i < posd->o_ol_cnt; i++)
   {
      sprintf(pOut + strlen(pOut),
         "  %4.4d       %6.6d     %2.2d     $%8.2f      %2.2d-%2.2d-
%4.4d<BR>",
         posd->OlOrderStatusData[i].ol_supply_w_id,
         posd->OlOrderStatusData[i].ol_i_id,
         posd->OlOrderStatusData[i].ol_quantity,
         posd->OlOrderStatusData[i].ol_amount,
         posd->OlOrderStatusData[i].ol_delivery_d.day,
         posd->OlOrderStatusData[i].ol_delivery_d.month,
         posd->OlOrderStatusData[i].ol_delivery_d.year);
   };
   sprintf(pOut + strlen(pOut),
      "<BR></PRE><HR><BR>%s</FORM>%s",szMenuList,HTMLTrailer);

   return(FALSE);
```

```
};   // ProcessOrderStatus

//============================================================================
//
// Function name: ProcessStockLevel
//
//    ProcessStockLevel extracts the input data fields from pIn,
//    processes the data, and returns a response in pOut.
//
//    Result:
//       FALSE - StockLevel processed successfully.
//       TRUE - StockLevel processing failed.
//
//============================================================================
BOOL ProcessStockLevel(CHAR * pIn,CHAR * pOut,TPCC_STATE * pTPCC)
{
   STOCK_LEVEL_DATA * psld;
   TMON_STATE * pTMon;
   BOOL bTMRslt;
   BOOL bTPRslt;
   INT iTPRslt;

   pTMon = &pTPCC->tsTMon;
   pTMon->lTMDataLen = sizeof(STOCK_LEVEL_DATA);
   memset(pTMon->pTMData,0,pTMon->lTMDataLen);
   psld = (STOCK_LEVEL_DATA *) pTMon->pTMData;
   psld->w_id = pTPCC->sWId;
   psld->d_id = pTPCC->sDId;
   psld->low_stock = 0;
   psld->execution_status[0] = 0;
   if (GetShortKey(&psld->thresh_hold,pIn,"TT*",pTPCC))
   {
     FormatMenu(pOut,pTPCC);
     return(TRUE);
   };
   if (psld->thresh_hold < MIN_THRESHOLD ||
       psld->thresh_hold > MAX_THRESHOLD)
   {
      sprintf(pTPCC->ErrTxt,"Threshold Out of Range(%ld,%ld) - %ld",
         MIN_THRESHOLD,MAX_THRESHOLD,psld->thresh_hold);
      pTPCC->iStatusId = ERR_THRESHOLD_RANGE;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };

   bTMRslt = TMTran(STOCKLEVEL_SERVICE,pTMon,&bTPRslt,&iTPRslt);
   psld = (STOCK_LEVEL_DATA *) pTMon->pTMData;
   if (bTMRslt)
   {
      pTPCC->iStatusId = ERR_TM_INTERFACE;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };
   if (bTPRslt)
   {
      sprintf(pTPCC->ErrTxt,
         "Stock Level Service Returned Error(%ld): %s",
         iTPRslt,psld->execution_status);
      pTPCC->iStatusId = ERR_SERVICE_RSLT;
      FormatMenu(pOut,pTPCC);
      return(TRUE);
   };

   FormatRespHdr(pOut,"TPC-C Stock Level",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                Stock-Level<BR>"
      "Warehouse: %4.4d   District: %2.2d<BR><BR>"
      "Stock Level Threshold: %2.2d<BR><BR>"
      "low stock: %3.3ld</PRE><BR><HR>"
      "%s</FORM>%s",
      pTPCC->sWId,pTPCC->sDId,psld->thresh_hold,psld->low_stock,
      szMenuList,HTMLTrailer);

   return(FALSE);

};   // ProcessStockLevel

//============================================================================
//
// Function name: GetHidden
//
//============================================================================
BOOL GetHidden(CHAR * pMsg,UINT * uFormId,INT * iSyncId,INT * iTermId)
{
   CHAR * pPtr;
   BOOL bRslt = TRUE;

   // Extract TERMID
   pPtr = strstr(pMsg,TERMIDTOKEN);
   if (pPtr == NULL)
      goto xit;
   pPtr += strlen(TERMIDTOKEN);
   *iTermId = atoi(pPtr);

   // Extract SYNCID
   pPtr = strstr(pMsg,SYNCIDTOKEN);
   if (pPtr == NULL)
      goto xit;
   pPtr += strlen(SYNCIDTOKEN);
   *iSyncId = atoi(pPtr);

   // Extract FORMID
   pPtr = strstr(pMsg,FORMIDTOKEN);
   if (pPtr == NULL)
      goto xit;
   pPtr += strlen(FORMIDTOKEN);
   *uFormId = abs(atoi(pPtr));

   bRslt = FALSE;

xit:

   return(bRslt);

};   // GetHidden

//============================================================================
//
// Function name: GetCmd
//
//============================================================================
BOOL GetCmd(CHAR * pMsg,CHAR * pWork,UINT uLen)
```

```
{
   UINT u;
   CHAR * ptr;
   CHAR * pUpd;

   // Check for CMD key
   if (!(ptr = strstr(pMsg,CMDTOKEN)))
      return(CMD_NULL);
   ptr += sizeof(CMDTOKEN);
   pUpd = pWork;
   while (*ptr && *ptr != '&')
      *pUpd++ = *ptr++;
   *pUpd = 0;

   // Convert command name into command index
   for(u=0; u < CMD_MAX; u++)
   {
      if (!strcmp(szCmds[u],pWork))
         return(u);
   };

   // Command string not found
   return(CMD_NULL);

};   // GetCmd

//============================================================================
//
// Function name: GetLongKey
//
//============================================================================
BOOL GetLongKey(LONG * lRslt,CHAR * pHTML,CHAR * pKey,TPCC_STATE * pTPCC)
{
   if (GetKeyValue(pHTML,pKey,pTPCC->szWork,sizeof(pTPCC->szWork)))
   {
      sprintf(pTPCC->ErrTxt,"Error - Missing %s Key",pKey);
      pTPCC->iStatusId = ERR_MISSING_KEY;
      return(TRUE);
   };
   if (pTPCC->szWork[0] != 0 )
   {
      if (CheckNumeric(pTPCC->szWork))
      {
         sprintf(pTPCC->ErrTxt,"Error - %s Value Not Numeric",pKey);
         pTPCC->iStatusId = ERR_NOT_NUMERIC;
         return(TRUE);
      };
   };
   *lRslt = atol(pTPCC->szWork);
   return(FALSE);
};   // GetLongKey

//============================================================================
//
// Function name: GetIntKey
//
//============================================================================
BOOL GetIntKey(INT * iRslt,CHAR * pHTML,CHAR * pKey,TPCC_STATE * pTPCC)
{
   if (GetKeyValue(pHTML,pKey,pTPCC->szWork,sizeof(pTPCC->szWork)))
   {
      sprintf(pTPCC->ErrTxt,"Error - Missing %s Key",pKey);
      pTPCC->iStatusId = ERR_MISSING_KEY;
      return(TRUE);
   };
   if (pTPCC->szWork[0] != 0 )
   {
      if (CheckNumeric(pTPCC->szWork))
      {
         sprintf(pTPCC->ErrTxt,"Error - %s Value Not Numeric",pKey);
         pTPCC->iStatusId = ERR_NOT_NUMERIC;
         return(TRUE);
      };
   };
   *iRslt = atoi(pTPCC->szWork);
   return(FALSE);
};   // GetIntKey

//============================================================================
//
// Function name: GetShortKey
//
//============================================================================
BOOL GetShortKey(SHORT * sRslt,CHAR * pHTML,CHAR * pKey,TPCC_STATE *
pTPCC)
{
   if (GetKeyValue(pHTML,pKey,pTPCC->szWork,sizeof(pTPCC->szWork)))
   {
      sprintf(pTPCC->ErrTxt,"Error - Missing %s Key",pKey);
      pTPCC->iStatusId = ERR_MISSING_KEY;
      return(TRUE);
   };
   if (pTPCC->szWork[0] != 0 )
   {
      if (CheckNumeric(pTPCC->szWork))
      {
         sprintf(pTPCC->ErrTxt,"Error - %s Value Not Numeric",pKey);
         pTPCC->iStatusId = ERR_NOT_NUMERIC;
         return(TRUE);
      };
   };
   *sRslt = (SHORT) atoi(pTPCC->szWork);
   return(FALSE);
};   // GetShortKey

//============================================================================
//
// Function name: GetStringKey
//
//============================================================================
BOOL GetStringKey(CHAR * szRslt,CHAR * pHTML,CHAR * pKey,
                  TPCC_STATE * pTPCC,UINT uMax)
{
   UINT uLen;
   if (GetKeyValue(pHTML,pKey,pTPCC->szWork,sizeof(pTPCC->szWork)))
   {
      sprintf(pTPCC->ErrTxt,"Error - Missing %s Key",pKey);
      pTPCC->iStatusId = ERR_MISSING_KEY;
      return(TRUE);
   };
   uLen = strlen(pTPCC->szWork);
   if (uLen > uMax)
```

```
   {
      sprintf(pTPCC->ErrTxt,
         "Error - %s Key Input (%ld) Too Long (%ld)"
         ,pKey,uLen,uMax);
      pTPCC->iStatusId = ERR_INPUT_TOOLONG;
      return(TRUE);
   };
   _strupr(pTPCC->szWork);
   strcpy(szRslt,pTPCC->szWork);
   return(FALSE);
};   // GetStringKey

//=========================================================================
//
// Function name: GetAmountKey
//
//=========================================================================
BOOL GetAmountKey(DOUBLE * dRslt,CHAR * pHTML,CHAR * pKey,
                  TPCC_STATE * pTPCC)
{
   CHAR * ptr;
   BOOL bInvalid = FALSE;

   if (GetKeyValue(pHTML,pKey,pTPCC->szWork,sizeof(pTPCC->szWork)))
   {
      sprintf(pTPCC->ErrTxt,"Error - Missing %s Key",pKey);
      pTPCC->iStatusId = ERR_MISSING_KEY;
      return(TRUE);
   };
   ptr = pTPCC->szWork;
   while(*ptr)
   {
      if (*ptr == '.')
      {
         ptr++;
         if (!*ptr)
            break;
         if (*ptr < '0' || *ptr > '9')
         {
            bInvalid = TRUE;
            break;
         };
         ptr++;
         if (!*ptr)
            break;
         if (*ptr < '0' || *ptr > '9')
         {
            bInvalid = TRUE;
            break;
         };
         ptr++;
         if (*ptr)
         {
            bInvalid = TRUE;
            break;
         };
         break;
      }
      else
      if (*ptr < '0' || *ptr > '9')
      {
         bInvalid = TRUE;
         break;
      };
            ptr++;
       };   // while(!*ptr)

   if (!bInvalid)
      *dRslt = atof(pTPCC->szWork);
   else
   {
      sprintf(pTPCC->ErrTxt,
         "Error - Invalid Amount Format (%s)",pTPCC->szWork);
      pTPCC->iStatusId = ERR_AMOUNT_BADFORM;
   };

   return(bInvalid);

};   // GetAmountKey

//=========================================================================
//
// Function name: GetKeyValue
//   This function parses an HTTP formatted string for specific key
//   values.  HTTP keys terminate with '='.  HTTP values terminate
//   with an '&' or '\0'.
//
//    Result:
//       FALSE - Key found, string value return in pValue
//       TRUE - Key not found
//
//=========================================================================
BOOL GetKeyValue(CHAR * pHTML,CHAR * pKey,CHAR * pValue,UINT uMax)
{
   CHAR * ptr;
   if (!(ptr=strstr(pHTML,pKey)))
      return(TRUE);
   if (!(ptr=strchr(ptr,'=')))
      return(TRUE);
   ptr++;
   uMax--;
   while (*ptr && *ptr != '&' && uMax)
   {
      *pValue++ = *ptr++;
      uMax--;
   };
   *pValue = 0;
   return(FALSE);
};   // GetKeyValue

//=========================================================================
//
// Function name: FormatLogin
//
//=========================================================================
VOID FormatLogin(CHAR * pOut,CHAR * pAddText)
{
   sprintf(pOut,"%s<BR>%s<BR>%s",szFormLogin,pAddText,HTMLTrailer);
};   // FormatLogin

//=========================================================================
//
```

```
// Function name: FormatMenu
//
//==============================================================================
VOID FormatMenu(CHAR * pOut,TPCC_STATE * pTPCC)
{
   sprintf(pOut,
      "%s<HTML><HEAD><TITLE>TPC-C MainMenu</TITLE></HEAD><BODY>"
      "Select Desired Transaction.<BR><HR>"
      "<FORM ACTION=\"tpcc.dll\"METHOD=\"GET\">"
      "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
      "%s</FORM><BR>%s<BR>%s",
      HTTPHdr,pTPCC->iStatusId,pTPCC->iTermId,pTPCC->iSyncId,FORM_MENU,
      szMenuList,pTPCC->ErrTxt,HTMLTrailer);
};   // FormatMenu

//==============================================================================
//
// Function name: FormatNewOrder
//
//==============================================================================
VOID FormatNewOrder(CHAR * pOut,TPCC_STATE * pTPCC)
{
   pTPCC->uFormId = FORM_NEWORDER;
   FormatFormHdr(pOut,"TPC-C New Order",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                  New Order<BR>"
      "Warehouse: %4.4d   District: <INPUT NAME=\"DID*\" SIZE=1>
Date:<BR>"
               "Customer:  <INPUT NAME=\"CID*\" SIZE=4>   Name:
Credit:      %Disc:<BR>"
      "Order Number:           Number of Lines:           W_tax:
D_tax:<BR><BR>"
      " Supp_W  Item_Id  Item Name                 Qty  Stock  B/G  Price
Amount<BR>"
      " <INPUT NAME=\"SP00*\" SIZE=4>  <INPUT NAME=\"IID00*\" SIZE=6>
<INPUT NAME=\"Qty00*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP01*\" SIZE=4>  <INPUT NAME=\"IID01*\" SIZE=6>
<INPUT NAME=\"Qty01*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP02*\" SIZE=4>  <INPUT NAME=\"IID02*\" SIZE=6>
<INPUT NAME=\"Qty02*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP03*\" SIZE=4>  <INPUT NAME=\"IID03*\" SIZE=6>
<INPUT NAME=\"Qty03*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP04*\" SIZE=4>  <INPUT NAME=\"IID04*\" SIZE=6>
<INPUT NAME=\"Qty04*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP05*\" SIZE=4>  <INPUT NAME=\"IID05*\" SIZE=6>
<INPUT NAME=\"Qty05*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP06*\" SIZE=4>  <INPUT NAME=\"IID06*\" SIZE=6>
<INPUT NAME=\"Qty06*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP07*\" SIZE=4>  <INPUT NAME=\"IID07*\" SIZE=6>
<INPUT NAME=\"Qty07*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP08*\" SIZE=4>  <INPUT NAME=\"IID08*\" SIZE=6>
<INPUT NAME=\"Qty08*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP09*\" SIZE=4>  <INPUT NAME=\"IID09*\" SIZE=6>
<INPUT NAME=\"Qty09*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP10*\" SIZE=4>  <INPUT NAME=\"IID10*\" SIZE=6>
<INPUT NAME=\"Qty10*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP11*\" SIZE=4>  <INPUT NAME=\"IID11*\" SIZE=6>
<INPUT NAME=\"Qty11*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP12*\" SIZE=4>  <INPUT NAME=\"IID12*\" SIZE=6>
<INPUT NAME=\"Qty12*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP13*\" SIZE=4>  <INPUT NAME=\"IID13*\" SIZE=6>
<INPUT NAME=\"Qty13*\" SIZE=1><BR>"
      " <INPUT NAME=\"SP14*\" SIZE=4>  <INPUT NAME=\"IID14*\" SIZE=6>
<INPUT NAME=\"Qty14*\" SIZE=1><BR>"
      "Execution Status:
Total:<BR><HR>"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Process\">"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Menu\">"
      "</FORM>%s",
      pTPCC->sWId,HTMLTrailer);
};   // FormatNewOrder

//==============================================================================
//
// Function name: FormatPayment
//
//==============================================================================
VOID FormatPayment(CHAR * pOut,TPCC_STATE * pTPCC)
{
   pTPCC->uFormId = FORM_PAYMENT;
   FormatFormHdr(pOut,"TPC-C Payment",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                    Payment<BR>"
      "Date:<BR><BR>"
      "Warehouse: %4.4d"
      "                          District: <INPUT NAME=\"DID*\"
SIZE=1><BR><BR><BR><BR><BR>"
      "Customer: <INPUT NAME=\"CID*\" SIZE=4>"
      "Cust-Warehouse: <INPUT NAME=\"CWI*\" SIZE=4>  "
      "Cust-District: <INPUT NAME=\"CDI*\" SIZE=1><BR>"
      "Name:                        <INPUT NAME=\"CLT*\" SIZE=16>
Since:<BR>"
      "                                                    Credit:<BR>"
      "                                                    Disc:<BR>"
      "                                                    Phone:<BR><BR>"
      "Amount Paid:          $<INPUT NAME=\"HAM*\" SIZE=7>      New Cust
Balance:<BR>"
      "Credit Limit:<BR><BR>Cust-Data: <BR><BR><BR><BR></PRE><HR>"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Process\">"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Menu\">"
      "</FORM>%s",
      pTPCC->sWId,HTMLTrailer);
};   // FormatPayment

//==============================================================================
//
// Function name: FormatDelivery
//
//==============================================================================
VOID FormatDelivery(CHAR * pOut,TPCC_STATE * pTPCC)
{
   pTPCC->uFormId = FORM_DELIVERY;
   FormatFormHdr(pOut,"TPC-C Delivery",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                    Delivery<BR>"
      "Warehouse: %4.4d<BR><BR>"
      "Carrier Number: <INPUT NAME=\"OCD*\" SIZE=1><BR><BR>"
      "Execution Status:<BR></PRE><HR>"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Process\">"
```

```
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Menu\">"
      "</FORM>%s",
      pTPCC->sWId,HTMLTrailer);
};   // FormatDelivery

//================================================================================
//
// Function name: FormatOrderStatus
//
//================================================================================
VOID FormatOrderStatus(CHAR * pOut,TPCC_STATE * pTPCC)
{
   pTPCC->uFormId = FORM_ORDERSTATUS;
   FormatFormHdr(pOut,"TPC-C Order-Status",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                  Order-Status<BR>"
      "Warehouse: %4.4d   "
      "District: <INPUT NAME=\"DID*\" SIZE=1><BR>"
               "Customer: <INPUT NAME=\"CID*\" SIZE=4>   Name:
<INPUT NAME=\"CLT*\" SIZE=23><BR>"
      "Cust-Balance:<BR><BR>"
      "Order-Number:            Entry-Date:                          Carrier-
Number:<BR>"
      "Supply-W     Item-Id    Qty     Amount      Delivery-
Date<BR></PRE><HR>"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Process\">"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Menu\">"
      "</FORM>%s",
      pTPCC->sWId,HTMLTrailer);
};   // FormatOrderStatus

//================================================================================
//
// Function name: FormatStockLevel
//
//================================================================================
VOID FormatStockLevel(CHAR * pOut,TPCC_STATE * pTPCC)
{
   pTPCC->uFormId = FORM_STOCKLEVEL;
   FormatFormHdr(pOut,"TPC-C Stock Level",pTPCC);
   sprintf(pOut + strlen(pOut),
      "<PRE>                                  Stock-Level<BR>"
      "Warehouse: %4.4d   District: %2.2d<BR><BR>"
      "Stock Level Threshold: <INPUT NAME=\"TT*\"SIZE=2><BR><BR>"
      "low stock:    <BR><HR>"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Process\">"
      "<INPUT TYPE=\"submit\"NAME=\"CMD\" VALUE=\"Menu\">"
      "</FORM>%s",
      pTPCC->sWId,pTPCC->sDId,HTMLTrailer);
};   // FormatStockLevel

//================================================================================
//
// Function name: FormatFormHdr
//
//================================================================================
VOID FormatFormHdr(CHAR * pOut,CHAR * pTitle,TPCC_STATE * pTPCC)
{
   sprintf(pOut,
      "%s<HTML><HEAD><TITLE>%s</TITLE></HEAD>"
      "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
      "<INPUT TYPE=\"hidden\" NAME=\"PI*\" VALUE=\"\">"
      "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"0\">"
      "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
      HTTPHdr,pTitle,pTPCC->uFormId,pTPCC->iTermId,pTPCC->iSyncId);
};   // FormatFormHdr

//================================================================================
//
// Function name: FormatRespHdr
//
//================================================================================
VOID FormatRespHdr(CHAR * pOut,CHAR * pTitle,TPCC_STATE * pTPCC)
{
   sprintf(pOut,
      "%s<HTML><HEAD><TITLE>%s</TITLE></HEAD>"
      "<FORM ACTION=\"tpcc.dll\" METHOD=\"GET\">"
      "<INPUT TYPE=\"hidden\" NAME=\"STATUSID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"FORMID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"TERMID\" VALUE=\"%d\">"
      "<INPUT TYPE=\"hidden\" NAME=\"SYNCID\" VALUE=\"%d\">",
      HTTPHdr,pTitle,pTPCC->iStatusId,pTPCC->uFormId,
      pTPCC->iTermId,pTPCC->iSyncId);
};   // FormatRespHdr

//================================================================================
//
// Function name: FormatHTMLString
//
//    Encodes HTML special characters.  If necessary, space fills
//    to pOut to total uLen characters.
//
//================================================================================
VOID FormatHTMLString(CHAR * pOut,CHAR * pIn,UINT uLen)
{
   while (uLen && *pIn)
   {
      *pOut++ = *pIn++;
      uLen--;
   };   // while (uLen && *pIn)
   while(uLen--)
      *pOut++ = ' ';
       *pOut = 0;
};   // FormatHTMLString

//================================================================================
//
// Function name: FormatString
//
//    Encodes formatted string for HTML transmission.
//
//================================================================================
VOID FormatString(CHAR * pOut,CHAR * pPic,CHAR * pIn)
{
   while(*pPic)
   {
      if (*pPic == 'X' )
      {
         if (*pIn)
            *pOut++ = *pIn++;
```

```
         else
            *pOut++ = ' ';
      }
      else
         *pOut++ = *pPic;
      pPic++;
   };
   *pOut = 0;
};   // FormatString

//=========================================================================
// FUNCTION: UtilStrCpy
//
//    Copies n characters from string pSrc to pDst and places a null
//    null character at the end of the destination string.  Unlike
//    strncpy this function ensures that the result string is always
//    null terminated.
//
//=========================================================================
VOID UtilStrCpy(CHAR * pDest,CHAR * pSrc,INT n)
{
   strncpy(pDest,pSrc,n);
   pDest[n] = '\0';
   return;
};   // UtilStrCpy

//=========================================================================
//
// Function name: CheckNumeric
//
//    Result
//       FALSE - string is all numeric
//       TRUE - sting contains non-numeric characters
//
//=========================================================================
BOOL CheckNumeric(CHAR * pNum)
{
   if (*pNum == 0 )
      return(TRUE);
   while (*pNum && isdigit(*pNum))
      pNum++;
   return(*pNum);
};   // CheckNumeric
```

term.h

```
// term.h

#include <sys\timeb.h>

#define TMILLI_TIMEOUT 3600000       // One hour

typedef struct
{
   BOOL bInUse;                        // In use flag
   INT iTermId;                        // TermId
   LPVOID ConnID;                      // Connection Id
   INT  iSyncId;                       // Sync Id
   SHORT sWId;                         // TPCC WareHouse Id
   SHORT sDId;                         // TPCC District Id
   struct _timeb tbLastAccess;         // Last activity timestamp
} TERM_STATE;

BOOL TermInit(INT iSetMaxTerm);
VOID TermTerm(VOID);
TERM_STATE * TermAlloc(VOID);
TERM_STATE * TermGet(INT iTermId);
BOOL TermFree(INT iTermId);
```

term.c

```
// term.c
//
// Copyright Unisys, 1997
//
#include <windows.h>
#include <stdio.h>
#include "diagio.h"
#include "timesupp.h"
#include "term.h"

TERM_STATE * pTArray;
INT iNextTerm = 0;
INT iMaxTerm = 0;
CRITICAL_SECTION csTerm;

VOID TermMaint(VOID);

//=========================================================================
//
// Function name: TermInit
//    Creates and initializes the first TERMINITIAL TArray entries.
//    Initializes critical section to control access to TArray.  Assumes
//    access to function is single threaded, no other threads will start
//    until this function completes and that function is called once
//    (DLL_PROCESS_ATTACH).
//
// Returns:
//    FALSE TArray allocated and initialized
//    TRUE  TArray allocation failure
//
//=========================================================================
BOOL TermInit(INT iSetMaxTerm)
{
   INT iTermId;
   CHAR szDiag[MAX_DIAG_SZ];
   if (pTArray != NULL)
   {
      sprintf(szDiag,"TermInit(%ld): TArray Already Initialized\n",
         GetCurrentThreadId());
      DiagIoWrite(szDiag,DIAG_ERROR);
      return(TRUE);
   };
   InitializeCriticalSection(&csTerm);
   iMaxTerm = iSetMaxTerm;
   pTArray = (TERM_STATE *) malloc(sizeof(TERM_STATE) * (iMaxTerm + 1));
   if (pTArray == NULL)
   {
      sprintf(szDiag,"TermInit(%ld): malloc failed (%ld)\n",
```

```
         GetCurrentThreadId(),GetLastError());
      DiagIoWrite(szDiag,DIAG_ERROR);
      return(TRUE);
   }
   for (iTermId = 1; iTermId <= iMaxTerm; iTermId++)
      TermFree(iTermId);
   iNextTerm = 1;
   return(FALSE);
};   // TermInit

//=========================================================================
//
// Function name: TermTerm
//    Frees TArray and deletes csTerm critical section.  Assumes access
//    to function is single threaded and no other threads are actively
//    accessing TArray entries (DLL_PROCESS_DETACH).
//
//=========================================================================
VOID TermTerm(VOID)
{
   DeleteCriticalSection(&csTerm);
   if (pTArray != NULL)
      free(pTArray);
   iNextTerm = 0;
   iMaxTerm =0;
};   // TermTerm

//=========================================================================
//
// Function name: TermAlloc
//    Allocates empty TArray.  Uses iNextTerm to start search.
//
// Returns:
//    > 0   TArray entry index (iTermId)
//    < 0   Empty TArray entry not available
//
//=========================================================================
TERM_STATE * TermAlloc(VOID)
{
   INT iTermId = -1;
   if (pTArray == NULL)
   {
      CHAR szDiag[MAX_DIAG_SZ];
      sprintf(szDiag,"TermAlloc(%ld): Term Array Not Allocated\n",
         GetCurrentThreadId());
      DiagIoWrite(szDiag,DIAG_ERROR);
      return(NULL);
   };
   EnterCriticalSection(&csTerm);
   __try
   {
      while(iNextTerm <= iMaxTerm)
      {
         if (!pTArray[iNextTerm].bInUse)
         {
            pTArray[iNextTerm].bInUse = TRUE;
            _ftime(&pTArray[iNextTerm].tbLastAccess);
            iTermId = iNextTerm;
            iNextTerm++;
            break;
         };
         iNextTerm++;
      };   // while(iNextTerm <= iMaxTerm) (1st Try)
      if (iTermId <= 0)
      {
         // No entry found.  Perform maint and try again
         TermMaint();
         iNextTerm = 1;
         while(iNextTerm <= iMaxTerm)
         {
            if (!pTArray[iNextTerm].bInUse)
            {
               pTArray[iNextTerm].bInUse = TRUE;
               _ftime(&pTArray[iNextTerm].tbLastAccess);
               iTermId = iNextTerm;
               iNextTerm++;
               break;
            };
            iNextTerm++;
         };   // while(iNextTerm <= iMaxTerm) (2nd Try)
      };   // if (iTermId <= 0)
      if (iTermId <= 0)
         iNextTerm = 1;
   }
   __finally
   {
      LeaveCriticalSection(&csTerm);
   };

   if (iTermId > 0)
      return(&pTArray[iTermId]);
   else
      return(NULL);


};   // TermAlloc

//=========================================================================
//
// Function name: TermMaint
//    Clears entries whose last access time exceeds TMILLI_TIMEOUT.
//    Assumes caller has entered csTerm.
//
//=========================================================================
VOID TermMaint(VOID)
{
   INT iTermId;
   TMILLI tmElapsed;
   // Free entries that have timed out
   for (iTermId = 1; iTermId <= iMaxTerm; iTermId++)
   {
      if (pTArray[iTermId].bInUse)
      {
         tmElapsed = TimebElapsed(&pTArray[iTermId].tbLastAccess);
         if (tmElapsed > TMILLI_TIMEOUT)
            TermFree(iTermId);
      };
   };
};   // TermMaint

//=========================================================================
//
```

```
// Function name: TermGet
//    Returns pointer to TArray slot at iTermId.
//
// Returns:
//    FALSE TArray entry made available
//    TRUE  iTermId invalid.
//
//=============================================================================
TERM_STATE * TermGet(INT iTermId)
{
   TERM_STATE * pTerm;
   TMILLI tmElapsed;
   if (iTermId <= 0 || iTermId > iMaxTerm)
   {
      CHAR szDiag[MAX_DIAG_SZ];
      sprintf(szDiag,"TermGet(%ld): Invalid TermId (%ld)\n",
         GetCurrentThreadId(),iTermId);
      DiagIoWrite(szDiag,DIAG_ERROR);
      return(NULL);
   };
   pTerm = &pTArray[iTermId];
   if (!pTerm->bInUse)
      return(NULL);
   tmElapsed = TimebElapsed(&pTerm->tbLastAccess);
   if (tmElapsed > TMILLI_TIMEOUT)
      return(NULL);   // Entry destined to be freed by maint
   _ftime(&pTArray[iTermId].tbLastAccess);
   return(&pTArray[iTermId]);
};   // TermGet

//=============================================================================
//
// Function name: TermFree
//    Initializes contents of TArray slot at iTermId.
//
// Returns:
//    FALSE TArray entry made available
//    TRUE  iTermId invalid.
//
//=============================================================================
BOOL TermFree(INT iTermId)
{
   TERM_STATE * pTerm;
   if (iTermId <= 0 || iTermId > iMaxTerm)
   {
      CHAR szDiag[MAX_DIAG_SZ];
      sprintf(szDiag,"TermFree(%ld): Invalid TermId (%ld)\n",
         GetCurrentThreadId(),iTermId);
      DiagIoWrite(szDiag,DIAG_ERROR);
      return(TRUE);
   };
   pTerm = &pTArray[iTermId];
   pTerm->ConnID = 0;
   pTerm->sWId = 0;
   pTerm->sDId = 0;
   pTerm->iSyncId = 0;
   pTerm->iTermId = iTermId;
   TimebClear(&pTerm->tbLastAccess);
   pTerm->bInUse = FALSE;
};   // TermFree
```

tmon.h

```
// tmon.h

typedef struct
{
   CHAR * pszErrTxt;                    // Error text
   CHAR * pTMData;                      // TM buffer area
   LONG lTMDataLen;                     // TM buffer len
} TMON_STATE;

VOID TMonInit(INT iSetMaxMsg);
VOID TMonTerm(VOID);
BOOL TMInit(TMON_STATE * pTMon);
VOID TMDone(TMON_STATE * pTMon);
BOOL TMTran(CHAR * pService,TMON_STATE * pTMon,
            BOOL * bTPRslt,INT * iTPRslt);
BOOL TMPost(CHAR * pService,TMON_STATE * pTMon);
```

tmon.c

```
// tmon.c
//
// Copyright Unisys, 1997
//
#include <windows.h>
#include <stdio.h>
#include <atmi.h>
#include "tmon.h"

INT iTMMaxSz;

//=============================================================================
//
// Function name: TMonInit
//
//=============================================================================
VOID TMonInit(INT iSetMaxMsg)
{
   iTMMaxSz = iSetMaxMsg;
};   // TMonInit


//=============================================================================
//
// Function name: TMonTerm
//
//=============================================================================
VOID TMonTerm(VOID)
{
};   // TMonTerm

//=============================================================================
//
// Function name: TMInit
//
//    Result:
//       FALSE    Initialization completed successfully
//       TRUE     Initialization failed
//
```

```
//==========================================================================
BOOL TMInit(TMON_STATE * pTMon)
{
   BOOL bRslt = FALSE;
   TPINIT * tpinfo;

   // Must have ErrTxt message area set before init
   if (pTMon->pszErrTxt == NULL)
      return(TRUE);
   tpinfo = (TPINIT *) tpalloc("TPINIT",NULL,TPINITNEED(20));
   memset(tpinfo,0,sizeof(TPINIT));
   tpinfo->flags=TPMULTICONTEXTS;
   sprintf(tpinfo->cltname,"tpcc%d",GetCurrentThreadId());

   if (tpinit(tpinfo) == -1)
   {
      sprintf(pTMon->pszErrTxt,"TPInit Failed(%ld)",tperrno);
      bRslt = TRUE;
   }
   else
   {
      pTMon->pTMData = tpalloc("CARRAY",NULL,iTMMaxSz);
      if (pTMon->pTMData == NULL)
      {
         sprintf(pTMon->pszErrTxt,"TPAlloc Failed(%ld)",tperrno);
         bRslt = TRUE;
      };
   };

   return(bRslt);

};   // TMInit

//==========================================================================
//
// Function name: TMDone
//
//==========================================================================
VOID TMDone(TMON_STATE * pTMon)
{
   tpfree(pTMon->pTMData);
   tpterm();
};   // TMDone

//==========================================================================
//
// Function name: TMTran
//
//    Result:
//       FALSE    call completed. bTPRslt contains outcome (FALSE tran
//                success).  iTPRslt contains application returned
//                result code.
//       TRUE     TM interface error, ErrTxt has diagnostic.
//
//==========================================================================
BOOL TMTran(CHAR * pService,TMON_STATE * pTMon,
            BOOL * bTPRslt,INT * iTPRslt)
{
   BOOL bRslt = FALSE;
   INT iGRply;

   iGRply = tpcall(pService,pTMon->pTMData,iTMMaxSz,
      &pTMon->pTMData,&pTMon->lTMDataLen,TPNOTIME | TPSIGRSTRT);
   if (iGRply != -1)
   {
      *iTPRslt = tpurcode;
      *bTPRslt = FALSE;
   }
   else
   if (tperrno == TPESVCFAIL)
   {
      *iTPRslt = tpurcode;
      *bTPRslt = TRUE;
   }
   else
   {
      sprintf(pTMon->pszErrTxt,"TPCall Failed (%ld)",tperrno);
      bRslt = TRUE;
   };
   return(bRslt);
};   // TMTran

//==========================================================================
//
// Function name: TMPost
//
//    Result:
//       FALSE    transaction submitted with no response expected
//       TRUE     tpacall failed, ErrTxt has diagnostic
//
//==========================================================================
BOOL TMPost(CHAR * pService,TMON_STATE * pTMon)
{
   BOOL bRslt = FALSE;
   INT iCD;

   iCD = tpacall(pService,pTMon->pTMData,iTMMaxSz,TPNOREPLY);
   if (iCD == -1)
   {
      sprintf(pTMon->pszErrTxt,"TPACall Failed (%ld)",tperrno);
      bRslt = TRUE;
   };
   return(bRslt);
};   // TMPost
```

timesupp.h

```
// timesupp.h

#include <windows.h>
#include <time.h>
#include <sys\timeb.h>

#define TIMEBSEED_MOD 10000
#define TIMEBSEED_SHIFT 1000
#define TIMEB_STRING_SZ 23
#define TIMEB_STRING_DATESZ 10
#define TIMEB_STRING_TIMEOFFSET 11
#define TIMEB_STRING_TIMESZ 12

typedef ULONG TMILLI;
```

```
TMILLI TimebDiff(struct _timeb * p_tb1, struct _timeb * p_tb2);
VOID TimebCopy(struct _timeb * p_tbDest, struct _timeb * p_tbSource);
TMILLI TimebElapsed(struct _timeb * p_tb1);
VOID TimebClear(struct _timeb * p_tb1);
CHAR * TimebToString(struct _timeb * p_tb1,CHAR * psz,BOOL bMillis);
BOOL TimebFromString(struct _timeb * p_tb1,CHAR * psz);
VOID TimebAddSecs(struct _timeb * p_tb1,INT iSeconds);
ULONG TimebSeed(VOID);
```

timesupp.c

```
// timesupp.c
//
// Copyright Unisys, 1997
//

#include <stdio.h>
#include "timesupp.h"

//=========================================================================
//
// Function name: TimebCopy
//    Structure contents copy of _timeb source to _timeb dest.
//
//=========================================================================
VOID TimebCopy(struct _timeb * p_tbDest, struct _timeb * p_tbSource)
{
   p_tbDest->time = p_tbSource->time;
   p_tbDest->millitm = p_tbSource->millitm;
   p_tbDest->dstflag = p_tbSource->dstflag;
   p_tbDest->timezone = p_tbSource->timezone;

};   // TimebCopy

//=========================================================================
//
// Function name: TimebDiff
//    Time difference in milliseconds between _timeb _t1 and _timeb _t2.
//
//=========================================================================
TMILLI TimebDiff(struct _timeb * p_tb1, struct _timeb * p_tb2)
{
   LONG lRslt;
   lRslt = ((p_tb2->time - p_tb1->time) * 1000) +
               (p_tb2->millitm - p_tb1->millitm);
   if (lRslt < 0)
      return(0);
   else
      return((TMILLI) lRslt);

};   // TimebDiff

//=========================================================================
//
// Function name: TimebElaspsed
//
//=========================================================================
TMILLI TimebElapsed(struct _timeb * p_tb1)
{
   struct _timeb _tb2;
   _ftime(&_tb2);
   return (TimebDiff(p_tb1,&_tb2));

};   // TimebElapsed

//=========================================================================
//
// Function name: TimebClear
//
//=========================================================================
VOID TimebClear(struct _timeb * p_tb1)
{
   p_tb1->time = 0;
   p_tb1->millitm = 0;

};   // TimebClear

//=========================================================================
//
// Function name: TimebToString
//    Converts timeb to yyyy:mm:dd,hh:mm:ss.sss format
//
//=========================================================================
CHAR * TimebToString(struct _timeb * p_tb1,CHAR * psz,BOOL bMillis)
{
   struct tm * ptm;
   ptm = localtime(&p_tb1->time);
   sprintf(psz,"%4.4d/%2.2d/%2.2d,%2.2d:%2.2d:%2.2d",
      ptm->tm_year + 1900,ptm->tm_mon + 1,ptm->tm_mday,
      ptm->tm_hour,ptm->tm_min,ptm->tm_sec);
   if (bMillis)
      sprintf(psz + strlen(psz),".%3.3d",p_tb1->millitm);
   return(psz);
};   // TimebToString

//=========================================================================
//
// Function name: TimebFromString
//    Converts yyyy:mm:dd,hh:mm:ss.sss (TimebToString) format to timeb
//
//=========================================================================
BOOL TimebFromString(struct _timeb * p_tb1,CHAR * psz)
{
   struct tm tmTime;
   struct tm * ptm;
   UINT uLen;

   ptm = &tmTime;
   uLen = strlen(psz);
   if (uLen < (TIMEB_STRING_SZ - 4))   // millis are optional
   {
      p_tb1->time = 0;
      p_tb1->millitm = 0;
      return (TRUE);
   };
   // Clear fields that won't be set
   ptm->tm_wday = 0;
   ptm->tm_yday = 0;
   ptm->tm_isdst = -1;
   // Set tm struct fields from string
```

```
   ptm->tm_year = (atoi(psz)) - 1900;
   psz += 5;
   ptm->tm_mon = (atoi(psz)) - 1;
   psz += 3;
   ptm->tm_mday = atoi(psz);
   psz += 3;
   ptm->tm_hour = atoi(psz);
   psz += 3;
   ptm->tm_min = atoi(psz);
   psz +=3;
   ptm->tm_sec = atoi(psz);
   if (uLen >= TIMEB_STRING_SZ)   // Millis present
   {
      psz += 3;
      p_tb1->millitm = atoi(psz);
   };
   p_tb1->time = mktime(ptm);
   return(FALSE);
};   // TimebFromString

//=========================================================================
//
// Function name: TimebAddSecs
//
//=========================================================================
VOID TimebAddSecs(struct _timeb * p_tb1,INT iSeconds)
{
   p_tb1->time += iSeconds;
};   // TimebAddSecs
```

diagio.h

```
// diagio.h

// Environment variable defaults
#define DEFAULTDIAGLEVEL DIAG_INFO
#define DEFAULTEVENTLOG 0

#define DIAGNOSTICS TRUE
#define MAX_DIAG_SZ 2000

// Severity level of diagnostic report
#define DIAG_FORCE 1
#define DIAG_ERROR 2
#define DIAG_STATE 3
#define DIAG_INFO 4

VOID DiagIoInit(CHAR * pDiagId,BOOL bConsole,BOOL bEvent,UINT uLevel);
VOID DiagIoTerm(VOID);
VOID DiagIoWrite(CHAR * pDiagBuffer, UINT uSeverity);
```

diagio.c

```
// diagio.c
//
// Copyright Unisys, 1997
//
#include <windows.h>
#include <stdio.h>
#include "diagio.h"

CRITICAL_SECTION csDiagIo;
HANDLE hEventLog = NULL;
UINT uDiagLevel;
BOOL bEventLog;
BOOL bConsoleLog;
CHAR * pDiagHdr;
CHAR * pEventHost;
CHAR * pErrHdr =
   {"*** ERROR *** ERROR *** ERROR *** ERROR *** ERROR ***"};

INT WriteEventLog(CHAR * pDMsgs[],UINT uMsgCnt,UINT uSeverity);

//=========================================================================
//
// Function name: DiagIoInit
//
//=========================================================================
VOID DiagIoInit(CHAR * pDiagId,BOOL bConsole,BOOL bEvent,UINT uLevel)
{
   if (DIAGNOSTICS)
   {
      InitializeCriticalSection(&csDiagIo);

      uDiagLevel = uLevel;
      bEventLog = bEvent;
      bConsoleLog = bConsole;
      pEventHost = (CHAR *) malloc(10);
      strcpy(pEventHost,"");  // local host
      pDiagHdr = (CHAR *) malloc(strlen(pDiagId) + 1);
      strcpy(pDiagHdr,pDiagId);
      if (bEventLog)
      {
         hEventLog = RegisterEventSource(pEventHost,pDiagId);
         if (hEventLog == NULL)
         {
            bEventLog = FALSE;
            if (bConsoleLog)
               fprintf(stdout,
                  "%s: Event Log Register Failed (%ld)\n"
                  "Event Log Will NOT be Used\n",
                  pDiagHdr,GetLastError());
         }
         else
         {
            if (bConsoleLog)
               fprintf(stdout,"%s: Event Logging to LocalHost as %s\n",
                  pDiagHdr,pDiagHdr);
         };
      };   // if bEventLog
   };   // if Diagnostics
};   // DiagIoInit


//=========================================================================
//
// Function name: DiagIoTerm
//
//=========================================================================
```

```
VOID DiagIoTerm(VOID)
{
   if (DIAGNOSTICS)
   {
      DeleteCriticalSection(&csDiagIo);
      if (hEventLog != NULL)
         DeregisterEventSource(hEventLog);
      free(pDiagHdr);
      free(pEventHost);
   };
};   // DiagIoTerm

//============================================================================
//
// Function name: DiagIoWrite
//
//============================================================================
VOID DiagIoWrite(CHAR * pDiagBuffer, UINT uSeverity)
{
   CHAR * pDMsgs[3];
   UINT uMsgCnt = 0;
   INT iERslt = 0;
   if (DIAGNOSTICS)
   {
      if (uDiagLevel >= uSeverity)
      {
         EnterCriticalSection(&csDiagIo);
         __try
         {
            if (uSeverity == DIAG_ERROR)
            {
               pDMsgs[0] = pDiagHdr;
               pDMsgs[1] = pErrHdr;
               pDMsgs[2] = pDiagBuffer;
               uMsgCnt = 3;
            }
            else
            {
               pDMsgs[0] = pDiagHdr;
               pDMsgs[1] = pDiagBuffer;
               uMsgCnt = 2;
            };
            if (bEventLog)
               iERslt = WriteEventLog(pDMsgs,uMsgCnt,uSeverity);
            if (bConsoleLog)
            {
               if (uMsgCnt == 3)
                  fprintf(stdout,"\n%s:
%s\n%s",pDMsgs[0],pDMsgs[1],pDMsgs[2]);
               else
                  fprintf(stdout,"\n%s: %s",pDMsgs[0],pDMsgs[1]);
               if (iERslt != 0)
                  fprintf(stdout,
                     "EventLog Write Failed (%ld), No Longer in Use\n",
                     iERslt);
            };
         }
         __finally
         {
            LeaveCriticalSection(&csDiagIo);
         };
      };   // if uDiagLevel >= uSeverity
   };   // if Diagnostics
};   // DiagIoWrite

INT WriteEventLog(CHAR * pDMsgs[],UINT uMsgCnt,UINT uSeverity)
{
   WORD wType;
   WORD wCount;
   wCount = uMsgCnt;
   switch (uSeverity)
   {
      case DIAG_ERROR:
         wType = EVENTLOG_ERROR_TYPE;
         break;
      default:
         wType = EVENTLOG_INFORMATION_TYPE;
         break;
   };
   if (wType != 0)
   {
      if (!ReportEvent(hEventLog,           // event log handle
                       wType,               // event type
                       0,                   // category zero
                       uSeverity,           // no event identifier
                       NULL,                // no user security identifier
                       wCount,              // # of substitution strings
                       0,                   // no binary data
                       (LPCTSTR *) pDMsgs,  // address of string array
                       NULL))               // address of binary
      {
         DeregisterEventSource(hEventLog);
         hEventLog = NULL;
         bEventLog = FALSE;
         return(GetLastError());
      };   // ReportEvent failed
   };   // if wType != 0
   return(0);
};   // WriteEventLog
```

SERVER MAKEFILES

```
SVR = tpccsvr
SRC = \webrte\tpcctux\tpccsvr.c
DBG = /f "/Zi"
$(SVR).exe: $(SRC)
   erase $(SVR).exe
   $(TUXDIR)\bin\buildserver /f "$(SRC)" /o $(SVR).exe /s
NEWORDER:NEWORDER /s PAYMENT:PAYMENT /s ORDERSTS:ORDERSTS /s
STOCKLVL:STOCKLVL -l i:\mssql7\devtools\lib\ntwdblib.lib
   copy $(SVR).exe $(APPDIR)

SVR = tpccdelv
SRC = \webrte\tpcctux\tpccdelv.c
DBG = /f "/Zi"
$(SVR).exe: $(SRC)
   erase $(SVR).exe
```

```
   $(TUXDIR)\bin\buildserver /f "$(SRC)" /o $(SVR).exe /s
DELIVERY:DELIVERY  -l i:\mssql7\devtools\lib\ntwdblib.lib
   copy $(SVR).exe $(APPDIR)
```

tpccsvr.h

```
// tpccsvr.h
//
// Copyright Unisys, 1997
// Copyright Microsoft, 1996

#include "tpcc.h"

#define DEFCLPACKSIZE            2000
#define DEADLOCKWAIT             10
#define LOGFILE_NAME             "delilog"

// String length constants
#define SERVER_NAME_LEN            20
#define DATABASE_NAME_LEN          20
#define USER_NAME_LEN              20
#define PASSWORD_LEN               20
#define TABLE_NAME_LEN             20
```

tpcc.h

```
// tpcc.h

#include <time.h>
#define DBNTWIN32
#include <sqlfront.h>
#include <sqldb.h>

// TPCCHandler return codes
#define TPCCSEND 1
#define TPCCSENDEND 2
#define TPCCENDNOW 3

// TPCC Service return codes
#define SVC_BADITEMID 1
#define SVC_NOERROR 0
#define SVCERR_DEADLOCK -1
#define SVCERR_NOCUSTOMER -2
#define SVCERR_NOORDERS -3
#define SVCERR_DBLIB -4

// Min/Max transaction data definitions
#define MIN_DId 1
#define MAX_DId 10
#define MIN_OL 5
#define MAX_OL 15
#define MIN_QUANTITY 1
#define MAX_QUANTITY 10
#define MIN_ITEM_ID 1
#define MAX_ITEM_ID 100000
#define MIN_CUST_ID 1
#define MAX_CUST_ID 3000
#define MIN_CARRIER 1
#define MAX_CARRIER 10
#define MIN_THRESHOLD 10
#define MAX_THRESHOLD 20

// pTPCC->iStatusId codes
#define INVALID_IID               1
#define STATUS_OK                 0
#define ERR_CMD_UNKNOWN           -10
#define ERRTXT_CMD_UNKNOWN        "Unrecognized Command"
#define ERR_ALREADY_LOGGEDIN      -11
#define ERRTXT_ALREADY_LOGGEDIN   "Already Logged In"
#define ERR_TERMID                -12
#define ERRTXT_TERMID             "TermId or SyncId in Error"
#define ERR_FORM_UNKNOWN          -13
#define ERRTXT_FORM_UNKNOWN       "Unrecognized FormId"
#define ERR_WID_INVALID           -14
#define ERR_DID_INVALID           -15
#define ERR_MISSING_KEY           -16
#define ERR_NOT_NUMERIC           -17
#define ERR_THRESHOLD_RANGE       -18
#define ERR_EMBEDDED_EMPTY_OL     -19
#define ERR_QUANTITY_INVALID      -20
#define ERR_OL_INVALID            -21
#define ERR_OL_COUNT              -22
#define ERR_TM_INTERFACE          -23
#define ERR_SERVICE_RSLT          -24
#define ERR_INPUT_TOOLONG         -25
#define ERR_IDANDNAME_EMPTY       -26
#define ERR_IDANDNAME_ENTERED     -27
#define ERR_AMOUNT_BADFORM        -28
#define ERR_AMOUNT_INVALID        -29
#define ERR_CARRIER_INVALID       -30
#define ERR_TERM_ALLOC            -31

#define STATUS_LEN 200
#define NAME_LEN 16
#define ADDR_LEN 20
#define STATE_LEN 2
#define ZIP_LEN 9

#define MAX_MSG_SZ  5000

typedef struct
{
   short ol_supply_w_id;
   long ol_i_id;
   char ol_i_name[25];
   short ol_quantity;
   char ol_brand_generic[2];
   double ol_i_price;
   double ol_amount;
   short ol_stock;
} OL_NEW_ORDER_DATA;

typedef struct
{
   short w_id;
   short d_id;
   long        c_id;
   short o_ol_cnt;
   char c_last[NAME_LEN + 1];
```

```
   char c_credit[3];
   double c_discount;
   double w_tax;
   double d_tax;
   long o_id;
   short o_commit_flag;
   DBDATEREC o_entry_d;
   short o_all_local;
   double total_amount;
   char execution_status[STATUS_LEN];
   OL_NEW_ORDER_DATA Ol[MAX_OL];
} NEW_ORDER_DATA;

typedef struct
{
   short w_id;
   short d_id;
   long c_id;
   short c_d_id;
   short c_w_id;
   double h_amount;
   DBDATEREC h_date;
   char w_street_1[ADDR_LEN + 1];
   char w_street_2[ADDR_LEN + 1];
   char w_city[ADDR_LEN + 1];
   char w_state[STATE_LEN + 1];
   char w_zip[ZIP_LEN + 1];
   char d_street_1[ADDR_LEN + 1];
   char d_street_2[ADDR_LEN + 1];
   char d_city[ADDR_LEN + 1];
   char d_state[STATE_LEN + 1];
   char d_zip[ZIP_LEN + 1];
   char c_first[NAME_LEN + 1];
   char c_middle[3];
   char c_last[NAME_LEN + 1];
   char c_street_1[ADDR_LEN + 1];
   char c_street_2[ADDR_LEN + 1];
   char c_city[ADDR_LEN + 1];
   char c_state[STATE_LEN + 1];
   char c_zip[ZIP_LEN + 1];
   char c_phone[16];
   DBDATEREC c_since;
   char c_credit[3];
   double c_credit_lim;
   double c_discount;
   double c_balance;
   char c_data[200+1];
   char execution_status[STATUS_LEN];
} PAYMENT_DATA;

typedef struct
{
   long ol_i_id;
   short ol_supply_w_id;
   short ol_quantity;
   double ol_amount;
   DBDATEREC ol_delivery_d;
} OL_ORDER_STATUS_DATA;

typedef struct
{
   short w_id;
   short d_id;
   long c_id;
   char c_first[NAME_LEN + 1];
   char c_middle[3];
   char c_last[NAME_LEN + 1];
   double c_balance;
   long o_id;
   DBDATEREC o_entry_d;
   short o_carrier_id;
   OL_ORDER_STATUS_DATA OlOrderStatusData[MAX_OL];
   short o_ol_cnt;
   char execution_status[STATUS_LEN];
} ORDER_STATUS_DATA;

typedef struct
{
   short w_id;
   short o_carrier_id;
   long o_id[10];
   int iComplete;
   SYSTEMTIME QTime;                // time delivery was queued
   SYSTEMTIME EndTime;              // time delivery completed
   char execution_status[STATUS_LEN];
} DELIVERY_DATA;

typedef struct
{
   short w_id;
   short d_id;
   short thresh_hold;
   long low_stock;
   char execution_status[STATUS_LEN];
} STOCK_LEVEL_DATA;
```

tpccsvr.c

```
// tpcctux.c
//
// Copyright Unisys, 1997
// Copyright Microsoft, 1996

#include <windows.h>
#include <malloc.h>
#include <stdarg.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>

#include <atmi.h>
#include <userlog.h>

#include "tpccsvr.h"

char    szServer[32]   = "tpccserver";
char    szUser[32]             = { 0 };
char    szPassword[32] = { 0 };
char    szDatabase[32] = "tpcc";
```

```
char  szService[16]  = "tpccsvr";
char  szWork[200];
PDBPROCESS     dbproc;
int     spid;                                  // spid assigned from dblib
BOOL  bFailed;
BOOL  bDeadlock;
short   DeadlockRetry  = (short)3;

int err_handler(DBPROCESS *dbproc, int severity, int dberr, int oserr,
char *dberrstr, char *oserrstr);
int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate, int
severity, char *msgtext);
int SQLStockLevel(STOCK_LEVEL_DATA *psld);
int SQLNewOrder(NEW_ORDER_DATA * pnod);
int SQLPayment(PAYMENT_DATA *ppd);
int SQLOrderStatus(ORDER_STATUS_DATA * pOrderStatus);
void UtilStrCpy(char * pDest, char * pSrc, int n);
VOID GetArgs(INT argc, CHAR **argv);

//============================================================================
//
// Function name: tpsvrinit
//
//============================================================================
tpsvrinit(int argc, char *argv[])
{
   GetArgs(argc,argv);
   sprintf(szWork,"%s Started, DBServer=%s,DB=%s",
      szService,szServer,szDatabase);
   userlog(szWork);
   if (SQLInit(szServer,szDatabase,szUser,szPassword))
      return(-1);
   userlog("Database open, initialization complete");
   return(0);
};   // tpsvrinit

//============================================================================
//
// Function name: tpsvrdone
//
//============================================================================
void tpsvrdone()
{
   userlog("Shutdown request for tpcctux server");
   dbclose(dbproc);
   dbexit();
};   // tpsvrdone

//============================================================================
//
// Function name: NEWORDER
//
//    Entry point called by tuxedo for NEWORDER service requests.
//
//============================================================================
void NEWORDER(TPSVCINFO * svcinfo)
{
   int iRslt;
   NEW_ORDER_DATA * pnod;

   pnod = (NEW_ORDER_DATA *) svcinfo->data;
   iRslt = SQLNewOrder(pnod);

   // Check for DBLib termination error
   if (bFailed)
   {
      strcpy(pnod->execution_status,szWork);
      tpreturn(TPFAIL,SVCERR_DBLIB,svcinfo->data,svcinfo->len,0);
   }
   else
   if (iRslt == 0)
      tpreturn(TPSUCCESS,0,svcinfo->data,svcinfo->len,0);
   else
      tpreturn(TPFAIL,iRslt,svcinfo->data,svcinfo->len,0);
};   // NEWORDER

//============================================================================
//
// Function name: PAYMENT
//
//    Entry point called by tuxedo for PAYMENT service requests.
//
//============================================================================
void PAYMENT(TPSVCINFO * svcinfo)
{
   int iRslt;
   PAYMENT_DATA * ppd;

   ppd = (PAYMENT_DATA *) svcinfo->data;

   iRslt = SQLPayment(ppd);

   if (bFailed)
   {
      strcpy(ppd->execution_status,szWork);
      tpreturn(TPFAIL,SVCERR_DBLIB,svcinfo->data,svcinfo->len,0);
   }
   else
   if (iRslt == 0)
      tpreturn(TPSUCCESS,0,svcinfo->data,svcinfo->len,0);
   else
      tpreturn(TPFAIL,iRslt,svcinfo->data,svcinfo->len,0);
};   // PAYMENT

//============================================================================
//
// Function name: ORDERSTS
//
//    Entry point called by tuxedo for ORDERSTS service requests.
//
//============================================================================
void ORDERSTS(TPSVCINFO * svcinfo)
{
   int iRslt;
   ORDER_STATUS_DATA * posd;

   posd = (ORDER_STATUS_DATA *) svcinfo->data;
   iRslt = SQLOrderStatus(posd);

   // Check for DBLib termination error
   if (bFailed)
   {
```

```
      strcpy(posd->execution_status,szWork);
      tpreturn(TPFAIL,SVCERR_DBLIB,svcinfo->data,svcinfo->len,0);
   }
   else
   if (iRslt == 0)
      tpreturn(TPSUCCESS,0,svcinfo->data,svcinfo->len,0);
   else
      tpreturn(TPFAIL,iRslt,svcinfo->data,svcinfo->len,0);
};   // ORDERSTS

//==============================================================================
//
// Function name: STOCKLVL
//
//    Entry point called by tuxedo for STOCKLVL service requests.
//
//==============================================================================
void STOCKLVL(TPSVCINFO * svcinfo)
{
   int iRslt;
   STOCK_LEVEL_DATA * psld;

   psld = (STOCK_LEVEL_DATA *) svcinfo->data;
   iRslt = SQLStockLevel(psld);

   // Check for DBLib termination error
   if (bFailed)
   {
      strcpy(psld->execution_status,szWork);
      tpreturn(TPFAIL,SVCERR_DBLIB,svcinfo->data,svcinfo->len,0);
   }
   else
   if (iRslt == 0)
      tpreturn(TPSUCCESS,0,svcinfo->data,svcinfo->len,0);
   else
      tpreturn(TPFAIL,iRslt,svcinfo->data,svcinfo->len,0);

};   // STOCKLVL

//==============================================================================
//
// Function name: SQLInit
//
//    Set global dbproc and spid.
//
//    Result:
//       FALSE - database open, dbproc valid
//       TRUE - database open failed
//
//==============================================================================
BOOL SQLInit(CHAR * pSvr,CHAR * pDB,CHAR * pUsr,CHAR * pPW,CHAR * pSvc)
{
   char szApp[32];
   char server[256];
   char database[256];
   char user[256];
   char password[256];
   LOGINREC    *login;

   dbinit();
   // install error and message handlers
   dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
   dberrhandle((DBERRHANDLE_PROC)err_handler);

   dbproc = NULL;
   strcpy(server,pSvr);
   strcpy(database,pDB);
   strcpy(user,pUsr);
   strcpy(password,pPW);
   sprintf(szApp,"%s%ld",pSvc,_getpid());

   login = dblogin();
   if (!*user )
      DBSETLUSER(login,"sa");
   else
      DBSETLUSER(login,user);
   DBSETLPWD(login,password);
   DBSETLHOST(login,szApp);
   DBSETLVERSION(login, DBVER60);
// DBSETLPACKET(login,(unsigned short)DEFCLPACKSIZE);

   if ((dbproc = dbopen(login,server)) == NULL)
   {
      userlog("dbopen failed");
      return TRUE;
   };
   // Use the the right database
   dbuse(dbproc,database);
   dbcmd(dbproc,"select @@spid");
   dbsqlexec(dbproc);
   while (dbresults(dbproc) != NO_MORE_RESULTS)
   {
      dbbind(dbproc,1,SMALLBIND,(DBINT) 0,(BYTE *) spid);
      while (dbnextrow(dbproc) != NO_MORE_ROWS)
         ;
   };

   dbcmd(dbproc,"set nocount on");
   dbsqlexec(dbproc);
   while (dbresults(dbproc) != NO_MORE_RESULTS)
   {
      while (dbnextrow(dbproc) != NO_MORE_ROWS)
         ;
   };

   //rollback transaction on abort
   dbcmd(dbproc,"set XACT_ABORT ON");
   dbsqlexec(dbproc);
   while (dbresults(dbproc) != NO_MORE_RESULTS)
   {
      while (dbnextrow(dbproc) != NO_MORE_ROWS)
         ;
   };

   return(FALSE);

};   // SQLInit

//==============================================================================
// FUNCTION: err_handler
//
//    Handles DB-Library errors
```

```
//
// ARGUMENTS:
//    DBPROCESS   *dbproc     DBPROCESS id pointer
//    int         severity    severity of error
//    int         dberr       error id
//    int         oserr       operating system specific error code
//    char        *dberrstr   printable error description of dberr
//    char        *oserrstr   printable error description of oserr
//
// RETURNS:
//    int      INT_CANCEL
//
// COMMENTS:   None
//
//=============================================================================
int err_handler(DBPROCESS *dbproc, int severity, int dberr, int oserr,
char *dberrstr, char *oserrstr)
{
   if ((dbproc == NULL) || (DBDEAD(dbproc)))
   {
      userlog("ErrHandler: DBPROC is invalid");
      return INT_CANCEL;
   };
   if (bFailed)
      return INT_CANCEL;
   if (oserr != DBNOERR)
   {
      sprintf(szWork,"ErrHandler: OSErr(%ld) - %s",oserr,oserrstr);
      userlog(szWork);
      bFailed = TRUE;
   };

   return INT_CANCEL;

};   // err_handler

//=============================================================================
// FUNCTION: msg_handler
//
//    Handles DB-Library SQL Server error messages
//
// ARGUMENTS:
//    DBPROCESS   *dbproc     DBPROCESS id pointer
//    DBINT       msgno       message number
//    int         msgstate    message state
//    int         severity    message severity
//    char        *msgtext    printable message description
//
// RETURNS:    int   INT_CONTINUE   continue operation
//                   INT_CANCEL      cancel operation
//
// COMMENTS:   This function also sets the dead lock dbproc
//             variable if necessary.
//
//=============================================================================
int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate, int
severity, char *msgtext)
{

   if ((msgno == 5701) || (msgno == 2528) ||
       (msgno == 5703) || (msgno == 6006))
      return INT_CONTINUE;

   // deadlock message
   if (msgno == 1205)
   {
      // set the deadlock indicator
      bDeadlock = TRUE;
      return INT_CONTINUE;
   };

   if (bFailed)
      return INT_CANCEL;

   if (msgno == 0)
      return INT_CONTINUE;
   else
   {
      sprintf(szWork,"MsgHandler: MsgNo(%ld) - %s",msgno,msgtext);
      userlog(szWork);
      bFailed = TRUE;
   };

   return INT_CANCEL;

};   // msg_handler

//=============================================================================
// FUNCTION: SQLStockLevel
//
//    Handles the stock level transaction.
//
// ARGUMENTS:
//    STOCK_LEVEL_DATA  StockLevel input / output data structure
//    dbdata (global)
//    bDeadlock (global)
//
// RETURNS:
//    SVC_NOERROR  success
//    !SVC_NOERROR failure
//
// COMMENTS:   None
//
//=============================================================================
int SQLStockLevel(STOCK_LEVEL_DATA * psld)
{
   int tryit;
   short num_deadlocks = 0;
   RETCODE rc;
   BYTE * pData;

   bFailed = FALSE;
   bDeadlock = FALSE;

   for (tryit=0; tryit < DeadlockRetry; tryit++)
   {
      if (dbrpcinit(dbproc,"tpcc_stocklevel",0) == SUCCEED)
      {
         dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
            (BYTE *) &psld->w_id);
         dbrpcparam(dbproc, NULL, 0, SQLINT1, -1, -1,
            (BYTE *) &psld->d_id);
```

```
         dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
            (BYTE *) &psld->thresh_hold);

         if (dbrpcexec(dbproc) == SUCCEED)
         {
            while (((rc = dbresults(dbproc)) != NO_MORE_RESULTS) &&
                   (rc != FAIL))
            {
               if (DBROWS(dbproc))
               {
                  while (((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) &&
                         (rc != FAIL))
                  {
                     if(pData=dbdata(dbproc,1))
                        psld->low_stock = *((long *) pData);
                  };
               };   // if (DBROWS(dbproc)
            };   // while (dbresults)
         };   // if (dbrpcexec)
      };   // if (dbrpcinit)
      if (bDeadlock)
      {
         num_deadlocks++;
         bDeadlock = FALSE;
         userlog("StockLevel Deadlock Retry (%d)",num_deadlocks);
         Sleep(10 * tryit);
      }
      else
      {
         strcpy(psld->execution_status,"Transaction commited.");
         return(SVC_NOERROR);
      };
   };  // for (tryit)

   // If we reached here, it means we quit after MAX_RETRY deadlocks
   strcpy(psld->execution_status,"Hit deadlock max.");
   userlog("StockLevel Deadlock Failure (%d)",num_deadlocks);
        return(SVCERR_DEADLOCK);

};   // SQLStockLevel

//======================================================================
// FUNCTION: SQLNewOrder
//
//    Handles the new order transaction.
//
// ARGUMENTS:
//    NEW_ORDER_DATA    NewOrder structure for input/output data
//    dbdata (global)
//    bDeadlock (global)
//
// RETURNS:
//    SVC_NOERROR  success
//    !SVC_NOERROR failure
//
// COMMENTS:   None
//
//======================================================================
int SQLNewOrder(NEW_ORDER_DATA * pnod)
{
   RETCODE rc;
   int i;
   DBINT commit_flag;
   short num_deadlocks = 0;
   int tryit;
   DBDATETIME datetime;
   BYTE * pData;

   bFailed = FALSE;
   bDeadlock = FALSE;

   for (tryit=0; tryit < DeadlockRetry; tryit++)
   {
      if (dbrpcinit(dbproc,"tpcc_neworder",0) == SUCCEED)
      {
         dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
            (BYTE *) &pnod->w_id);
         dbrpcparam(dbproc, NULL, 0, SQLINT1, -1, -1,
            (BYTE *) &pnod->d_id);
         dbrpcparam(dbproc, NULL, 0, SQLINT4, -1, -1,
            (BYTE *) &pnod->c_id);
         dbrpcparam(dbproc, NULL, 0, SQLINT1, -1, -1,
            (BYTE *) &pnod->o_ol_cnt);

         pnod->o_all_local = 1;
         for (i = 0; i < pnod->o_ol_cnt; i++)
         {
            if (pnod->o_all_local &&
                pnod->Ol[i].ol_supply_w_id != pnod->w_id )
               pnod->o_all_local = 0;
         };
         dbrpcparam(dbproc, NULL, 0, SQLINT1, -1, -1,
            (BYTE *) &pnod->o_all_local);

         for (i = 0; i < pnod->o_ol_cnt; i++)
         {
            dbrpcparam(dbproc, NULL, 0, SQLINT4, -1, -1,
               (BYTE *) &pnod->Ol[i].ol_i_id);
            dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
               (BYTE *) &pnod->Ol[i].ol_supply_w_id);
            dbrpcparam(dbproc, NULL, 0, SQLINT2, -1, -1,
               (BYTE *) &pnod->Ol[i].ol_quantity);
         };

         if (dbrpcexec(dbproc) == SUCCEED)
         {
            pnod->total_amount=0;
            // Get results from order line
            for (i = 0; i<pnod->o_ol_cnt; i++)
            {
               if (((rc = dbresults(dbproc)) != NO_MORE_RESULTS) &&
                    (rc != FAIL))
               {
                  if (DBROWS(dbproc) && (dbnumcols(dbproc) == 5))
                  {
                     while (dbnextrow(dbproc) != NO_MORE_ROWS)
                     {
                        if(pData=dbdata(dbproc, 1))
                           UtilStrCpy(pnod-
>Ol[i].ol_i_name,pData,dbdatlen(dbproc, 1));
                        if(pData=dbdata(dbproc, 2))
                           pnod->Ol[i].ol_stock = (*(DBSMALLINT *) pData);
```

```
                        if(pData=dbdata(dbproc, 3))
                           UtilStrCpy(pnod-
>Ol[i].ol_brand_generic,pData,dbdatlen(dbproc, 3));
                        if(pData=dbdata(dbproc, 4))

dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                              SQLFLTN,(CHAR *) &pnod->Ol[i].ol_i_price,8);
                        if(pData=dbdata(dbproc, 5))

dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                              SQLFLTN,(CHAR *) &pnod->Ol[i].ol_amount,8);
                         pnod->total_amount = pnod->total_amount + pnod-
>Ol[i].ol_amount;
                     };   // while (dbnextrow)
                  };   // if (DBROWS && dbnumcols)
               };   // if (dbresults)
            };   // for (o_ol_cnt)
            while (((rc = dbresults(dbproc)) != NO_MORE_RESULTS) &&
                   (rc != FAIL))
            {
               if (DBROWS(dbproc) && (dbnumcols(dbproc) == 8))
               {
                  while (((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) &&
                         (rc != FAIL))
                  {
                     if(pData=dbdata(dbproc, 1))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &pnod->w_tax,8);
                     if(pData=dbdata(dbproc, 2))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &pnod->d_tax,8);
                     if(pData=dbdata(dbproc, 3))
                        pnod->o_id = (*(DBINT *) pData);
                     if(pData=dbdata(dbproc, 4))
                        UtilStrCpy(pnod->c_last,pData,dbdatlen(dbproc,4));
                     if(pData=dbdata(dbproc, 5))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &pnod->c_discount,8);
                     if(pData=dbdata(dbproc, 6))
                        UtilStrCpy(pnod-
>c_credit,pData,dbdatlen(dbproc,6));
                     if(pData=dbdata(dbproc, 7))
                     {
                        datetime = *((DBDATETIME *) pData);
                        dbdatecrack(dbproc,&pnod->o_entry_d,&datetime);
                     };
                     if(pData=dbdata(dbproc, 8))
                        commit_flag = (*(DBTINYINT *) pData);
                  };   // while (dbnextrow)
               };   // if (DBROWS && dbnumcols)
            };   // while (dbresults)
         };   // if (dbrpcexec)
      };   // if (dbrpcinit)
      if (bDeadlock)
      {
         num_deadlocks++;
         bDeadlock = FALSE;
         userlog("NewOrder Deadlock Retry (%d)",num_deadlocks);
         Sleep(10 * tryit);
      }
      else
      {
         if (commit_flag == 1)
         {
            pnod->total_amount = pnod->total_amount *
               ((1 + pnod->w_tax + pnod->d_tax) * (1 - pnod->c_discount));
            strcpy(pnod->execution_status,"Transaction commited.");
            return(SVC_NOERROR);
         }
         else
         {
            strcpy(pnod->execution_status,"Item number is not valid.");
            return(SVC_BADITEMID);
         };
      };   // !bDeadlock
   };   // for (tryit)

   // If we reached here, it means we quit after MAX_RETRY deadlocks
   strcpy(pnod->execution_status,"Hit deadlock max.");
   userlog("NewOrder Deadlock Failure (%d)",num_deadlocks);
   return(SVCERR_DEADLOCK);

};   // SQLNewOrder

//============================================================================
// FUNCTION: SQLPayment
//
//    Handles the payment transaction.
//
// ARGUMENTS:
//    PAYMENT_DATA      Payment input/output data structure
//    dbdata (global)
//    bDeadlock (global)
//
// RETURNS:
//    SVC_NOERROR  success
//    !SVC_NOERROR failure
//
// COMMENTS:   None
//
//============================================================================
int SQLPayment(PAYMENT_DATA *ppd)
{
   RETCODE rc;
   int tryit;
   short num_deadlocks = 0;
   DBDATETIME datetime;
   BYTE * pData;

   bFailed = FALSE;
   bDeadlock = FALSE;

   for (tryit=0; tryit < DeadlockRetry; tryit++)
   {
      if (dbrpcinit(dbproc,"tpcc_payment",0) == SUCCEED)
      {
         dbrpcparam(dbproc,NULL,0,SQLINT2,-1,-1,(BYTE *) &ppd->w_id);
         dbrpcparam(dbproc,NULL,0,SQLINT2,-1,-1,(BYTE *) &ppd->c_w_id);
         dbrpcparam(dbproc,NULL,0,SQLFLT8,-1,-1,(BYTE *) &ppd->h_amount);
         dbrpcparam(dbproc,NULL,0,SQLINT1,-1,-1,(BYTE *) &ppd->d_id);
         dbrpcparam(dbproc,NULL,0,SQLINT1,-1,-1,(BYTE *) &ppd->c_d_id);
         dbrpcparam(dbproc,NULL,0,SQLINT4,-1,-1,(BYTE *) &ppd->c_id);
```

```
         if (ppd->c_id == 0)
         {
            dbrpcparam(dbproc,NULL,0,SQLCHAR,-1,strlen(ppd->c_last),ppd-
>c_last);
         };
      };
      if (dbrpcexec(dbproc) == SUCCEED)
      {
         while (((rc = dbresults(dbproc)) != NO_MORE_RESULTS) && (rc !=
FAIL))
         {
            if (DBROWS(dbproc) && (dbnumcols(dbproc) == 27))
            {
               while (((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
               {
                  if(pData=dbdata(dbproc,1))
                     ppd->c_id = *((DBINT *) pData);
                  if(pData=dbdata(dbproc,2))
                     UtilStrCpy(ppd->c_last,pData,dbdatlen(dbproc,2));
                  if(pData=dbdata(dbproc,3))
                  {
                     datetime = *((DBDATETIME *) pData);
                     dbdatecrack(dbproc,&ppd->h_date,&datetime);
                  };
                  if(pData=dbdata(dbproc,4))
                     UtilStrCpy(ppd->w_street_1,pData,dbdatlen(dbproc,4));
                  if(pData=dbdata(dbproc,5))
                     UtilStrCpy(ppd->w_street_2,pData,dbdatlen(dbproc,5));
                  if(pData=dbdata(dbproc,6))
                     UtilStrCpy(ppd->w_city,pData,dbdatlen(dbproc,6));
                  if(pData=dbdata(dbproc,7))
                     UtilStrCpy(ppd->w_state,pData,dbdatlen(dbproc,7));
                  if(pData=dbdata(dbproc,8))
                     UtilStrCpy(ppd->w_zip,pData,dbdatlen(dbproc,8));
                  if(pData=dbdata(dbproc,9))
                     UtilStrCpy(ppd->d_street_1,pData,dbdatlen(dbproc,9));
                  if(pData=dbdata(dbproc,10))
                     UtilStrCpy(ppd-
>d_street_2,pData,dbdatlen(dbproc,10));
                  if(pData=dbdata(dbproc,11))
                     UtilStrCpy(ppd->d_city,pData,dbdatlen(dbproc,11));
                  if(pData=dbdata(dbproc,12))
                     UtilStrCpy(ppd->d_state,pData,dbdatlen(dbproc,12));
                  if(pData=dbdata(dbproc,13))
                     UtilStrCpy(ppd->d_zip,pData,dbdatlen(dbproc,13));
                  if(pData=dbdata(dbproc,14))
                     UtilStrCpy(ppd->c_first,pData,dbdatlen(dbproc,14));
                  if(pData=dbdata(dbproc,15))
                     UtilStrCpy(ppd->c_middle,pData,dbdatlen(dbproc,15));
                  if(pData=dbdata(dbproc,16))
                     UtilStrCpy(ppd-
>c_street_1,pData,dbdatlen(dbproc,16));
                  if(pData=dbdata(dbproc,17))
                     UtilStrCpy(ppd-
>c_street_2,pData,dbdatlen(dbproc,17));
                  if(pData=dbdata(dbproc,18))
                     UtilStrCpy(ppd->c_city,pData,dbdatlen(dbproc,18));
                  if(pData=dbdata(dbproc,19))
                     UtilStrCpy(ppd->c_state,pData,dbdatlen(dbproc,19));
                  if(pData=dbdata(dbproc,20))
                     UtilStrCpy(ppd->c_zip,pData,dbdatlen(dbproc,20));
                  if(pData=dbdata(dbproc,21))
                     UtilStrCpy(ppd->c_phone,pData,dbdatlen(dbproc,21));
                  if(pData=dbdata(dbproc,22))
                  {
                     datetime = *((DBDATETIME *) pData);
                     dbdatecrack(dbproc,&ppd->c_since, &datetime);
                  };
                  if(pData=dbdata(dbproc,23))
                     UtilStrCpy(ppd->c_credit,pData,dbdatlen(dbproc,23));
                  if(pData=dbdata(dbproc,24))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &ppd->c_credit_lim,8);
                  if(pData=dbdata(dbproc,25))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &ppd->c_discount,8);
                  if(pData=dbdata(dbproc,26))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &ppd->c_balance,8);
                  if(pData=dbdata(dbproc,27))
                     UtilStrCpy(ppd->c_data,pData,dbdatlen(dbproc,27));
               };   // while (dbnextrow)
            };   // if (DBROWS && dbnumcols)
         };   // while (dbresults)
      };   // if (dbrpcexe)
      if (bDeadlock)
      {
         num_deadlocks++;
         bDeadlock = FALSE;
         userlog("Payment Deadlock Retry (%d)",num_deadlocks);
         Sleep(10 * tryit);
      }
      else
      {
         if (ppd->c_id == 0)
         {
            strcpy(ppd->execution_status,"Invalid Customer id,name.");
                              return(SVCERR_NOCUSTOMER);
         }
         else
            strcpy(ppd->execution_status,"Transaction commited.");
         return(SVC_NOERROR);
      };   // !bDeadlock
   };   // for (tryit)

   // If we reached here, it means we quit after MAX_RETRY deadlocks
   strcpy(ppd->execution_status,"Hit deadlock max.");
   userlog("Payment Deadlock Failure (%d)",num_deadlocks);
   return(SVCERR_DEADLOCK);

};   // SQLPayment

//================================================================
// FUNCTION: SQLOrderStatus
//
//    Handles the Order Status transaction.
//
// ARGUMENTS:
//    ORDER_STATUS_DATA      Payment input/output data structure
//    dbdata (global)
//    bDeadlock (global)
```

```
//
// RETURNS:
//    SVC_NOERROR  success
//    !SVC_NOERROR failure
//
// COMMENTS:   None
//
//=============================================================================
int SQLOrderStatus(ORDER_STATUS_DATA * posd)
{
   RETCODE rc;
   int tryit;
   short num_deadlocks = 0;
   int i;
   DBDATETIME datetime;
   BYTE * pData;

   bFailed = FALSE;
   bDeadlock = FALSE;

   for (tryit=0; tryit < DeadlockRetry; tryit++)
   {
      if (dbrpcinit(dbproc,"tpcc_orderstatus", 0) == SUCCEED)
      {
         dbrpcparam(dbproc,NULL,0,SQLINT2,-1,-1,(BYTE *) &posd->w_id);
         dbrpcparam(dbproc,NULL,0,SQLINT1,-1,-1,(BYTE *) &posd->d_id);
         dbrpcparam(dbproc,NULL,0,SQLINT4,-1,-1,(BYTE *) &posd->c_id);
         if (posd->c_id == 0)
         {
            dbrpcparam(dbproc,NULL,0,SQLCHAR,-1,strlen(posd->c_last),posd-
>c_last);
         };
      };
      if (dbrpcexec(dbproc) == SUCCEED)
      {
         while (((rc = dbresults(dbproc)) != NO_MORE_RESULTS) && (rc !=
FAIL))
         {
            if (DBROWS(dbproc) && (dbnumcols(dbproc) == 5))
            {
               i = 0;
               while (((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
               {
                  if(pData=dbdata(dbproc,1))
                     posd->OlOrderStatusData[i].ol_supply_w_id =
(*(DBSMALLINT *) pData);
                  if(pData=dbdata(dbproc,2))
                     posd->OlOrderStatusData[i].ol_i_id = (*(DBINT *)
pData);
                  if(pData=dbdata(dbproc,3))
                     posd->OlOrderStatusData[i].ol_quantity =
(*(DBSMALLINT *) pData);
                  if(pData=dbdata(dbproc,4))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &posd-
>OlOrderStatusData[i].ol_amount,8);
                  if(pData=dbdata(dbproc,5))
                  {
                     datetime = *((DBDATETIME *) pData);
                     dbdatecrack(dbproc,&posd-
>OlOrderStatusData[i].ol_delivery_d,&datetime);
                  };
                  i++;
               };   // while (dbnextrow)
               posd->o_ol_cnt = i;
            }   // if (DBROWS && dbnumcols == 5)
            else
            if (DBROWS(dbproc) && (dbnumcols(dbproc) == 8))
            {
               while (((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
               {
                  if(pData=dbdata(dbproc,1))
                     posd->c_id = (*(DBINT *) pData);
                  if(pData=dbdata(dbproc,2))
                     UtilStrCpy(posd->c_last,pData,dbdatlen(dbproc,2));
                  if(pData=dbdata(dbproc,3))
                     UtilStrCpy(posd->c_first,pData,dbdatlen(dbproc,3));
                  if(pData=dbdata(dbproc,4))
                     UtilStrCpy(posd->c_middle,pData,dbdatlen(dbproc,4));
                  if(pData=dbdata(dbproc,5))
                  {
                     datetime = *((DBDATETIME *) pData);
                     dbdatecrack(dbproc,&posd->o_entry_d,&datetime);
                  };
                  if(pData=dbdata(dbproc,6))
                     posd->o_carrier_id = (*(DBSMALLINT *) pData);
                  if(pData=dbdata(dbproc,7))
                     dbconvert(dbproc,SQLNUMERIC,pData,sizeof(DBNUMERIC),
                        SQLFLTN,(CHAR *) &posd->c_balance,8);
                  if(pData=dbdata(dbproc,8))
                     posd->o_id = (*(DBINT *) pData);
               };   // while (dbnextrow)
            };   // if (DBROWS && dbnumcols == 8)
            if (i==0)
               return(SVCERR_NOORDERS); //"No orders found for customer"
         };   // while (dbresults)
      };   // if (dbrpcexec)
      if (bDeadlock)
      {
         num_deadlocks++;
         bDeadlock = FALSE;
         userlog("OrderStatus Deadlock Retry (%d)",num_deadlocks);
         Sleep(10 * tryit);
      }
      else
      {
         if (posd->c_id == 0 && posd->c_last[0] == 0)
         {
            strcpy(posd->execution_status,"Invalid Customer id,name.");
            return(SVCERR_NOCUSTOMER);
         }
         else
            strcpy(posd->execution_status,"Transaction commited.");
         return(SVC_NOERROR);
      };  // !bDeadlock
   };   // for (tryit)

   // If we reached here, it means we quit after MAX_RETRY deadlocks
   strcpy(posd->execution_status,"Hit deadlock max.");
```

```
   userlog("OrderStatus Deadlock Failure (%d)",num_deadlocks);
   return(SVCERR_DEADLOCK);

};   // SQLOrderStatus

//==============================================================================
// FUNCTION: UtilStrCpy
//
//    Copies n characters from string pSrc to pDst and places a null
//    null character at the end of the destination string.  Unlike
//    strncpy this function ensures that the result string is always
//    null terminated.
//
//==============================================================================
void UtilStrCpy(char * pDest, char * pSrc, int n)
{
   strncpy(pDest, pSrc, n);
   pDest[n] = '\0';
   return;
};   // UtilStrCpy

//==============================================================================
//
// Function name: GetArgs
//
//==============================================================================
VOID GetArgs(INT argc, CHAR **argv)
{
   INT j;
   CHAR * ptr;
   BOOL bRslt = TRUE;

   for (j = 1; j < argc; ++j)
   {
      ptr = argv[j];
      switch (ptr[1])
      {
         case 's':
         case 'S':
            strcpy(szServer,ptr+2);
            break;

         case 'd':
         case 'D':
            strcpy(szDatabase,ptr+2);
            break;

      };   // switch(ptr[1])
   };   // for (j = 1; j < argc; ++j)
};   // GetArgs
```

tpccdelv.c

```
// tpccdelv.// tpccdelv.c
//
// Copyright Unisys, 1997
// Copyright Microsoft, 1996

#include <windows.h>
#include <malloc.h>
#include <stdarg.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>

#include <atmi.h>
#include <userlog.h>

#include "tpccsvr.h"

int   iServerNo = 0;
char   szServer[32]   = "tpccdelv";
char   szUser[32]             = { 0 };
char   szPassword[32] = { 0 };
char   szDatabase[32] = "tpcc";
char  szService[16]  = "tpccdelv";
char  szWork[200];

PDBPROCESS     dbproc;
int     spid;                                  // spid assigned from dblib
BOOL  bFailed;
BOOL  bDeadlock;
short   DeadlockRetry  = (short)10;

FILE *fpLog;
char  szLogTitle[32];
BOOL  bFlush = FALSE;               // flush after every write

int err_handler(DBPROCESS *dbproc,int severity,int dberr,int oserr,
                char *dberrstr, char *oserrstr);
int msg_handler(DBPROCESS *dbproc,DBINT msgno,int msgstate,
                int severity,char *msgtext);
void WriteLog(DELIVERY_DATA * pdd);
BOOL OpenLogFile(void);
void CalculateElapsed(int * pElapsed,LPSYSTEMTIME lpBegin,
                      LPSYSTEMTIME lpEnd);
void UtilStrCpy(char * pDest, char * pSrc, int n);
void GetArgs(INT argc, CHAR **argv);

//==============================================================================
//
// Function name: tpsvrinit
//
//==============================================================================
tpsvrinit(int argc, char *argv[])
{
   GetArgs(argc,argv);
   iServerNo = _getpid();
   sprintf(szWork,"%s%ld Started, DBServer=%s, DB=%s",
      szService,iServerNo,szServer,szDatabase);
   userlog(szWork);
   if (OpenLogFile())
      return(-1);
   if (SQLInit(szServer,szDatabase,szUser,szPassword))
      return(-1);
   userlog("Database open, initialization complete");
   return(0);
};   // tpsvrinit
```

```
//========================================================================
//
// Function name: tpsvrdone
//
//========================================================================
void tpsvrdone()
{
   userlog("Shutdown request for tpccdelv server");
   if ( fpLog )
      fclose(fpLog);
   dbclose(dbproc);
   dbexit();
};   // tpsvrdone

//========================================================================
//
// Function name: DELIVERY
//
//    Entry point called by tuxedo for DELIVERY service requests.
//
//========================================================================
void DELIVERY(TPSVCINFO * svcinfo)
{
   int iRslt;
   DELIVERY_DATA * pdd;

   pdd = (DELIVERY_DATA *) svcinfo->data;
   iRslt = SQLDelivery(pdd);
   WriteLog(pdd);

   // Check for DBLib termination error
   if (bFailed)
   {
      strcpy(pdd->execution_status,szWork);
      userlog(szWork);
      tpreturn(TPFAIL,SVCERR_DBLIB,svcinfo->data,svcinfo->len,0);
   }
   else
   if (iRslt == 0)
      tpreturn(TPSUCCESS,0,svcinfo->data,svcinfo->len,0);
   else
      tpreturn(TPFAIL,iRslt,svcinfo->data,svcinfo->len,0);

};   // DELIVERY

//========================================================================
//
// Function name: SQLInit
//
//    Set global dbproc and spid.
//
//    Result:
//       FALSE - database open, dbproc valid
//       TRUE - database open failed
//
//========================================================================
BOOL SQLInit(CHAR * pSvr,CHAR * pDB,CHAR * pUsr,CHAR * pPW,CHAR * pSvc)
{
   char szApp[32];
   char server[256];
   char database[256];
   char user[256];
   char password[256];
   LOGINREC    *login;

   dbinit();
   // install error and message handlers
   dbmsghandle((DBMSGHANDLE_PROC)msg_handler);
   dberrhandle((DBERRHANDLE_PROC)err_handler);

   dbproc = NULL;
   strcpy(server,pSvr);
   strcpy(database,pDB);
   strcpy(user,pUsr);
   strcpy(password,pPW);
   sprintf(szApp,"%s%ld",pSvc,_getpid());

   login = dblogin();
   if (!*user )
      DBSETLUSER(login,"sa");
   else
      DBSETLUSER(login,user);
   DBSETLPWD(login,password);
   DBSETLHOST(login,szApp);
   DBSETLVERSION(login, DBVER60);
// DBSETLPACKET(login,(unsigned short)DEFCLPACKSIZE);

   if ((dbproc = dbopen(login,server)) == NULL)
   {
      userlog("dbopen failed");
      return TRUE;
   };
   // Use the the right database
   dbuse(dbproc,database);
   dbcmd(dbproc,"select @@spid");
   dbsqlexec(dbproc);
   while (dbresults(dbproc) != NO_MORE_RESULTS)
   {
      dbbind(dbproc,1,SMALLBIND,(DBINT) 0,(BYTE *) spid);
      while (dbnextrow(dbproc) != NO_MORE_ROWS)
         ;
   };

   dbcmd(dbproc,"set nocount on");
   dbsqlexec(dbproc);
   while (dbresults(dbproc) != NO_MORE_RESULTS)
   {
      while (dbnextrow(dbproc) != NO_MORE_ROWS)
         ;
   };

   //rollback transaction on abort
   dbcmd(dbproc,"set XACT_ABORT ON");
   dbsqlexec(dbproc);
   while (dbresults(dbproc) != NO_MORE_RESULTS)
   {
      while (dbnextrow(dbproc) != NO_MORE_ROWS)
         ;
   };

   return(FALSE);
```

```
};   // SQLInit

//================================================================================
// FUNCTION: err_handler
//
//    Handles DB-Library errors
//
// ARGUMENTS:
//    DBPROCESS   *dbproc     DBPROCESS id pointer
//    int         severity    severity of error
//    int         dberr       error id
//    int         oserr       operating system specific error code
//    char        *dberrstr   printable error description of dberr
//    char        *oserrstr   printable error description of oserr
//
// RETURNS:
//    int      INT_CANCEL
//
// COMMENTS:   None
//
//================================================================================
int err_handler(DBPROCESS *dbproc, int severity, int dberr, int oserr,
char *dberrstr, char *oserrstr)
{
   if ((dbproc == NULL) || (DBDEAD(dbproc)))
   {
      userlog("ErrHandler: DBPROC is invalid");
      return INT_CANCEL;
   };
   if (bFailed)
      return INT_CANCEL;
   if (oserr != DBNOERR)
   {
      sprintf(szWork,"ErrHandler: OSErr(%ld) - %s",oserr,oserrstr);
      userlog(szWork);
      bFailed = TRUE;
   };

   return INT_CANCEL;

};   // err_handler

//================================================================================
// FUNCTION: msg_handler
//
//    Handles DB-Library SQL Server error messages
//
// ARGUMENTS:
//    DBPROCESS   *dbproc     DBPROCESS id pointer
//    DBINT       msgno       message number
//    int         msgstate    message state
//    int         severity    message severity
//    char        *msgtext    printable message description
//
// RETURNS:    int   INT_CONTINUE   continue operation
//                   INT_CANCEL      cancel operation
//
// COMMENTS:   This function also sets the dead lock dbproc
//             variable if necessary.
//
//================================================================================
int msg_handler(DBPROCESS *dbproc, DBINT msgno, int msgstate, int
severity, char *msgtext)
{

   if ((msgno == 5701) || (msgno == 2528) ||
       (msgno == 5703) || (msgno == 6006))
      return INT_CONTINUE;

   // deadlock message
   if (msgno == 1205)
   {
      // set the deadlock indicator
      bDeadlock = TRUE;
      return INT_CONTINUE;
   };

   if (bFailed)
      return INT_CANCEL;

   if (msgno == 0)
      return INT_CONTINUE;
   else
   {
      sprintf(szWork,"MsgHandler: MsgNo(%ld) - %s",msgno,msgtext);
      userlog(szWork);
      bFailed = TRUE;
   };

   return INT_CANCEL;

};   // msg_handler

//================================================================================
// FUNCTION: SQLDelivery
//
// ARGUMENTS:
//    pdd      delivery transaction structure
//    dbdata (global)
//    bDeadlock (global)
//
// RETURNS:
//    SVC_NOERROR  success
//    !SVC_NOERROR failure
//
// COMMENTS:   None
//
//================================================================================
int SQLDelivery(DELIVERY_DATA * pdd)
{
   RETCODE rc;
   int i;
   short num_deadlocks = 0;
   int tryit;
   DBDATETIME datetime;
   BYTE * pData;

   bFailed = FALSE;
   bDeadlock = FALSE;
   pdd->iComplete = 0;

   for (tryit=0; tryit < DeadlockRetry; tryit++)
```

```
   {
      if (dbrpcinit(dbproc,"tpcc_delivery",0) == SUCCEED)
      {
         dbrpcparam(dbproc,NULL,0,SQLINT2,-1,-1,(BYTE *) &pdd->w_id);
         dbrpcparam(dbproc,NULL,0,SQLINT1,-1,-1,(BYTE *) &pdd-
>o_carrier_id);

         if (dbrpcexec(dbproc) == SUCCEED)
         {
            while (((rc = dbresults(dbproc)) != NO_MORE_RESULTS) && (rc !=
FAIL))
            {
               while (((rc = dbnextrow(dbproc)) != NO_MORE_ROWS) && (rc !=
FAIL))
               {
                  for (i = 0; i < 10; i++)
                  {
                     if(pData = dbdata(dbproc,i + 1))
                        pdd->o_id[i] = *((DBINT *)pData);
                     else
                        pdd->o_id[i] = 0;
                  };
               };   // while (dbnextrow)
            };   // while (dbresults)
         };   // if (dbrpcexec)
      };   // if (dbrpcinit)
      if (bDeadlock)
      {
         num_deadlocks++;
         bDeadlock = FALSE;
         userlog("Delivery Deadlock Retry (%d)",num_deadlocks);
         Sleep(10 * tryit);
      }
      else
      {
         GetLocalTime(&pdd->EndTime);
         pdd->iComplete = 1;
         strcpy(pdd->execution_status,"Transaction commited.");
         return(SVC_NOERROR);
      };
   };  // for (tryit)

   // If we reached here, it means we quit after MAX_RETRY deadlocks
   strcpy(pdd->execution_status,"Hit deadlock max.");
   userlog("Delivery Deadlock Failure (%d)",num_deadlocks);
   return(SVCERR_DEADLOCK);

};   // SQLDelivery

//=========================================================================
// FUNCTION: WriteLog
//
//    Writes the delivery results to a log file.
//
// ARGUMENTS:
//    pDelivery   delivery information.
//
// RETURNS:
//
// COMMENTS:
//    Record format:
//       QTime,EndTime,Elapsed,w_id,o_carrier_id,o_id1, ... o_id10
//
//=========================================================================
void WriteLog(DELIVERY_DATA * pdd)
{
   int elapsed = 9999999;
   if (pdd->iComplete)
      CalculateElapsed(&elapsed,&pdd->QTime,&pdd->EndTime);
   fprintf(fpLog,
      "%2.2d/%2.2d/%2.2d,%2.2d:%2.2d:%2.2d:%3.3d,%2.2d:%2.2d:%2.2d:%3.3d,"
      "%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d,%d\r\n",
      pdd->EndTime.wYear - 1900,pdd->EndTime.wMonth,pdd->EndTime.wDay,
      pdd->QTime.wHour,pdd->QTime.wMinute,
      pdd->QTime.wSecond,pdd->QTime.wMilliseconds,
      pdd->EndTime.wHour,pdd->EndTime.wMinute,
      pdd->EndTime.wSecond,pdd->EndTime.wMilliseconds,
      elapsed,pdd->w_id,pdd->o_carrier_id,
      pdd->o_id[0],pdd->o_id[1],pdd->o_id[2],pdd->o_id[3],pdd->o_id[4],
      pdd->o_id[5],pdd->o_id[6],pdd->o_id[7],pdd->o_id[8],pdd->o_id[9] );
        if (bFlush)
               fflush(fpLog);
};   // WriteLog

//=========================================================================
// FUNCTION: OpenLogFile
//
//    Opens the delivery log file.
//
// ARGUMENTS:
//    None.
//
// RETURNS:
//    FALSE    Log file successfully opened
//    TRUE     Failed to open log file
//
// COMMENTS:
//
//=========================================================================
BOOL OpenLogFile(void)
{
   sprintf(szLogTitle,"%s%ld",LOGFILE_NAME,iServerNo);
   fpLog = fopen(szLogTitle,"ab");
        if (!fpLog)
   {
      sprintf(szWork,"LogFile %s Open Failed (%ld)",
         szLogTitle,GetLastError());
      userlog(szWork);
      return(TRUE);
   };
   return(FALSE);
};   // OpenLogFile

//=========================================================================
// FUNCTION: CalculateElapsed
//
//    Calculates the elapsed time of the delivery transaction.
//
// ARGUMENTS:
//    lpBegin  time delivery was queued
//    lpEnd           time delivery update completed
//
```

```
// RETURNS:
//    int            pElapsed elapsed time result (in milliseconds)
//
// COMMENTS:
//    None
//
//=========================================================================
void CalculateElapsed(int * pElapsed,LPSYSTEMTIME lpBegin,
                      LPSYSTEMTIME lpEnd)
{
   int tmBegin;
   int tmEnd;

   tmBegin = (lpBegin->wHour * 3600000) + (lpBegin->wMinute * 60000) +
      (lpBegin->wSecond * 1000) + lpBegin->wMilliseconds;
   tmEnd = (lpEnd->wHour * 3600000) + (lpEnd->wMinute * 60000) +
      (lpEnd->wSecond * 1000) + lpEnd->wMilliseconds;
   *pElapsed = tmEnd - tmBegin;

   // Check for day boundry, this will function for 24 hour period but
   // will fail over a 48 hours period.
   if (*pElapsed < 0)
      *pElapsed = *pElapsed + (24 * 60 * 60 * 1000);
   return;
};   // CalculateElapsed

//=========================================================================
// FUNCTION: UtilStrCpy
//
//    Copies n characters from string pSrc to pDst and places a null
//    null character at the end of the destination string.
//
// ARGUMENTS:
//    char     *pDest   destination string pointer
//    char     *pSrc    source string pointer
//    int      n        number of characters to copy
//
// RETURNS:           None
//
// COMMENTS:
//    Unlike strncpy this function ensures that the result string is
//    always null terminated.
//
//=========================================================================
void UtilStrCpy(char * pDest, char * pSrc, int n)
{
   strncpy(pDest, pSrc, n);
   pDest[n] = '\0';
   return;
};   // UtilStrCpy

//=========================================================================
//
// Function name: GetArgs
//
//=========================================================================
void GetArgs(INT argc, CHAR **argv)
{
   INT j;
   CHAR * ptr;
   BOOL bRslt = TRUE;

   for (j = 1; j < argc; ++j)
   {
      ptr = argv[j];
      switch (ptr[1])
      {
         case 's':
         case 'S':
            strcpy(szServer,ptr+2);
            break;

         case 'd':
         case 'D':
            strcpy(szDatabase,ptr+2);
            break;

         case 'F':
         case 'f':
            bFlush = TRUE;    //turn on delilog flush when written.
            break;

      };   // switch(ptr[1])
   };   // for (j = 1; j < argc; ++j)
};   // GetArgs
```

Appendix B - Database Design

Build Scripts

BACKUP.SQL

```
--  File:     BACKUP.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates backup of tpcc database


declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

backup database tpcc to tpccback1 with init, stats = 5

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

CREATEDB.SQL

```
--  File:     CREATEDB.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates tpcc database and backup files
--            for 816 warehouses.

use master
go

--  remove any existing database and backup files

exec sp_dbremove tpcc, dropdev
exec sp_dropdevice 'tpccback1', delfile
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

--  create main database files

create database tpcc on
       (name="MSSQL70_tpcc_root",filename="D:\MSSQL7\Data\tpcc_root.mdf",
size=10MB, FILEGROWTH=0)
log on
       (name="MSSQL70_tpcc_log",filename="L:",size=25001MB, FILEGROWTH=0)

--  create filegroups

alter database tpcc add filegroup MSSQL70_cs_fg
alter database tpcc add filegroup MSSQL70_misc_fg

--  add files to filegroups

alter database tpcc add file
       (name="MSSQL70_cs1",filename="J:",size=6800MB, FILEGROWTH=0),
       (name="MSSQL70_cs3",filename="O:",size=6800MB, FILEGROWTH=0),
       (name="MSSQL70_cs4",filename="S:",size=6800MB, FILEGROWTH=0),
       (name="MSSQL70_cs5",filename="H:",size=6800MB, FILEGROWTH=0),
       (name="MSSQL70_cs6",filename="M:",size=6800MB, FILEGROWTH=0),
       (name="MSSQL70_cs7",filename="Q:",size=6800MB, FILEGROWTH=0),
       (name="MSSQL70_cs8",filename="U:",size=6800MB, FILEGROWTH=0)
to filegroup MSSQL70_cs_fg

alter database tpcc add file
       (name="MSSQL70_misc2",filename="V:",size=3400MB, FILEGROWTH=0),
       (name="MSSQL70_misc3",filename="R:",size=3400MB, FILEGROWTH=0),
       (name="MSSQL70_misc4",filename="N:",size=3400MB, FILEGROWTH=0),
       (name="MSSQL70_misc5",filename="I:",size=3400MB, FILEGROWTH=0),
       (name="MSSQL70_misc6",filename="T:",size=3400MB, FILEGROWTH=0),
       (name="MSSQL70_misc7",filename="P:",size=3400MB, FILEGROWTH=0),
       (name="MSSQL70_misc8",filename="K:",size=3400MB, FILEGROWTH=0)
to filegroup MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)
go

--  create backup devices

exec sp_addumpdevice 'disk','tpccback1','G:\tpccback1.dmp'
go
```

DBOPT1.SQL

```
--  File:     DBOPT1.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Sets database options for data load


use master
go

exec sp_dboption tpcc,'select into/bulkcopy',true
exec sp_dboption tpcc,'trunc. log on chkpt.',true
go

use tpcc
go
```

```
checkpoint
go
```

DBOPT2.SQL

```
--  File:     DBOPT2.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.01
--            Copyright Microsoft, 1996
--  Purpose:  Resets database options after data load


use master
go

sp_dboption tpcc,'select ',false
go

sp_dboption tpcc,'trunc. ',false
go

use tpcc
go

checkpoint
go

sp_configure allow,1
go

reconfigure with override
go

/*                                              */
/* Set option values for user-defined indexes */
/*                                              */

sp_indexoption 'customer','AllowPageLocks',FALSE
go
sp_indexoption 'district','AllowPageLocks',FALSE
go
sp_indexoption 'warehouse','AllowPageLocks',FALSE
go
sp_indexoption 'stock','AllowPageLocks',FALSE
go
sp_indexoption 'order_line','AllowRowLocks',FALSE
go
sp_indexoption 'orders','AllowRowLocks',FALSE
go
sp_indexoption 'new_order','AllowRowLocks',FALSE
go
sp_indexoption 'item','AllowRowLocks',FALSE
go
sp_indexoption 'item','AllowPageLocks',FALSE
go

Print ' '
Print '******************'
Print 'Pre-specified Locking Hierarchy:'
Print '   Lockflag = 0 ==> No pre-specified hierarchy'
Print '   Lockflag = 1 ==> Lock at Page-level then Table-level'
Print '   Lockflag = 2 ==> Lock at Row-level then Table-level'
Print '   Lockflag = 3 ==> Lock at Table-level'
Print ' '

select name,lockflags
from sysindexes
where object_id("warehouse")=id or
         object_id("district")=id or
         object_id("customer")=id or
         object_id("stock")=id or
         object_id("orders")=id or
         object_id("order_line")=id or
         object_id("history")=id or
         object_id("new_order")=id or
         object_id("item")=id
order by lockflags asc
go

sp_configure allow,0
go

reconfigure with override
go

exec sp_dboption tpcc, 'auto update statistics', FALSE
exec sp_dboption tpcc, 'auto create statistics', FALSE
go

exec sp_tableoption "district","pintable",true
exec sp_tableoption "warehouse","pintable",true
exec sp_tableoption "new_order","pintable",true
exec sp_tableoption "item","pintable",true
go
```

IDXCUSCL.SQL

```
--  File:     IDXCUSCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on customer table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where name = 'customer_c1' )
       drop index customer.customer_c1

create unique clustered index customer_c1 on customer(c_w_id, c_d_id,
c_id)
       on MSSQL70_cs_fg
```

```
select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXCUSNC.SQL

```
--  File:     IDXCUSNC.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates non-clustered index on customer table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'customer_nc1' )
       drop index customer.customer_nc1

create unique nonclustered index customer_nc1 on customer(c_w_id, c_d_id,
c_last, c_first, c_id)
       on MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXDISCL.SQL

```
--  File:     IDXDISCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on district table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where name = 'district_c1' )
       drop index district.district_c1

create unique clustered index  district_c1 on district(d_w_id, d_id)
        on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXITMCL.SQL

```
--  File:     IDXITMCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on item table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'item_c1' )
       drop index item.item_c1

create unique clustered index item_c1 on item(i_id)
       on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXNODCL.SQL

```
--  File:     IDXNODCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on new_order table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'new_order_c1' )
       drop index new_order.new_order_c1
```

```
create unique clustered index new_order_c1 on new_order(no_w_id, no_d_id,
no_o_id)
        on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXODLCL.SQL

```
--  File:     IDXODLCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on order_line table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'order_line_c1' )
        drop index order_line.order_line_c1

create unique clustered index order_line_c1 on order_line(ol_w_id,
ol_d_id, ol_o_id, ol_number)
        on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXORDCL.SQL

```
--  File:     IDXORDCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on orders table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'orders_c1' )
        drop index orders.orders_c1

create unique clustered index orders_c1 on orders(o_w_id, o_d_id, o_id)
        on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXORDNC.SQL

```
--  File:     IDXORDNC.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates non-clustered index on orders table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'orders_nc1' )
        drop index orders.orders_nc1

create unique nonclustered index orders_nc1 on orders(o_w_id, o_d_id,
o_c_id, o_id)
        on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXSTKCL.SQL

```
--  File:     IDXSTKCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on stock table


use tpcc
go
```

```
declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where  name = 'stock_c1' )
        drop index stock.stock_c1

create unique clustered index stock_c1 on stock(s_i_id, s_w_id)
        on MSSQL70_cs_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

IDXWARCL.SQL

```
--  File:     IDXWARCL.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates clustered index on warehouse table


use tpcc
go

declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

if exists ( select name from sysindexes where name = 'warehouse_c1' )
        drop index warehouse.warehouse_c1

create unique clustered index warehouse_c1 on warehouse(w_id)
        on MSSQL70_misc_fg

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

RESTORE.SQL

```
--  File:     RESTORE.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Loads database backup from backup files


declare @startdate datetime
declare @enddate datetime
select @startdate = getdate()
select "Start date:", convert(varchar(30),@startdate,9)

restore database tpcc from tpccback1 with replace, stats = 5

select @enddate = getdate()
select "End date: ", convert(varchar(30),@enddate,9)
select "Elapsed time (in seconds): ", datediff(second, @startdate,
@enddate)

go
```

TABLES .SQL

```
--  File:     TABLES.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates TPC-C tables


use tpcc
go

if exists ( select name from sysobjects where name = 'warehouse' )
        drop table warehouse
go
create table warehouse
(
        w_id                            smallint,
        w_name                          char(10),
        w_street_1                      char(20),
        w_street_2                      char(20),
        w_city                          char(20),
        w_state                         char(2),
        w_zip                           char(9),
        w_tax                           numeric(4,4),
        w_ytd                           numeric(12,2)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'district' )
        drop table district
go
create table district
(
        d_id                            tinyint,
        d_w_id                          smallint,
        d_name                          char(10),
        d_street_1                      char(20),
        d_street_2                      char(20),
        d_city                          char(20),
        d_state                         char(2),
        d_zip                           char(9),
        d_tax                           numeric(4,4),
        d_ytd                           numeric(12,2),
        d_next_o_id                     int
) on MSSQL70_misc_fg
go
```

```
if exists ( select name from sysobjects where name = 'customer' )
       drop table customer
go
create table customer
(
       c_id                          int,
       c_d_id                        tinyint,
       c_w_id                        smallint,
       c_first                       char(16),
       c_middle                      char(2),
       c_last                        char(16),
       c_street_1                    char(20),
       c_street_2                    char(20),
       c_city                        char(20),
       c_state                       char(2),
       c_zip                         char(9),
       c_phone                       char(16),
       c_since                       datetime,
       c_credit                      char(2),
       c_credit_lim          numeric(12,2),
       c_discount                    numeric(4,4),
       c_balance                     numeric(12,2),
       c_ytd_payment         numeric(12,2),
       c_payment_cnt         smallint,
       c_delivery_cnt        smallint,
       c_data                        char(500)
) on MSSQL70_cs_fg
go

if exists ( select name from sysobjects where name = 'history' )
       drop table history
go
create table history
(
       h_c_id                        int,
       h_c_d_id                      tinyint,
       h_c_w_id                      smallint,
       h_d_id                        tinyint,
       h_w_id                        smallint,
       h_date                        datetime,
       h_amount                      numeric(6,2),
       h_data                        char(24)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'new_order' )
       drop table new_order
go
create table new_order
(
       no_o_id                       int,
       no_d_id                       tinyint,
       no_w_id                       smallint
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'orders' )
       drop table orders
go
create table orders
(
       o_id                          int,
       o_d_id                        tinyint,
       o_w_id                        smallint,
       o_c_id                        int,
       o_entry_d                     datetime,
       o_carrier_id          tinyint,
       o_ol_cnt                      tinyint,
       o_all_local                   tinyint
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'order_line' )
       drop table order_line
go
create table order_line
(
       ol_o_id                       int,
       ol_d_id                       tinyint,
       ol_w_id                       smallint,
       ol_number                     tinyint,
       ol_i_id                       int,
       ol_supply_w_id        smallint,
       ol_delivery_d         datetime,
       ol_quantity                   smallint,
       ol_amount                     numeric(6,2),
       ol_dist_info          char(24)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'item' )
       drop table item
go
create table item
(
       i_id                          int,
       i_im_id                       int,
       i_name                        char(24),
       i_price                       numeric(5,2),
       i_data                        char(50)
) on MSSQL70_misc_fg
go

if exists ( select name from sysobjects where name = 'stock' )
       drop table stock
go
create table stock
(
       s_i_id                        int,
       s_w_id                        smallint,
       s_quantity                    smallint,
       s_dist_01                     char(24),
       s_dist_02                     char(24),
       s_dist_03                     char(24),
       s_dist_04                     char(24),
       s_dist_05                     char(24),
       s_dist_06                     char(24),
       s_dist_07                     char(24),
       s_dist_08                     char(24),
       s_dist_09                     char(24),
       s_dist_10                     char(24),
```

```
        s_ytd                           int,
        s_order_cnt                     smallint,
        s_remote_cnt            smallint,
        s_data                          char(50)
) on MSSQL70_cs_fg
go
```

VERIFYTPCCLOAD

```
use tpcc
print 'WAREHOUSE'
select rows from sysindexes where id=object_id("warehouse")
print 'DISTRICT = (10 * No of warehouses)'
select rows from sysindexes where id=object_id("district")
print 'ITEM = 100,000'
select rows from sysindexes where id=object_id("item")
print 'CUSTOMER = (30,000 * No of warehouses)'
select rows from sysindexes where id=object_id("customer")
print 'ORDERS = (30,000 * No of warehouses)'
select rows from sysindexes where id=object_id("orders")
print 'HISTORY = (30,000 * No of warehouses)'
select rows from sysindexes where id=object_id("history")
print 'STOCK = (100,000 * No of warehouses)'
select rows from sysindexes where id=object_id("stock")
print 'ORDER_LINE = (300,000 * No of warehouses + some change)'
select rows from sysindexes where id=object_id("order_line")
print 'NEW_ORDER = (9000 * No of warehouses)'
select rows from sysindexes where id=object_id("new_order")
print '**************Index Check***************'
use tpcc
go
sp_helpindex customer
go
sp_helpindex stock
go
sp_helpindex district
go
sp_helpindex item
go
sp_helpindex new_order
go
sp_helpindex orders
go
sp_helpindex order_line
go
sp_helpindex warehouse
go
```

Stored Procedures

DELIVERY.SQL

```
--  File:     DELIVERY.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates delivery transaction stored procedure

use tpcc
go

if exists (select name from sysobjects where name = "tpcc_delivery" )
        drop procedure tpcc_delivery
go

create proc tpcc_delivery     @w_id           smallint,

                                                @o_carrier_id   smallint
as

declare @d_id tinyint,
        @o_id int,
        @c_id int,
        @total numeric(12,2),
        @oid1 int,
        @oid2 int,
        @oid3 int,
        @oid4 int,
        @oid5 int,
        @oid6 int,
        @oid7 int,
        @oid8 int,
        @oid9 int,
        @oid10 int

select @d_id = 0

begin tran d

    while (@d_id < 10)
    begin

        select @d_id  = @d_id + 1,
               @total = 0,
               @o_id  = 0

               select top 1 @o_id = no_o_id
               from new_order (serializable updlock)
        where no_w_id = @w_id and
                     no_d_id = @d_id
               order by no_o_id asc

        if (@@rowcount <> 0)
        begin

--  claim the order for this district

            delete new_order
            where no_w_id = @w_id and
                         no_d_id = @d_id and
                            no_o_id = @o_id

--  set carrier_id on this order (and get customer id)

            update orders
                   set o_carrier_id = @o_carrier_id,
                @c_id        = o_c_id
```

```
            where o_w_id = @w_id and
                          o_d_id = @d_id and
                             o_id   = @o_id

--  set date in all lineitems for this order (and sum amounts)

            update order_line
                   set ol_delivery_d = getdate(),
                    @total        = @total + ol_amount
            where ol_w_id = @w_id and
                  ol_d_id = @d_id and
                          ol_o_id = @o_id

--  accummulate lineitem amounts for this order into customer

                    update customer
                       set c_balance      = c_balance + @total,
                           c_delivery_cnt = c_delivery_cnt + 1

            where c_w_id = @w_id and
                          c_d_id = @d_id and
                             c_id   = @c_id

        end

        select @oid1 = case @d_id when  1  then @o_id else @oid1 end,
               @oid2 = case @d_id when  2  then @o_id else @oid2 end,
               @oid3 = case @d_id when  3  then @o_id else @oid3 end,
               @oid4 = case @d_id when  4  then @o_id else @oid4 end,
               @oid5 = case @d_id when  5  then @o_id else @oid5 end,
               @oid6 = case @d_id when  6  then @o_id else @oid6 end,
               @oid7 = case @d_id when  7  then @o_id else @oid7 end,
               @oid8 = case @d_id when  8  then @o_id else @oid8 end,
               @oid9 = case @d_id when  9  then @o_id else @oid9 end,
               @oid10 = case @d_id when 10 then @o_id else @oid10 end

    end

commit tran d

-- return delivery data to client

select @oid1,
       @oid2,
       @oid3,
       @oid4,
       @oid5,
       @oid6,
       @oid7,
       @oid8,
       @oid9,
       @oid10

go
```

NEWORD.SQL

```
--  File:     NEWORD.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates new order transaction stored procedure
--
--  Modified 9/21/98 - Jamie Reding - Microsoft Corporation
--             Reordered @rowcount check so that invalid supply warehouse
id,
--      as well as invalid item id, is detected and causes explicit
--             transaction rollback.
--

use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_neworder" )
       drop procedure tpcc_neworder
go

create proc tpcc_neworder
                                        @w_id           smallint,
                                        @d_id           tinyint,
                                        @c_id           int,
                                        @o_ol_cnt       tinyint,
                                        @o_all_local    tinyint,
                                        @i_id1  int = 0, @s_w_id1 smallint =
0, @ol_qty1 smallint = 0,
                                        @i_id2  int = 0, @s_w_id2 smallint =
0, @ol_qty2 smallint = 0,
                                        @i_id3  int = 0, @s_w_id3 smallint =
0, @ol_qty3 smallint = 0,
                                        @i_id4  int = 0, @s_w_id4 smallint =
0, @ol_qty4 smallint = 0,
                                        @i_id5  int = 0, @s_w_id5 smallint =
0, @ol_qty5 smallint = 0,
                                        @i_id6  int = 0, @s_w_id6 smallint =
0, @ol_qty6 smallint = 0,
                                        @i_id7  int = 0, @s_w_id7 smallint =
0, @ol_qty7 smallint = 0,
                                        @i_id8  int = 0, @s_w_id8 smallint =
0, @ol_qty8 smallint = 0,
                                        @i_id9  int = 0, @s_w_id9 smallint =
0, @ol_qty9 smallint = 0,
                                        @i_id10 int = 0, @s_w_id10 smallint
= 0, @ol_qty10 smallint = 0,
                                        @i_id11 int = 0, @s_w_id11 smallint
= 0, @ol_qty11 smallint = 0,
                                        @i_id12 int = 0, @s_w_id12 smallint
= 0, @ol_qty12 smallint = 0,
                                        @i_id13 int = 0, @s_w_id13 smallint
= 0, @ol_qty13 smallint = 0,
                                        @i_id14 int = 0, @s_w_id14 smallint
= 0, @ol_qty14 smallint = 0,
                                        @i_id15 int = 0, @s_w_id15 smallint
= 0, @ol_qty15 smallint = 0


as
declare @w_tax          numeric(4,4),
        @d_tax          numeric(4,4),
        @c_last         char(16),
        @c_credit       char(2),
        @c_discount     numeric(4,4),
        @i_price        numeric(5,2),
```

```
        @i_name         char(24),
        @i_data         char(50),
        @o_entry_d      datetime,
        @remote_flag    int,
        @s_quantity     smallint,
        @s_data         char(50),
        @s_dist         char(24),
               @li_no          int,
               @o_id                   int,
               @commit_flag    tinyint,
        @li_id          int,
        @li_s_w_id      smallint,
        @li_qty         smallint,
               @ol_number              int,
               @c_id_local             int

begin

       begin transaction n

--  get district tax and next availible order id and update
--  plus initialize local variables

       update  district
       set             @d_tax       = d_tax,
                       @o_id        = d_next_o_id,
                       d_next_o_id  = d_next_o_id + 1,
                       @o_entry_d   = getdate(),
                       @li_no       = 0,
                       @commit_flag = 1
       where   d_w_id       = @w_id and
                       d_id         = @d_id

--  process orderlines

    while (@li_no < @o_ol_cnt)
       begin

        select @li_no = @li_no + 1

--  set i_id, s_w_id, and qty for this lineitem

           select @li_id = case @li_no
                  when 1 then @i_id1
                         when 2 then @i_id2
                         when 3 then @i_id3
                         when 4 then @i_id4
                         when 5 then @i_id5
                         when 6 then @i_id6
                         when 7 then @i_id7
                         when 8 then @i_id8
                         when 9 then @i_id9
                         when 10 then @i_id10
                         when 11 then @i_id11
                         when 12 then @i_id12
                         when 13 then @i_id13
                         when 14 then @i_id14
                         when 15 then @i_id15
                         end,

                         @li_s_w_id = case @li_no
                         when 1 then @s_w_id1
                         when 2 then @s_w_id2
                         when 3 then @s_w_id3
                         when 4 then @s_w_id4
                         when 5 then @s_w_id5
                         when 6 then @s_w_id6
                         when 7 then @s_w_id7
                         when 8 then @s_w_id8
                         when 9 then @s_w_id9
                         when 10 then @s_w_id10
                         when 11 then @s_w_id11
                         when 12 then @s_w_id12
                         when 13 then @s_w_id13
                         when 14 then @s_w_id14
                         when 15 then @s_w_id15
                         end,

                         @li_qty = case  @li_no
                         when 1 then @ol_qty1
                         when 2 then @ol_qty2
                         when 3 then @ol_qty3
                         when 4 then @ol_qty4
                         when 5 then @ol_qty5
                         when 6 then @ol_qty6
                         when 7 then @ol_qty7
                         when 8 then @ol_qty8
                         when 9 then @ol_qty9
                         when 10 then @ol_qty10
                         when 11 then @ol_qty11
                         when 12 then @ol_qty12
                         when 13 then @ol_qty13
                         when 14 then @ol_qty14
                         when 15 then @ol_qty15
                         end

--  get item data (no one updates item)

                select  @i_price = i_price,
                                @i_name  = i_name,
                                @i_data  = i_data
                from    item (tablock repeatableread)
                where   i_id = @li_id

--  update stock values

                update  stock
                set             s_ytd        = s_ytd + @li_qty,
                                @s_quantity  = s_quantity   = s_quantity -
@li_qty +

                        case when (s_quantity - @li_qty < 10) then 91 else
0 end,
                                s_order_cnt  = s_order_cnt + 1,
                                s_remote_cnt = s_remote_cnt +
                                                                        case
when (@li_s_w_id = @w_id) then 0 else 1 end,
                                @s_data      = s_data,
                                @s_dist      = case @d_id
                                                                when 1  then
s_dist_01
                                                        when 2  then s_dist_02
```

```
                                        when 3  then s_dist_03
                                        when 4  then s_dist_04
                                        when 5  then s_dist_05
                                        when 6  then s_dist_06
                                        when 7  then s_dist_07
                                        when 8  then s_dist_08
                                        when 9  then s_dist_09
                                        when 10 then s_dist_10
                                end
                where   s_i_id          = @li_id and
                        s_w_id          = @li_s_w_id

--  if there actually is a stock (and item) with these ids, go to work

            if (@@rowcount > 0)
                    begin

--  insert order_line data (using data from item and stock)

                                insert into order_line values(@o_id,

                    @d_id,

                    @w_id,

                    @li_no,

                    @li_id,

                    @li_s_w_id,

                    "dec 31, 1899",

                    @li_qty,

                    @i_price * @li_qty,

                    @s_dist)


--  send line-item data to client

                                select  @i_name,
                                        @s_quantity,
                                        b_g = case when (
(patindex("%ORIGINAL%",@i_data) > 0) and

          (patindex("%ORIGINAL%",@s_data) > 0) )
                                                        then "B" else "G"
end,
                                        @i_price,
                                        @i_price * @li_qty

                    end
        else
                begin

--  no item (or stock) found - triggers rollback condition


                    select "",0,"",0,0

                        select @commit_flag = 0

                end
        end

--  get customer last name, discount, and credit rating

    select      @c_last     = c_last,
                        @c_discount = c_discount,
                        @c_credit   = c_credit,
                        @c_id_local = c_id
    from        customer (repeatableread)
    where       c_id            = @c_id and
                        c_w_id          = @w_id and
                        c_d_id          = @d_id

--  insert fresh row into orders table

    insert into orders values (@o_id,
                                    @d_id,
                                       @w_id,
                                              @c_id_local,
                                              @o_entry_d,
                                                  0,
                                                  @o_ol_cnt,
                                                  @o_all_local)

--  insert corresponding row into new-order table

        insert into new_order values (@o_id,
                                                                        @d_id,
                                                                        @w_id)

--  select warehouse tax

        select  @w_tax  = w_tax
        from    warehouse (repeatableread)
        where   w_id    = @w_id

        if (@commit_flag = 1)
                commit transaction n
        else

--  all that work for nuthin!!!

                rollback transaction n

--  return order data to client

        select @w_tax,
               @d_tax,
                   @o_id,
                   @c_last,
                   @c_discount,
                   @c_credit,
                   @o_entry_d,
                   @commit_flag

end

go
```

ORDSTAT.SQL

```
--  File:     ORDSTAT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates order status transaction stored procedure


use tpcc
go

if exists ( select name from sysobjects where name = "tpcc_orderstatus" )
       drop procedure   tpcc_orderstatus
go

create proc tpcc_orderstatus @w_id           smallint,
                                                @d_id
       tinyint,
                                                @c_id         int,
                                                @c_last
       char(16) = ""

as

declare @c_balance            numeric(12,2),
        @c_first              char(16),
        @c_middle             char(2),
        @o_id                 int,
        @o_entry_d            datetime,
        @o_carrier_id  smallint,
        @cnt                  smallint

begin tran o

       if (@c_id = 0)
              begin

--  get customer id and info using last name

               select @cnt = (count(*)+1)/2
               from customer (repeatableread)
               where c_last = @c_last and
                 c_w_id = @w_id and
                 c_d_id = @d_id

               set rowcount @cnt

               select @c_id = c_id,
                         @c_balance = c_balance,
                         @c_first   = c_first,
                         @c_last    = c_last,
                         @c_middle  = c_middle
               from customer (repeatableread)
               where c_last = @c_last and
                 c_w_id = @w_id and
                 c_d_id = @d_id
               order by c_w_id, c_d_id, c_last, c_first

               set rowcount 0
               end

       else
              begin

--  get customer info if by id

               select @c_balance = c_balance,
                      @c_first   = c_first,
                      @c_middle  = c_middle,
                      @c_last    = c_last
               from customer (repeatableread)
               where c_id   = @c_id and
                     c_d_id = @d_id and
                     c_w_id = @w_id

               select @cnt = @@rowcount

               end

--  if no such customer

       if (@cnt = 0)
       begin
              raiserror("Customer not found",18,1)
              goto custnotfound
       end

--  get order info

       select @o_id = o_id,
                 @o_entry_d    = o_entry_d,
          @o_carrier_id = o_carrier_id
       from orders (serializable)
       where o_c_id = @c_id and
         o_d_id = @d_id and
         o_w_id = @w_id
       order by o_id asc

--  select order lines for the current order

       select ol_supply_w_id,
          ol_i_id,
              ol_quantity,
              ol_amount,
              ol_delivery_d
       from order_line (repeatableread)
       where ol_o_id = @o_id and
             ol_d_id = @d_id and
             ol_w_id = @w_id

custnotfound:

commit tran o

--  return data to client

select @c_id,
          @c_last,
          @c_first,
          @c_middle,
          @o_entry_d,
```

```
          @o_carrier_id,
          @c_balance,
          @o_id

go
```

PAYMENTS.SQL

```
--  File:     PAYMENT.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates payment transaction stored procedure


use tpcc
go

if exists (select name from sysobjects where name = "tpcc_payment" )
       drop procedure tpcc_payment
go

create proc tpcc_payment @w_id           smallint,
                                         @c_w_id         smallint,
                                         @h_amount
numeric(6,2),
                                         @d_id           tinyint,
                                         @c_d_id         tinyint,
                                         @c_id           int,
                                         @c_last         char(16) =
""


as
declare  @w_street_1     char(20),
         @w_street_2     char(20),
         @w_city         char(20),
         @w_state        char(2),
         @w_zip          char(9),
         @w_name         char(10),
         @d_street_1     char(20),
         @d_street_2     char(20),
         @d_city         char(20),
         @d_state        char(2),
         @d_zip          char(9),
         @d_name         char(10),
         @c_first        char(16),
         @c_middle       char(2),
         @c_street_1     char(20),
         @c_street_2     char(20),
         @c_city         char(20),
         @c_state        char(2),
         @c_zip          char(9),
         @c_phone        char(16),
         @c_since        datetime,
         @c_credit       char(2),
         @c_credit_lim   numeric(12,2),
         @c_balance      numeric(12,2),
         @c_discount     numeric(4,4),
         @data           char(500),
         @c_data         char(500),
         @datetime       datetime,
         @w_ytd          numeric(12,2),
         @d_ytd          numeric(12,2),
         @cnt            smallint,
         @val            smallint,
         @screen_data   char(200),
                @d_id_local    tinyint,
                @w_id_local    smallint,
                @c_id_local    int

select @screen_data = ""

begin tran p

--  get payment date

        select @datetime = getdate()

        if (@c_id = 0)
        begin

--  get customer id and info using last name

                select @cnt = count(*)
                from customer (repeatableread)
                where c_last = @c_last and
                      c_w_id = @c_w_id and
                      c_d_id = @c_d_id


                select @val = (@cnt + 1) / 2
                set rowcount @val

                select @c_id = c_id
                from customer (repeatableread)
                where c_last = @c_last and
                      c_w_id = @c_w_id and
                      c_d_id = @c_d_id
                order by c_last, c_first

                set rowcount 0
        end

--  get customer info and update balances

        update customer set
                @c_balance     = c_balance = c_balance - @h_amount,
                c_payment_cnt  = c_payment_cnt + 1,
                c_ytd_payment  = c_ytd_payment + @h_amount,
                @c_first       = c_first,
                @c_middle      = c_middle,
           @c_last        = c_last,
           @c_street_1    = c_street_1,
               @c_street_2    = c_street_2,
               @c_city        = c_city,
               @c_state       = c_state,
               @c_zip         = c_zip,
               @c_phone       = c_phone,
               @c_credit      = c_credit,
               @c_credit_lim  = c_credit_lim,
               @c_discount    = c_discount,
```

```
                @c_since       = c_since,
                @data          = c_data,
                @c_id_local    = c_id
        where c_id   = @c_id and
              c_w_id = @c_w_id and
              c_d_id = @c_d_id

--  if customer has bad credit get some more info

        if (@c_credit = "BC")
        begin

--      compute new info

                select @c_data = convert(char(5),@c_id) +
                                    convert(char(4),@c_d_id) +
                                 convert(char(5),@c_w_id) +
                                 convert(char(4),@d_id) +
                                 convert(char(5),@w_id) +
                                 convert(char(19),@h_amount) +
                                 substring(@data, 1, 458)

--  update customer info

                update customer set
                       c_data = @c_data
                where c_id   = @c_id and
                         c_w_id = @c_w_id and
                      c_d_id = @c_d_id

                select @screen_data = substring (@c_data,1,200)
        end

--  get district data and update year-to-date

        update district
        set d_ytd       = d_ytd + @h_amount,
                @d_street_1 = d_street_1,
                @d_street_2 = d_street_2,
                @d_city     = d_city,
                @d_state    = d_state,
                @d_zip      = d_zip,
                @d_name     = d_name,
                @d_id_local = d_id
        where d_w_id = @w_id and
              d_id   = @d_id

--  get warehouse data and update year-to-date

        update warehouse
        set w_ytd       = w_ytd + @h_amount,
               @w_street_1 = w_street_1,
            @w_street_2 = w_street_2,
            @w_city     = w_city,
            @w_state    = w_state,
            @w_zip      = w_zip,
            @w_name     = w_name,
               @w_id_local = w_id
        where w_id = @w_id

--  create history record

       insert into history values  (@c_id_local,
                                                                @c_d_id,
                                                                   @c_w_id,
                                                                   @d_id_local,
                                                                   @w_id_local,
                                                                   @datetime,
                                                                   @h_amount,
                                                                   @w_name + "
" + @d_name)

commit tran p

--  return data to client

select  @c_id,
                @c_last,
                @datetime,
                @w_street_1,
                @w_street_2,
                @w_city,
                @w_state,
                @w_zip,
                @d_street_1,
                @d_street_2,
                @d_city,
                @d_state,
                @d_zip,
                @c_first,
                @c_middle,
                @c_street_1,
                @c_street_2,
                @c_city,
                @c_state,
                @c_zip,
                @c_phone,
                @c_since,
                @c_credit,
                @c_credit_lim,
                @c_discount,
                @c_balance,
                @screen_data

go
```

STOCKLEV.SQL

```
--  File:     STOCKLEV.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Creates stock level transaction stored procedure


use tpcc
go

if exists (select name from sysobjects where name = "tpcc_stocklevel" )
       drop procedure tpcc_stocklevel
go
```

```
create proc tpcc_stocklevel   @w_id          smallint,
                                             @d_id          tinyint,
                                             @threshhold    smallint
as

       declare @o_id_low int,
                   @o_id_high int

    select @o_id_low  = (d_next_o_id - 20),
              @o_id_high = (d_next_o_id - 1)
    from district
    where d_w_id = @w_id and
                 d_id   = @d_id

    select count(distinct(s_i_id))
        from  stock, order_line
    where ol_w_id    =  @w_id and
              ol_d_id    =  @d_id and
              ol_o_id between @o_id_low and @o_id_high and
           s_w_id     =  ol_w_id and
              s_i_id     =  ol_i_id and
              s_quantity <  @threshhold

go
```

Loader Source

GETARGS.C

```
//      File:           GETARGS.C
//                              Microsoft TPC-C Kit Ver. 4.00
//                              Copyright Microsoft, 1996, 1997, 1998
//      Purpose:        Source file for command line processing


// Includes
#include "tpcc.h"

//===========================================================================
//
// Function name: GetArgsLoader
//
//===========================================================================

void GetArgsLoader(int argc, char **argv, TPCCLDR_ARGS *pargs)
{
    int         i;
    char        *ptr;

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsLoader()\n", (int)
GetCurrentThreadId());
#endif

    /* init args struct with some useful values */
    pargs->server                   =  SERVER;
    pargs->user                     =  USER;
    pargs->password                 =  PASSWORD;
    pargs->database                 =  DATABASE;
    pargs->batch                    =  BATCH;
    pargs->num_warehouses           =  UNDEF;
       pargs->tables_all                    =  TRUE;
       pargs->table_item                    =  FALSE;
       pargs->table_warehouse       =  FALSE;
       pargs->table_customer        =  FALSE;
       pargs->table_orders                  =  FALSE;
       pargs->loader_res_file               =  LOADER_RES_FILE;
       pargs->pack_size                     =  DEFLDPACKSIZE;
       pargs->starting_warehouse    =  DEF_STARTING_WAREHOUSE;
       pargs->build_index                   =  BUILD_INDEX;
       pargs->index_order                   =  INDEX_ORDER;
       pargs->index_script_path     =  INDEX_SCRIPT_PATH;
       pargs->scale_down                    =  SCALE_DOWN;

    /* check for zero command line args */
    if ( argc == 1 )
               GetArgsLoaderUsage();

    for (i = 1; i < argc; ++i)
    {
               if (argv[i][0] != '-' && argv[i][0] != '/')
               {
               printf("\nUnrecognized command");
               GetArgsLoaderUsage();
               exit(1);
               }

               ptr = argv[i];

               switch (ptr[1])
               {
               case 'h':     /* Fall throught */
               case 'H':
                               GetArgsLoaderUsage();
                               break;

               case 'D':
                               pargs->database = ptr+2;
                               break;

               case 'P':
                               pargs->password = ptr+2;
                               break;

               case 'S':
                               pargs->server = ptr+2;
                               break;

               case 'U':
                               pargs->user = ptr+2;
                               break;

               case 'b':
                               pargs->batch = atol(ptr+2);
                               break;
```

```
                case 'W':
                        pargs->num_warehouses = atol(ptr+2);
                        break;

                case 's':
                        pargs->starting_warehouse = atol(ptr+2);
                        break;

                case 't':
                        {
                                pargs->tables_all = FALSE;
                                if (strcmp(ptr+2,"item") == 0)
                                        pargs->table_item = TRUE;
                                else if (strcmp(ptr+2,"warehouse")
== 0)
                                        pargs->table_warehouse =
TRUE;
                                else if (strcmp(ptr+2,"customer") ==
0)
                                        pargs->table_customer = TRUE;
                                else if (strcmp(ptr+2,"orders") ==
0)
                                        pargs->table_orders = TRUE;
                                else
                                {
                                printf("\nUnrecognized command");
                                GetArgsLoaderUsage();
                                exit(1);
                                }

                                break;
                        }

                case 'f':
                        pargs->loader_res_file = ptr+2;
                        break;

                case 'p':
                        pargs->pack_size = atol(ptr+2);
                        break;

                case 'i':
                        pargs->build_index = atol(ptr+2);
                        break;

                case 'o':
                        pargs->index_order = atol(ptr+2);
                        break;

                case 'c':
                        pargs->scale_down = atol(ptr+2);
                        break;

                case 'd':
                        pargs->index_script_path = ptr+2;
                        break;

                default:
                        GetArgsLoaderUsage();
                        exit(-1);
                        break;
                }
        }

        /* check for required args */
        if (pargs->num_warehouses == UNDEF )
        {
                printf("Number of Warehouses is required\n");
                exit(-2);
        }

        return;
}


//==============================================================================
//
// Function name: GetArgsLoaderUsage
//
//==============================================================================

void GetArgsLoaderUsage()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering GetArgsLoaderUsage()\n", (int)
GetCurrentThreadId());
#endif


    printf("TPCCLDR:\n\n");
       printf("Parameter
Default\n");
       printf("-------------------------------------------------------------
----\n");
    printf("-W Number of Warehouses to Load                         Required
\n");
    printf("-S Server                                               %s\n",
SERVER);
    printf("-U Username                                             %s\n",
USER);
    printf("-P Password                                             %s\n",
PASSWORD);
    printf("-D Database                                             %s\n",
DATABASE);
       printf("-b Batch Size
%ld\n", (long) BATCH);
       printf("-p TDS packet size
%ld\n", (long) DEFLDPACKSIZE);
       printf("-f Loader Results Output Filename
%s\n", LOADER_RES_FILE);
       printf("-s Starting Warehouse
%ld\n", (long) DEF_STARTING_WAREHOUSE);
       printf("-i Build Option (data = 0, data and index = 1)
%ld\n", (long) BUILD_INDEX);
       printf("-o Cluster Index Build Order (before = 1, after = 0)
%ld\n", (long) INDEX_ORDER);
       printf("-c Build Scaled Database (normal = 0, tiny = 1)
%ld\n", (long) SCALE_DOWN);
       printf("-d Index Script Path
%s\n", INDEX_SCRIPT_PATH);
```

```
        printf("-t Table to Load                                        all
tables \n");
    printf("   [item|warehouse|customer|orders]\n");
    printf("   Notes: \n");
    printf("     - the '-t' parameter may be included multiple times to
\n");
    printf("       specify multiple tables to be loaded \n");
    printf("     - 'item' loads ITEM table \n");
    printf("     - 'warehouse' loads WAREHOUSE, DISTRICT, and STOCK tables
\n");
    printf("     - 'customer' loads CUSTOMER and HISTORY tables \n");
    printf("     - 'orders' load NEW-ORDER, ORDERS, ORDER-LINE tables
\n");

        printf("\nNote:  Command line switches are case sensitive.\n");

    exit(0);
}
```

RANDOM.C

```
//      File:           RANDOM.C
//                              Microsoft TPC-C Kit Ver. 4.00
//                              Copyright Microsoft, 1996, 1997, 1998
//      Purpose:        Random number generation routines for database
loader


// Includes
#include "tpcc.h"
#include "math.h"

// Defines
#define A             16807
#define M        2147483647
#define Q            127773      /* M div A */
#define R              2836      /* M mod A */
#define Thread          __declspec(thread)

// Globals
long    Thread Seed = 0;        /* thread local seed */

/*****************************************************************************
*****
*
*
* random -
*
*       Implements a GOOD pseudo random number generator.  This generator
*
*       will/should? run the complete period before repeating.
*
*
*
* Copied from:
*
*       Random Numbers Generators: Good Ones Are Hard to Find.
*
*       Communications of the ACM - October 1988 Volume 31 Number 10
*
*
*
* Machine Dependencies:
*
*       long must be 2 ^ 31 - 1 or greater.
*
*
*
*****************************************************************************
****/

/*****************************************************************************
*****
* seed - load the Seed value used in irand and drand.  Should be used
before  *
*       first call to irand or drand.
*
*****************************************************************************
****/

void seed(long val)
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering seed()...\n", (int) GetCurrentThreadId());
        printf("Old Seed %ld New Seed %ld\n",Seed, val);
#endif

    if ( val < 0 )
            val = abs(val);

    Seed = val;

}


/*****************************************************************************
****
*
*
* irand - returns a 32 bit integer pseudo random number with a period of
*
*       1 to 2 ^ 32 - 1.
*
*
*
* parameters:
*
*       none.
*
*
*
* returns:
*
*       32 bit integer - defined as long ( see above ).
*
*
*
```

```
* side effects:
*
*       seed get recomputed.
*
************************************************************************
***/

long irand()
{
    register long    s;      /* copy of seed */
    register long    test;   /* test flag */
    register long    hi;     /* tmp value for speed */
    register long    lo;     /* tmp value for speed */

#ifdef DEBUG
    printf("[%ld]DBG: Entering irand()...\n", (int) GetCurrentThreadId());
#endif

    s = Seed;
    hi = s / Q;
    lo = s % Q;

    test = A * lo - R * hi;
    if ( test > 0 )
                Seed = test;
    else
                Seed = test + M;

    return( Seed );
}


/************************************************************************
****
*
* drand - returns a double pseudo random number between 0.0 and 1.0.
*
*       See irand.
*
************************************************************************
***/
double drand()
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering drand()...\n", (int) GetCurrentThreadId());
#endif

    return( (double)irand() / 2147483647.0);
}


//====================================================================
// Function   : RandomNumber
//
// Description:
//====================================================================
long RandomNumber(long lower, long upper)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering RandomNumber()...\n", (int)
GetCurrentThreadId());
#endif

        if ( upper == lower )  /* pgd 08-13-96 perf enhancement */
                return lower;

        upper++;

    if ( upper <= lower )
                rand_num = upper;
    else
                rand_num = lower + irand() % (upper - lower); /* pgd 08-13-
96 perf enhancement */


#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld ==> %ld\n",
                                (int) GetCurrentThreadId(), lower, upper,
rand_num);
#endif


    return rand_num;
}


#if 0

//Orginal code pgd 08/13/96

long RandomNumber(long lower,
                                     long upper)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering RandomNumber()...\n", (int)
GetCurrentThreadId());
#endif

        upper++;

    if ((upper <= lower))
                rand_num = upper;
    else
                rand_num = lower + irand() % ((upper > lower) ? upper -
lower : upper);


#ifdef DEBUG
    printf("[%ld]DBG: RandomNumber between %ld & %ld ==> %ld\n",
                                (int) GetCurrentThreadId(), lower, upper,
rand_num);
#endif


    return rand_num;
}
```

```
#endif

//==========================================================================
// Function   : NURand
//
// Description:
//==========================================================================
long NURand(int iConst,
            long x,
            long y,
            long C)
{
    long rand_num;

#ifdef DEBUG
    printf("[%ld]DBG: Entering NURand()...\n", (int)
GetCurrentThreadId());
#endif

    rand_num = (((RandomNumber(0,iConst) | RandomNumber(x,y)) + C) % (y-
x+1))+x;

#ifdef DEBUG
    printf("[%ld]DBG: NURand: num = %d\n", (int) GetCurrentThreadId(),
rand_num);
#endif

    return rand_num;
}
```

STRINGS.C

```
//      File:           STRINGS.C
//                              Microsoft TPC-C Kit Ver. 4.00
//                              Copyright Microsoft, 1996, 1997, 1998
//      Purpose:        Source file for database loader string functions


// Includes
#include "tpcc.h"
#include <string.h>
#include <ctype.h>

//==========================================================================
//
// Function name: MakeAddress
//
//==========================================================================

void MakeAddress(char *street_1,
                                char *street_2,
                                char *city,
                                char *state,
                                char *zip)
{

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAddress()\n", (int)
GetCurrentThreadId());
#endif

    MakeAlphaString (10, 20, ADDRESS_LEN, street_1);
    MakeAlphaString (10, 20, ADDRESS_LEN, street_2);
    MakeAlphaString (10, 20, ADDRESS_LEN, city);
    MakeAlphaString ( 2,  2, STATE_LEN, state);
    MakeZipNumberString( 9,  9, ZIP_LEN, zip);

#ifdef DEBUG
    printf("[%ld]DBG: MakeAddress: street_1: %s, street_2: %s, city: %s,
state: %s, zip: %s\n",
                        (int) GetCurrentThreadId(), street_1, street_2,
city, state, zip);
#endif

    return;

}


//==========================================================================
//
// Function name: LastName
//
//==========================================================================

void LastName(int  num,
                      char *name)
{
    static char *n[] =
    {
                "BAR" , "OUGHT", "ABLE" , "PRI"  , "PRES",
                "ESE" , "ANTI" , "CALLY", "ATION", "EING"
    };

#ifdef DEBUG
    printf("[%ld]DBG: Entering LastName()\n", (int) GetCurrentThreadId());
#endif

    if ((num >= 0) && (num < 1000))
    {
                strcpy(name, n[(num/100)%10]);
                strcat(name, n[(num/10)%10]);
                strcat(name, n[(num/1)%10]);

                if (strlen(name) < LAST_NAME_LEN)
                {
                        PaddString(LAST_NAME_LEN, name);
                }

    }
    else
    {
                printf("\nError in LastName()... num <%ld> out of range
(0,999)\n", num);
                exit(-1);
    }
```

```
#ifdef DEBUG
    printf("[%ld]DBG: LastName: num = [%d] ==> [%d][%d][%d]\n",
                        (int) GetCurrentThreadId(), num, num/100,
(num/10)%10, num%10);
        printf("[%ld]DBG: LastName: String = %s\n", (int)
GetCurrentThreadId(), name);
#endif

    return;

}


//============================================================================
//
// Function name: MakeAlphaString
//
//============================================================================

//philipdu 08/13/96 Changed MakeAlphaString to use A-Z, a-z, and 0-9 in
//accordance with spec see below:
//The spec says:
//4.3.2.2       The notation random a-string [x .. y]
//(respectively, n-string [x .. y]) represents a string of random
alphanumeric
//(respectively, numeric) characters of a random length of minimum x,
maximum y,
//and mean (y+x)/2. Alphanumerics are A..Z, a..z, and 0..9.  The only
other
//requirement is that the character set used "must be able to represent a
minimum
//of 128 different characters".  We are using 8-bit chars, so this is a
non issue.
//It is completely unreasonable to stuff non-printing chars into the text
fields.
//-CLevine 08/13/96

int MakeAlphaString( int  x, int  y, int  z, char *str)
{
        int             len;
        int             i;
        static  char chArray[] =
"0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz";
        static  int     chArrayMax = 61;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeAlphaString()\n", (int)
GetCurrentThreadId());
#endif

        len= RandomNumber(x, y);

        for (i=0; i<len; i++)
                str[i] = chArray[RandomNumber(0, chArrayMax)];
        if ( len < z )
                memset(str+len, ' ', z - len);
        str[len] = 0;

    return len;
}


//============================================================================
//
// Function name: MakeOriginalAlphaString
//
//============================================================================

int MakeOriginalAlphaString(int  x,
                                                        int  y,
                                                           int  z,
                                                        char *str,
                                                    int  percent)
{
    int         len;
    int         val;
    int         start;

#ifdef DEBUG
    printf("[%ld]DBG: Entering MakeOriginalAlphaString()\n", (int)
GetCurrentThreadId());
#endif

    // verify prercentage is valid
    if ((percent < 0) || (percent > 100))
    {
                printf("MakeOrigianlAlphaString: Invalid percentage: %d\n",
percent);
                exit(-1);
    }

    // verify string is at least 8 chars in length
    if ((x + y) <= 8)
    {
                printf("MakeOriginalAlphaString: string length must be >=
8\n");
                exit(-1);
    }

    // Make Alpha String
    len = MakeAlphaString(x,y, z, str);

    val = RandomNumber(1,100);
    if (val <= percent)
    {
                start = RandomNumber(0, len - 8);
                strncpy(str + start, "ORIGINAL", 8);
    }


#ifdef DEBUG
    printf("[%ld]DBG: MakeOriginalAlphaString: : %s\n",
                        (int) GetCurrentThreadId(), str);
#endif

    return strlen(str);
}


//============================================================================
//
// Function name: MakeNumberString
```

```
//
//====================================================================
int MakeNumberString(int  x, int  y, int  z, char *str)
{
        char tmp[16];

        //MakeNumberString is always called MakeZipNumberString(16, 16,
16, string)

        memset(str, '0', 16);
        itoa(RandomNumber(0, 99999999), tmp, 10);
        memcpy(str, tmp, strlen(tmp));

        itoa(RandomNumber(0, 99999999), tmp, 10);
        memcpy(str+8, tmp, strlen(tmp));

        str[16] = 0;

    return 16;
}


//====================================================================
//
// Function name: MakeZipNumberString
//
//====================================================================
int MakeZipNumberString(int  x, int  y, int  z, char *str)
{
        char tmp[16];

        //MakeZipNumberString is always called MakeZipNumberString(9, 9,
9, string)

        strcpy(str, "000011111");

        itoa(RandomNumber(0, 9999), tmp, 10);
        memcpy(str, tmp, strlen(tmp));

    return 9;
}


//====================================================================
//
// Function name: InitString
//
//====================================================================
void InitString(char *str, int len)
{
#ifdef DEBUG
    printf("[%ld]DBG: Entering InitString()\n", (int)
GetCurrentThreadId());
#endif

        memset(str, ' ', len);
    str[len] = 0;
}


//====================================================================
// Function name: InitAddress
//
// Description:
//
//====================================================================

void InitAddress(char *street_1, char *street_2, char *city, char *state,
char *zip)
{
        memset(street_1, ' ', ADDRESS_LEN+1);
        memset(street_2, ' ', ADDRESS_LEN+1);
        memset(city, ' ', ADDRESS_LEN+1);

    street_1[ADDRESS_LEN+1] = 0;
    street_2[ADDRESS_LEN+1] = 0;
    city[ADDRESS_LEN+1]     = 0;

        memset(state, ' ', STATE_LEN+1);
    state[STATE_LEN+1] = 0;

        memset(zip, ' ', ZIP_LEN+1);
    zip[ZIP_LEN+1] = 0;
}


//====================================================================
//
// Function name: PaddString
//
//====================================================================

void PaddString(int max, char *name)
{
        int             len;

        len = strlen(name);
        if ( len < max )
                memset(name+len, ' ', max - len);
        name[max] = 0;

        return;
}
```

TIME.C

```
//      File:           TIME.C
//                              Microsoft TPC-C Kit Ver. 4.00
//                              Copyright Microsoft, 1996, 1997, 1998
//      Purpose:        Source file for time functions


// Includes
#include "tpcc.h"

// Globals
static long start_sec;


//====================================================================
//
```

```
// Function name: TimeNow
//
//============================================================================

long TimeNow()
{
   long        time_now;
   struct      _timeb el_time;

#ifdef DEBUG
    printf("[%ld]DBG: Entering TimeNow()\n", (int) GetCurrentThreadId());
#endif

   _ftime(&el_time);

   time_now = ((el_time.time - start_sec) * 1000) + el_time.millitm;

   return time_now;
}
```

TPCC.H

```
//      File:          TPCC.H
//                             Microsoft TPC-C Kit Ver. 4.00
//                             Copyright Microsoft, 1996, 1997, 1998
//      Purpose:       Header file for TPC-C database loader


// Build number of TPC Benchmark Kit
#define TPCKIT_VER     "4.00"

// General headers
#include <windows.h>
#include <winbase.h>
#include <stdlib.h>
#include <stdio.h>
#include <process.h>
#include <stddef.h>
#include <stdarg.h>
#include <string.h>
#include <time.h>
#include <sys\timeb.h>
#include <sys\types.h>

// ODBC headers
#include <sql.h>
#include <sqlext.h>
#include <odbcss.h>

// General constants
#define MILLI                           1000
#define FALSE                                0
#define TRUE                                 1
#define UNDEF                                   -1
#define MINPRINTASCII                    32
#define MAXPRINTASCII                   126

// Default environment constants
#define SERVER                               ""
#define DATABASE                             "tpcc"
#define USER                                 "sa"
#define PASSWORD                        ""

// Default loader arguments
#define BATCH                           10000
#define DEFLDPACKSIZE                   32768
#define ORDERS_PER_DIST                  3000
#define LOADER_RES_FILE                   "logs\\load.out"
#define LOADER_NURAND_C                          123
#define DEF_STARTING_WAREHOUSE                1
#define BUILD_INDEX                                   1       // build both
data and indexes
#define INDEX_ORDER                                   1       // build
indexes before load
#define SCALE_DOWN                                    0   // build a normal
scale database
#define INDEX_SCRIPT_PATH     "scripts"

typedef struct
{
    char                            *server;
    char                            *database;
    char                            *user;
    char                            *password;
       BOOL                         tables_all;                    // set
if loading all tables
       BOOL                         table_item;                    // set
if loading ITEM table specifically
       BOOL                         table_warehouse;       // set if
loading WAREHOUSE, DISTRICT, and STOCK
       BOOL                         table_customer;                // set
if loading CUSTOMER and HISTORY
       BOOL                         table_orders;          // set if
loading NEW-ORDER, ORDERS, ORDER-LINE
    long                            num_warehouses;
    long                            batch;
    long                            verbose;
       long                         pack_size;
       char                         *loader_res_file;
       char                         *synch_servername;
       long                         case_sensitivity;
       long                         starting_warehouse;
       long                         build_index;
       long                         index_order;
       long                         scale_down;
       char                         *index_script_path;
} TPCCLDR_ARGS;

// String length constants
       #define SERVER_NAME_LEN            20
       #define DATABASE_NAME_LEN          20
       #define USER_NAME_LEN              20
       #define PASSWORD_LEN               20
       #define TABLE_NAME_LEN             20
       #define I_DATA_LEN                 50
       #define I_NAME_LEN                 24
       #define BRAND_LEN                   1
       #define LAST_NAME_LEN              16
       #define W_NAME_LEN                 10
```

```
        #define ADDRESS_LEN                20
        #define STATE_LEN                   2
        #define ZIP_LEN                     9
        #define S_DIST_LEN                 24
        #define S_DATA_LEN                 50
        #define D_NAME_LEN                 10
        #define FIRST_NAME_LEN             16
        #define MIDDLE_NAME_LEN             2
        #define PHONE_LEN                  16
        #define CREDIT_LEN                  2
        #define C_DATA_LEN                500
        #define H_DATA_LEN                 24
        #define DIST_INFO_LEN              24
        #define MAX_OL_NEW_ORDER_ITEMS     15
        #define MAX_OL_ORDER_STATUS_ITEMS  15
        #define STATUS_LEN                 25
        #define OL_DIST_INFO_LEN                 24
        #define C_SINCE_LEN                             23
        #define H_DATE_LEN                              23
        #define OL_DELIVERY_D_LEN                23
        #define O_ENTRY_D_LEN              23


// Functions in random.c
void    seed();
long    irand();
double  drand();
void    WUCreate();
short   WURand();
long    RandomNumber(long lower, long upper);

// Functions in getargs.c;
void    GetArgsLoader();
void    GetArgsLoaderUsage();

// Functions in time.c
long    TimeNow();

// Functions in strings.c
void    MakeAddress();
void    LastName();
int     MakeAlphaString();
int     MakeOriginalAlphaString();
int     MakeNumberString();
int     MakeZipNumberString();
void    InitString();
void    InitAddress();
void    PaddString();
```

TPCCLDR.C

```
//      File:           TPCCLDR.C
//                              Microsoft TPC-C Kit Ver. 4.00
//                              Copyright Microsoft, 1996, 1997, 1998
//      Purpose:        Source file for TPC-C database loader


// Includes
#include "tpcc.h"
#include "search.h"


// Defines
#define MAXITEMS                    100000
#define MAXITEMS_SCALE_DOWN           100
#define CUSTOMERS_PER_DISTRICT  3000
#define CUSTOMERS_SCALE_DOWN  30
#define DISTRICT_PER_WAREHOUSE  10
#define ORDERS_PER_DISTRICT     3000
#define ORDERS_SCALE_DOWN       30
#define MAX_CUSTOMER_THREADS    2
#define MAX_ORDER_THREADS       3
#define MAX_MAIN_THREADS        4

// Functions declarations

void HandleErrorDBC (SQLHDBC  hdbc1);

long NURand();
void LoadItem();
void LoadWarehouse();

void Stock();
void District();

void LoadCustomer();
void CustomerBufInit();
void CustomerBufLoad();
void LoadCustomerTable();
void LoadHistoryTable();

void LoadOrders();
void OrdersBufInit();
void OrdersBufLoad();
void LoadOrdersTable();
void LoadNewOrderTable();
void LoadOrderLineTable();
void GetPermutation();
void CheckForCommit();
void OpenConnections();
void BuildIndex();
void FormatDate ();

// Shared memory structures

typedef struct
{
    long                ol;
    long                ol_i_id;
    short               ol_supply_w_id;
    short               ol_quantity;
    double              ol_amount;
    char                ol_dist_info[DIST_INFO_LEN+1];
       char                             ol_delivery_d[OL_DELIVERY_D_LEN+1];
} ORDER_LINE_STRUCT;

typedef struct
{
    long                o_id;
    short               o_d_id;
    short               o_w_id;
    long                o_c_id;
```

```
    short               o_carrier_id;
    short               o_ol_cnt;
    short               o_all_local;
       ORDER_LINE_STRUCT   o_ol[15];
} ORDERS_STRUCT;

typedef struct
{
    long                            c_id;
    short                           c_d_id;
    short                           c_w_id;
       char                         c_first[FIRST_NAME_LEN+1];
    char                            c_middle[MIDDLE_NAME_LEN+1];
    char                            c_last[LAST_NAME_LEN+1];
    char                            c_street_1[ADDRESS_LEN+1];
    char                            c_street_2[ADDRESS_LEN+1];
    char                            c_city[ADDRESS_LEN+1];
    char                            c_state[STATE_LEN+1];
    char                            c_zip[ZIP_LEN+1];
    char                            c_phone[PHONE_LEN+1];
    char                            c_credit[CREDIT_LEN+1];
    double                          c_credit_lim;
    double                          c_discount;
//  fix to avoid ODBC float to numeric conversion problem.
//  double                          c_balance;
       char                         c_balance[6];

    double                          c_ytd_payment;
       short                        c_payment_cnt;
       short                        c_delivery_cnt;
       char                         c_data[C_DATA_LEN+1];
       double                       h_amount;
    char                            h_data[H_DATA_LEN+1];
} CUSTOMER_STRUCT;

typedef struct
{
       char                         c_last[LAST_NAME_LEN+1];
       char                         c_first[FIRST_NAME_LEN+1];
    long                            c_id;
} CUSTOMER_SORT_STRUCT;

typedef struct
{
    long                time_start;
} LOADER_TIME_STRUCT;


// Global variables

char    szLastError[300];

HENV    henv;

HDBC    i_hdbc1;                                    // for ITEM table
HDBC    w_hdbc1;                                    // for WAREHOUSE,
DISTRICT, STOCK
HDBC    c_hdbc1;                                    // for CUSTOMER
HDBC    c_hdbc2;                                    // for HISTORY
HDBC    o_hdbc1;                                    // for ORDERS
HDBC    o_hdbc2;                                    // for NEW-ORDER

HDBC    o_hdbc3;                                    // for ORDER-LINE

HSTMT   i_hstmt1;
HSTMT   w_hstmt1;
HSTMT   c_hstmt1, c_hstmt2;
HSTMT   o_hstmt1, o_hstmt2, o_hstmt3;

ORDERS_STRUCT   orders_buf[ORDERS_PER_DISTRICT];
CUSTOMER_STRUCT customer_buf[CUSTOMERS_PER_DISTRICT];
long            orders_rows_loaded;
long            new_order_rows_loaded;
long            order_line_rows_loaded;
long            history_rows_loaded;
long            customer_rows_loaded;
long            stock_rows_loaded;
long            district_rows_loaded;
long            item_rows_loaded;
long            warehouse_rows_loaded;
long            main_time_start;
long            main_time_end;
long                  max_items;
long                  customers_per_district;
long                  orders_per_district;
long                  first_new_order;
long                  last_new_order;


TPCCLDR_ARGS    *aptr, args;


//============================================================================
//
// Function name: main
//
//============================================================================

int main(int  argc, char **argv)
{

       DWORD           dwThreadID[MAX_MAIN_THREADS];
       HANDLE          hThread[MAX_MAIN_THREADS];
       FILE            *fLoader;
       char            buffer[255];
       int                             i;

       for (i=0; i<MAX_MAIN_THREADS; i++)
              hThread[i] = NULL;

    printf("\n*************************************************");
       printf("\n*                                                *");
       printf("\n*  Microsoft SQL Server                          *");
       printf("\n*                                                *");
       printf("\n*  TPC-C BENCHMARK KIT:  Database loader         *");
       printf("\n*  Version %s                                   *",
TPCKIT_VER);
       printf("\n*                                                *");
       printf("\n*************************************************\n\n"
);
```

```
    // process command line arguments

    aptr = &args;
    GetArgsLoader(argc, argv, aptr);

        printf("Build interface is ODBC.\n");

        if (aptr->build_index == 0)
                printf("Data load only - no index creation.\n");
        else
                printf("Data load and index creation.\n");

        if (aptr->index_order == 0)
                printf("Clustered indexes will be created after bulk
load.\n");
        else
                printf("Clustered indexes will be created before bulk
load.\n");

        // set database scale values
        if (aptr->scale_down == 1)
        {
                printf("*** Scaled Down Database ***\n");
                max_items = MAXITEMS_SCALE_DOWN;
                customers_per_district = CUSTOMERS_SCALE_DOWN;
                orders_per_district = ORDERS_SCALE_DOWN;
                first_new_order = 0;
                last_new_order  = 30;
        }
        else
        {
                max_items = MAXITEMS;
                customers_per_district = CUSTOMERS_PER_DISTRICT;
                orders_per_district = ORDERS_PER_DISTRICT;
                first_new_order = 2100;
                last_new_order  = 3000;
        }

        // open connections to SQL Server

        OpenConnections();

        // open file for loader results
    fLoader = fopen(aptr->loader_res_file, "w");

    if (fLoader == NULL)
        {
                printf("Error, loader result file open failed.");
                exit(-1);
        }

    // start loading data

    sprintf(buffer,"TPC-C load started for %ld warehouses.\n",aptr-
>num_warehouses);

        printf("%s",buffer);
        fprintf(fLoader,"%s",buffer);

        main_time_start = (TimeNow() / MILLI);

        // start parallel load threads


        if (aptr->tables_all || aptr->table_item)
        {
                fprintf(fLoader, "\nStarting loader threads for: item\n");

                hThread[0] = CreateThread(NULL,
                                                                0,

(LPTHREAD_START_ROUTINE) LoadItem,
                                                                NULL,
                                                                0,

&dwThreadID[0]);

                if (hThread[0] == NULL)
                {
                        printf("Error, failed in creating creating thread =
0.\n");
                        exit(-1);
                }
        }

        if (aptr->tables_all || aptr->table_warehouse)
        {
                fprintf(fLoader, "Starting loader threads for:
warehouse\n");

                hThread[1] = CreateThread(NULL,
                                                                0,

(LPTHREAD_START_ROUTINE) LoadWarehouse,
                                                                NULL,
                                                                0,

&dwThreadID[1]);

                if (hThread[1] == NULL)
                {
                        printf("Error, failed in creating creating thread =
1.\n");
                        exit(-1);
                }
        }

        if (aptr->tables_all || aptr->table_customer)
        {
                fprintf(fLoader, "Starting loader threads for:
customer\n");

                hThread[2] = CreateThread(NULL,
                                                                0,

(LPTHREAD_START_ROUTINE) LoadCustomer,
                                                                NULL,
                                                                0,

&dwThreadID[2]);

                if (hThread[2] == NULL)
```

```
                {
                        printf("Error, failed in creating creating main
thread = 2.\n");
                        exit(-1);
                }
        }

        if (aptr->tables_all || aptr->table_orders)
        {
                fprintf(fLoader, "Starting loader threads for: orders\n");

                hThread[3] = CreateThread(NULL,
                                                                        0,

(LPTHREAD_START_ROUTINE) LoadOrders,
                                                                        NULL,
                                                                        0,

&dwThreadID[3]);

                if (hThread[3] == NULL)
                {
                        printf("Error, failed in creating creating main
thread = 3.\n");
                        exit(-1);
                }
        }

        // Wait for threads to finish...
        for (i=0; i<MAX_MAIN_THREADS; i++)
        {
                if (hThread[i] != NULL)
                {
                        WaitForSingleObject( hThread[i], INFINITE );
                        CloseHandle(hThread[i]);
                        hThread[i] = NULL;
                }
        }

        main_time_end = (TimeNow() / MILLI);

    sprintf(buffer,"\nTPC-C load completed successfully in %ld
minutes.\n",
                        (main_time_end - main_time_start)/60);

        printf("%s",buffer);
        fprintf(fLoader, "%s", buffer);

        fclose(fLoader);

        SQLFreeEnv(henv);

    exit(0);

        return 0;
}


//============================================================================
//
// Function name: LoadItem
//
//============================================================================

void LoadItem()
{
    long                i_id;
        long            i_im_id;
    char                i_name[I_NAME_LEN+1];
    double              i_price;
    char                i_data[I_DATA_LEN+1];
        char            name[20];
        long            time_start;
        RETCODE         rc;
        DBINT           rcint;
        char            bcphint[128];

        // Seed with unique number
        seed(1);

        printf("Loading item table...\n");

        // if build index before load
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
                BuildIndex("idxitmcl");

        InitString(i_name, I_NAME_LEN+1);
        InitString(i_data, I_DATA_LEN+1);

        sprintf(name, "%s..%s", aptr->database, "item");

        rc = bcp_init(i_hdbc1, name, NULL, "logs\\item.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (i_id), ROWS_PER_BATCH =
100000");
                rc = bcp_control(i_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(i_hdbc1);
        }

        rc = bcp_bind(i_hdbc1, (BYTE *) &i_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        rc = bcp_bind(i_hdbc1, (BYTE *) &i_im_id, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT4, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        rc = bcp_bind(i_hdbc1, (BYTE *) i_name, 0, I_NAME_LEN, NULL, 0, 0,
3);
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        rc = bcp_bind(i_hdbc1, (BYTE *) &i_price, 0, SQL_VARLEN_DATA,
NULL, 0, SQLFLT8, 4);
        if (rc != SUCCEED)
```

```
                HandleErrorDBC(i_hdbc1);

        rc = bcp_bind(i_hdbc1, (BYTE *) i_data, 0, I_DATA_LEN, NULL, 0, 0,
5);
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        time_start = (TimeNow() / MILLI);

        item_rows_loaded = 0;

        for (i_id = 1; i_id <= max_items; i_id++)
        {
                i_im_id = RandomNumber(1L, 10000L);

                MakeAlphaString(14, 24, I_NAME_LEN, i_name);

                i_price = ((float) RandomNumber(100L, 10000L))/100.0;

                MakeOriginalAlphaString(26, 50, I_DATA_LEN, i_data, 10);

                rc = bcp_sendrow(i_hdbc1);
                if (rc != SUCCEED)
                        HandleErrorDBC(i_hdbc1);

                item_rows_loaded++;
                CheckForCommit(i_hdbc1, i_hstmt1, item_rows_loaded, "item",
&time_start);
        }

        rcint = bcp_done(i_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(i_hdbc1);

        printf("Finished loading item table.\n");

        SQLFreeStmt(i_hstmt1, SQL_DROP);
        SQLDisconnect(i_hdbc1);
        SQLFreeConnect(i_hdbc1);

        // if build index after load
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxitmcl");

}


//============================================================================
=====
//
// Function    : LoadWarehouse
//
// Loads WAREHOUSE table and loads Stock and District as Warehouses are
created
//
//============================================================================
=====

void LoadWarehouse()
{
    short       w_id;
    char        w_name[W_NAME_LEN+1];
    char        w_street_1[ADDRESS_LEN+1];
    char        w_street_2[ADDRESS_LEN+1];
    char        w_city[ADDRESS_LEN+1];
    char        w_state[STATE_LEN+1];
    char        w_zip[ZIP_LEN+1];
    double      w_tax;
    double      w_ytd;
        char    name[20];
        long    time_start;
        RETCODE rc;
        DBINT   rcint;
        char    bcphint[128];


        // Seed with unique number
        seed(2);

        printf("Loading warehouse table...\n");

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
                BuildIndex("idxwarcl");

        InitString(w_name, W_NAME_LEN+1);
        InitAddress(w_street_1, w_street_2, w_city, w_state, w_zip);

        sprintf(name, "%s..%s", aptr->database, "warehouse");

        rc = bcp_init(w_hdbc1, name, NULL, "logs\\whouse.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (w_id), ROWS_PER_BATCH =
%d", aptr->num_warehouses);
                rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);
        }

        rc = bcp_bind(w_hdbc1, (BYTE *) &w_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) w_name, 0, W_NAME_LEN, NULL, 0, 0,
2);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) w_street_1, 0, ADDRESS_LEN, NULL,
0, 0, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) w_street_2, 0, ADDRESS_LEN, NULL,
0, 0, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);
```

```
        rc = bcp_bind(w_hdbc1, (BYTE *) w_city, 0, ADDRESS_LEN, NULL, 0,
0, 5);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) w_state, 0, STATE_LEN, NULL, 0, 0,
6);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) w_zip, 0, ZIP_LEN, NULL, 0, 0, 7);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &w_tax, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 8);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &w_ytd, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 9);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        time_start = (TimeNow() / MILLI);

        warehouse_rows_loaded = 0;

        for (w_id = (short)aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
        {
                MakeAlphaString(6,10, W_NAME_LEN, w_name);

                MakeAddress(w_street_1, w_street_2, w_city, w_state,
w_zip);

                w_tax = ((float) RandomNumber(0L,2000L))/10000.00;

                w_ytd = 300000.00;

                rc = bcp_sendrow(w_hdbc1);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);

                warehouse_rows_loaded++;
                CheckForCommit(w_hdbc1, i_hstmt1, warehouse_rows_loaded,
"warehouse", &time_start);
        }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading warehouse table.\n");

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxwarcl");

        stock_rows_loaded = 0;
        district_rows_loaded = 0;

        District();
        Stock();

}


//==============================================================================
//
// Function   : District
//
//==============================================================================

void District()
{
    short      d_id;
    short      d_w_id;
    char       d_name[D_NAME_LEN+1];
    char       d_street_1[ADDRESS_LEN+1];
    char       d_street_2[ADDRESS_LEN+1];
    char       d_city[ADDRESS_LEN+1];
    char       d_state[STATE_LEN+1];
    char       d_zip[ZIP_LEN+1];
    double     d_tax;
    double     d_ytd;
       char    name[20];
    long       d_next_o_id;
       long    time_start;
       int             w_id;
       RETCODE rc;
       DBINT   rcint;
       char    bcphint[128];

       // Seed with unique number
       seed(4);

       printf("Loading district table...\n");

       // build index before load
       if ((aptr->build_index == 1) && (aptr->index_order == 1))
               BuildIndex("idxdiscl");

       InitString(d_name, D_NAME_LEN+1);
       InitAddress(d_street_1, d_street_2, d_city, d_state, d_zip);
       sprintf(name, "%s..%s", aptr->database, "district");

       rc = bcp_init(w_hdbc1, name, NULL, "logs\\district.err", DB_IN);
       if (rc != SUCCEED)
               HandleErrorDBC(w_hdbc1);

       if ((aptr->build_index == 1) && (aptr->index_order == 1))
       {
               sprintf(bcphint, "tablock, order (d_w_id, d_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 10));
               rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
               if (rc != SUCCEED)
                       HandleErrorDBC(w_hdbc1);
       }
```

```
        rc = bcp_bind(w_hdbc1, (BYTE *) &d_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &d_w_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) d_name, 0, D_NAME_LEN, NULL, 0, 0,
3);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) d_street_1, 0, ADDRESS_LEN, NULL,
0, 0, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) d_street_2, 0, ADDRESS_LEN, NULL,
0, 0, 5);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) d_city, 0, ADDRESS_LEN, NULL, 0,
0, 6);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) d_state, 0, STATE_LEN, NULL, 0, 0,
7);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) d_zip, 0, ZIP_LEN, NULL, 0, 0, 8);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &d_tax, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 9);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &d_ytd, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 10);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &d_next_o_id, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT4, 11);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        d_ytd  = 30000.0;

        d_next_o_id = orders_per_district+1;

        time_start = (TimeNow() / MILLI);

        for (w_id = aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
        {
                d_w_id = w_id;

                for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                {
                        MakeAlphaString(6,10,D_NAME_LEN, d_name);

                        MakeAddress(d_street_1, d_street_2, d_city,
d_state, d_zip);

                        d_tax = ((float) RandomNumber(0L,2000L))/10000.00;

                        rc = bcp_sendrow(w_hdbc1);
                        if (rc != SUCCEED)
                                HandleErrorDBC(w_hdbc1);

                        district_rows_loaded++;
                        CheckForCommit(w_hdbc1, w_hstmt1,
district_rows_loaded, "district", &time_start);
                }
    }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading district table.\n");

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxdiscl");

    return;
}


//============================================================================
//
// Function   : Stock
//
//============================================================================

void Stock()
{
    long       s_i_id;
    short      s_w_id;
    short      s_quantity;
    char       s_dist_01[S_DIST_LEN+1];
    char       s_dist_02[S_DIST_LEN+1];
    char       s_dist_03[S_DIST_LEN+1];
    char       s_dist_04[S_DIST_LEN+1];
    char       s_dist_05[S_DIST_LEN+1];
    char       s_dist_06[S_DIST_LEN+1];
    char       s_dist_07[S_DIST_LEN+1];
    char       s_dist_08[S_DIST_LEN+1];
    char       s_dist_09[S_DIST_LEN+1];
    char       s_dist_10[S_DIST_LEN+1];
    long       s_ytd;
    short      s_order_cnt;
```

```
    short       s_remote_cnt;
    char        s_data[S_DATA_LEN+1];
    short       len;
        char    name[20];
        long    time_start;
        RETCODE rc;
        DBINT   rcint;
        char    bcphint[128];

        // Seed with unique number
        seed(3);

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
                BuildIndex("idxstkcl");

        sprintf(name, "%s..%s", aptr->database, "stock");

        rc = bcp_init(w_hdbc1, name, NULL, "logs\\stock.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (s_i_id, s_w_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 100000));
                rc = bcp_control(w_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(w_hdbc1);
        }

        rc = bcp_bind(w_hdbc1, (BYTE *) &s_i_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        bcp_bind(w_hdbc1, (BYTE *) &s_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &s_quantity, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_01, 0, S_DIST_LEN, NULL, 0,
0, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_02, 0, S_DIST_LEN, NULL, 0,
0, 5);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_03, 0, S_DIST_LEN, NULL, 0,
0, 6);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_04, 0, S_DIST_LEN, NULL, 0,
0, 7);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_05, 0, S_DIST_LEN, NULL, 0,
0, 8);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_06, 0, S_DIST_LEN, NULL, 0,
0, 9);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_07, 0, S_DIST_LEN, NULL, 0,
0, 10);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_08, 0, S_DIST_LEN, NULL, 0,
0, 11);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_09, 0, S_DIST_LEN, NULL, 0,
0, 12);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_dist_10, 0, S_DIST_LEN, NULL, 0,
0, 13);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &s_ytd, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT4, 14);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &s_order_cnt, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 15);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) &s_remote_cnt, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 16);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = bcp_bind(w_hdbc1, (BYTE *) s_data, 0, S_DATA_LEN, NULL, 0, 0,
17);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        s_ytd = s_order_cnt = s_remote_cnt = 0;

        time_start = (TimeNow() / MILLI);

        printf("...Loading stock table\n");
```

```
        for (s_i_id=1; s_i_id <= max_items; s_i_id++)
        {

                for (s_w_id = (short)aptr->starting_warehouse; s_w_id <=
aptr->num_warehouses; s_w_id++)
                {

                        s_quantity = (short)RandomNumber(10L,100L);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_01);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_02);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_03);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_04);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_05);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_06);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_07);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_08);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_09);
                        len = MakeAlphaString(24,24,S_DIST_LEN, s_dist_10);

                        len = MakeOriginalAlphaString(26,50, S_DATA_LEN,
s_data,10);

                        rc = bcp_sendrow(w_hdbc1);
                        if (rc != SUCCEED)
                                HandleErrorDBC(w_hdbc1);

                        stock_rows_loaded++;
                        CheckForCommit(w_hdbc1, w_hstmt1,
stock_rows_loaded, "stock", &time_start);

                }
        }

        rcint = bcp_done(w_hdbc1);
        if (rcint < 0)
                HandleErrorDBC(w_hdbc1);

        printf("Finished loading stock table.\n");

        SQLFreeStmt(w_hstmt1, SQL_DROP);
        SQLDisconnect(w_hdbc1);
        SQLFreeConnect(w_hdbc1);

        // if build index after load...
        if ((aptr->build_index == 1) && (aptr->index_order == 0))
                BuildIndex("idxstkcl");

        return;
}


//============================================================================
//
// Function   : LoadCustomer
//
//============================================================================

void LoadCustomer()
{
        LOADER_TIME_STRUCT      customer_time_start;
        LOADER_TIME_STRUCT      history_time_start;
        short                           w_id;
    short                       d_id;
        DWORD                           dwThreadID[MAX_CUSTOMER_THREADS];
        HANDLE                          hThread[MAX_CUSTOMER_THREADS];
        char                            name[20];
        RETCODE                                 rc;
        DBINT                                   rcint;
        char                                    bcphint[128];
        char                                    cmd[256];
        // SQLRETURN                            rc_1;
        // SQLSMALLINT                          recnum, MsgLen;
        // SQLCHAR                                      SqlState[6],
Msg[SQL_MAX_MESSAGE_LENGTH];
        // SQLINTEGER                           NativeError;

        // Seed with unique number
        seed(5);

        printf("Loading customer and history tables...\n");

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
                BuildIndex("idxcuscl");

        // Initialize bulk copy
        sprintf(name, "%s..%s", aptr->database, "customer");

        rc = bcp_init(c_hdbc1, name, NULL, "logs\\customer.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (c_w_id, c_d_id, c_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 30000));
                rc = bcp_control(c_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(c_hdbc1);
        }

        sprintf(name, "%s..%s", aptr->database, "history");

        rc = bcp_init(c_hdbc2, name, NULL, "logs\\history.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        sprintf(bcphint, "tablock");
        rc = bcp_control(c_hdbc2, BCPHINTS, (void*) bcphint);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        customer_rows_loaded    = 0;
        history_rows_loaded     = 0;

        CustomerBufInit();

        customer_time_start.time_start = (TimeNow() / MILLI);
        history_time_start.time_start = (TimeNow() / MILLI);

        for (w_id = (short)aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
```

```
	{
		for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
		{

			CustomerBufLoad(d_id, w_id);

			// Start parallel loading threads here...

			// Start customer table thread

			printf("...Loading customer table for: d_id = %d,
w_id = %d\n", d_id, w_id);

			hThread[0] = CreateThread(NULL,
                                                                        0,
(LPTHREAD_START_ROUTINE) LoadCustomerTable,
&customer_time_start,
                                                                        0,
&dwThreadID[0]);

			if (hThread[0] == NULL)
			{
				printf("Error, failed in creating creating
thread = 0.\n");
				exit(-1);
			}

			// Start History table thread

			printf("...Loading history table for: d_id = %d,
w_id = %d\n", d_id, w_id);

			hThread[1] = CreateThread(NULL,
                                                                        0,
(LPTHREAD_START_ROUTINE) LoadHistoryTable,
&history_time_start,
                                                                        0,
&dwThreadID[1]);

			if (hThread[1] == NULL)
			{
				printf("Error, failed in creating creating
thread = 1.\n");
				exit(-1);
			}

			WaitForSingleObject( hThread[0], INFINITE );
			WaitForSingleObject( hThread[1], INFINITE );

			if (CloseHandle(hThread[0]) == FALSE)
			{
				printf("Error, failed in closing customer
thread handle with errno: %d\n", GetLastError());
			}

			if (CloseHandle(hThread[1]) == FALSE)
			{
				printf("Error, failed in closing history
thread handle with errno: %d\n", GetLastError());
			}


		}

	}

	// flush the bulk connection
	rcint = bcp_done(c_hdbc1);
	if (rcint < 0)
		HandleErrorDBC(c_hdbc1);

	rcint = bcp_done(c_hdbc2);
	if (rcint < 0)
		HandleErrorDBC(c_hdbc2);

	printf("Finished loading customer table.\n");

	// if build index after load...
	if ((aptr->build_index == 1) && (aptr->index_order == 0))
		BuildIndex("idxcuscl");

	// build non-clustered index
	if (aptr->build_index == 1)
		BuildIndex("idxcusnc");

	// Output the NURAND used for the loader into C_FIRST for C_ID =
1,
	// C_W_ID = 1, and C_D_ID = 1
	sprintf(cmd, "isql -S%s -U%s -P%s -d%s -e -Q\"update customer set
c_first = 'C_LOAD = %d' where c_id = 1 and c_w_id = 1 and c_d_id = 1\" >
logs\\nurand_load.log",
				aptr->server,
				aptr->user,
				aptr->password,
				aptr->database,
				LOADER_NURAND_C);

	system(cmd);

	SQLFreeStmt(c_hstmt1, SQL_DROP);
	SQLDisconnect(c_hdbc1);
	SQLFreeConnect(c_hdbc1);

	SQLFreeStmt(c_hstmt2, SQL_DROP);
	SQLDisconnect(c_hdbc2);
	SQLFreeConnect(c_hdbc2);


    return;

}


//==============================================================================
//
// Function   : CustomerBufInit
```

```
//
//=====================================================================

void CustomerBufInit()
{
        int     i;

        for (i=0;i<customers_per_district;i++)
        {
                customer_buf[i].c_id = 0;
                customer_buf[i].c_d_id = 0;
                customer_buf[i].c_w_id = 0;

                strcpy(customer_buf[i].c_first,"");
                strcpy(customer_buf[i].c_middle,"");
                strcpy(customer_buf[i].c_last,"");
                strcpy(customer_buf[i].c_street_1,"");
                strcpy(customer_buf[i].c_street_2,"");
                strcpy(customer_buf[i].c_city,"");
                strcpy(customer_buf[i].c_state,"");
                strcpy(customer_buf[i].c_zip,"");
                strcpy(customer_buf[i].c_phone,"");
                strcpy(customer_buf[i].c_credit,"");

                customer_buf[i].c_credit_lim = 0;
                customer_buf[i].c_discount = (float) 0;

                //  fix to avoid ODBC float to numeric conversion problem.
                //      customer_buf[i].c_balance = 0;
                strcpy(customer_buf[i].c_balance,"");

                customer_buf[i].c_ytd_payment = 0;
                customer_buf[i].c_payment_cnt = 0;
                customer_buf[i].c_delivery_cnt = 0;

                strcpy(customer_buf[i].c_data,"");

                customer_buf[i].h_amount = 0;

                strcpy(customer_buf[i].h_data,"");

        }


}


//=====================================================================
//
// Function   : CustomerBufLoad
//
// Fills shared buffer for HISTORY and CUSTOMER
//=====================================================================

void CustomerBufLoad(int d_id, int w_id)
{
        long                                    i;
    CUSTOMER_SORT_STRUCT    c[CUSTOMERS_PER_DISTRICT];


        for (i=0;i<customers_per_district;i++)
        {
                if (i < 1000)
                        LastName(i, c[i].c_last);
                else
                        LastName(NURand(255,0,999,LOADER_NURAND_C),
c[i].c_last);

                MakeAlphaString(8,16,FIRST_NAME_LEN, c[i].c_first);

                c[i].c_id = i+1;

        }

        printf("...Loading customer buffer for: d_id = %d, w_id = %d\n",
                        d_id, w_id);

        for (i=0;i<customers_per_district;i++)
        {

                customer_buf[i].c_d_id = d_id;
                customer_buf[i].c_w_id = w_id;
                customer_buf[i].h_amount = 10.0;

                customer_buf[i].c_ytd_payment  = 10.0;

                customer_buf[i].c_payment_cnt  = 1;
                customer_buf[i].c_delivery_cnt = 0;

                // Generate CUSTOMER and HISTORY data

                customer_buf[i].c_id = c[i].c_id;

                strcpy(customer_buf[i].c_first, c[i].c_first);
                strcpy(customer_buf[i].c_last, c[i].c_last);

                customer_buf[i].c_middle[0] = 'O';
                customer_buf[i].c_middle[1] = 'E';

                MakeAddress(customer_buf[i].c_street_1,
                                customer_buf[i].c_street_2,
                                customer_buf[i].c_city,
                                customer_buf[i].c_state,
                                customer_buf[i].c_zip);

                MakeNumberString(16, 16, PHONE_LEN,
customer_buf[i].c_phone);

                if (RandomNumber(1L, 100L) > 10)
                        customer_buf[i].c_credit[0] = 'G';
                else
                        customer_buf[i].c_credit[0] = 'B';
                customer_buf[i].c_credit[1] = 'C';

                customer_buf[i].c_credit_lim = 50000.0;
                customer_buf[i].c_discount = ((float) RandomNumber(0L,
5000L)) / 10000.0;

                //  fix to avoid ODBC float to numeric conversion problem.

                //  customer_buf[i].c_balance = -10.0;
                strcpy(customer_buf[i].c_balance,"-10.0");
```

```
                MakeAlphaString(500, 500, C_DATA_LEN,
customer_buf[i].c_data);

                // Generate HISTORY data
                MakeAlphaString(12, 24, H_DATA_LEN,
customer_buf[i].h_data);

        }
}

//=============================================================================
//
// Function   : LoadCustomerTable
//
//=============================================================================

void LoadCustomerTable(LOADER_TIME_STRUCT *customer_time_start)
{
        int         i;
    long        c_id;
    short       c_d_id;
    short       c_w_id;
    char        c_first[FIRST_NAME_LEN+1];
    char        c_middle[MIDDLE_NAME_LEN+1];
    char        c_last[LAST_NAME_LEN+1];
    char        c_street_1[ADDRESS_LEN+1];
    char        c_street_2[ADDRESS_LEN+1];
    char        c_city[ADDRESS_LEN+1];
    char        c_state[STATE_LEN+1];
    char        c_zip[ZIP_LEN+1];
    char        c_phone[PHONE_LEN+1];
    char        c_credit[CREDIT_LEN+1];
    double      c_credit_lim;
    double      c_discount;

        //  fix to avoid ODBC float to numeric conversion problem.

        //  double            c_balance;
        char           c_balance[6];

    double      c_ytd_payment;
    short       c_payment_cnt;
    short       c_delivery_cnt;
    char        c_data[C_DATA_LEN+1];
        char           c_since[C_SINCE_LEN+1];
        RETCODE        rc;

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        rc = bcp_bind(c_hdbc1, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_first, 0, FIRST_NAME_LEN, NULL, 0,
0, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_middle, 0, MIDDLE_NAME_LEN,NULL, 0,
0, 5);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_last, 0, LAST_NAME_LEN, NULL, 0, 0,
6);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_street_1, 0, ADDRESS_LEN, NULL, 0,
0, 7);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_street_2, 0, ADDRESS_LEN, NULL,0,0,
8);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_city, 0, ADDRESS_LEN, NULL, 0, 0,
9);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_state, 0, STATE_LEN, NULL, 0, 0,
10);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_zip, 0, ZIP_LEN, NULL, 0, 0, 11);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_phone, 0, PHONE_LEN, NULL, 0, 0,
12);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        rc = bcp_bind(c_hdbc1, (BYTE *) &c_since, 0, C_SINCE_LEN, NULL, 0,
SQLCHARACTER, 13);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_credit, 0, CREDIT_LEN, NULL, 0, 0,
14);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_credit_lim, 0, SQL_VARLEN_DATA,
NULL, 0, SQLFLT8, 15);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);
```

```
    rc = bcp_bind(c_hdbc1, (BYTE *) &c_discount, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 16);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);


        //  fix to avoid ODBC float to numeric conversion problem.

    //  rc = bcp_bind(c_hdbc1, (BYTE *) &c_balance, 0, SQL_VARLEN_DATA,
NULL, 0, SQLFLT8, 17);
        //  if (rc != SUCCEED)
        //      HandleErrorDBC(c_hdbc1);
    rc = bcp_bind(c_hdbc1, (BYTE *) c_balance, 0, 5, NULL, 0,
SQLCHARACTER, 17);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);


    rc = bcp_bind(c_hdbc1, (BYTE *) &c_ytd_payment, 0, SQL_VARLEN_DATA,
NULL, 0, SQLFLT8, 18);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_payment_cnt, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 19);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) &c_delivery_cnt,0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 20);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    rc = bcp_bind(c_hdbc1, (BYTE *) c_data, 0, 500, NULL, 0, 0, 21);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

    for (i = 0; i < customers_per_district; i++)
    {
                c_id = customer_buf[i].c_id;
                c_d_id = customer_buf[i].c_d_id;
                c_w_id = customer_buf[i].c_w_id;

                strcpy(c_first, customer_buf[i].c_first);
                strcpy(c_middle, customer_buf[i].c_middle);
                strcpy(c_last, customer_buf[i].c_last);
                strcpy(c_street_1, customer_buf[i].c_street_1);
                strcpy(c_street_2, customer_buf[i].c_street_2);
                strcpy(c_city, customer_buf[i].c_city);
                strcpy(c_state, customer_buf[i].c_state);
                strcpy(c_zip, customer_buf[i].c_zip);
                strcpy(c_phone, customer_buf[i].c_phone);
                strcpy(c_credit, customer_buf[i].c_credit);

                FormatDate(&c_since);

                c_credit_lim = customer_buf[i].c_credit_lim;
                c_discount = customer_buf[i].c_discount;

                //  fix to avoid ODBC float to numeric conversion problem.
                //  c_balance = customer_buf[i].c_balance;
                strcpy(c_balance, customer_buf[i].c_balance);

                c_ytd_payment = customer_buf[i].c_ytd_payment;
                c_payment_cnt = customer_buf[i].c_payment_cnt;
                c_delivery_cnt = customer_buf[i].c_delivery_cnt;

                strcpy(c_data, customer_buf[i].c_data);

                // Send data to server
                rc = bcp_sendrow(c_hdbc1);
                if (rc != SUCCEED)
                        HandleErrorDBC(c_hdbc1);

                customer_rows_loaded++;
                CheckForCommit(c_hdbc1, c_hstmt1, customer_rows_loaded,
"customer", &customer_time_start->time_start);
    }

}


//========================================================================
//
// Function   : LoadHistoryTable
//
//========================================================================

void LoadHistoryTable(LOADER_TIME_STRUCT *history_time_start)
{
        int         i;
    long        c_id;
    short       c_d_id;
    short       c_w_id;
        double          h_amount;
    char        h_data[H_DATA_LEN+1];
        char            h_date[H_DATE_LEN+1];
        RETCODE         rc;

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &c_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 5);
```

```
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        rc = bcp_bind(c_hdbc2, (BYTE *) &h_date, 0, H_DATE_LEN, NULL, 0,
SQLCHARACTER, 6);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) &h_amount, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 7);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    rc = bcp_bind(c_hdbc2, (BYTE *) h_data, 0, H_DATA_LEN, NULL, 0, 0, 8);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

    for (i = 0; i < customers_per_district; i++)
    {
                c_id = customer_buf[i].c_id;
                c_d_id = customer_buf[i].c_d_id;
                c_w_id = customer_buf[i].c_w_id;
                h_amount = customer_buf[i].h_amount;
                strcpy(h_data, customer_buf[i].h_data);

                FormatDate(&h_date);

                // send to server
                rc = bcp_sendrow(c_hdbc2);
                if (rc != SUCCEED)
                        HandleErrorDBC(c_hdbc2);

                history_rows_loaded++;
                CheckForCommit(c_hdbc2, c_hstmt2, history_rows_loaded,
"history", &history_time_start->time_start);
    }

}


//============================================================-
===============
//
// Function   : LoadOrders
//
//============================================================================
====

void LoadOrders()
{
        LOADER_TIME_STRUCT      orders_time_start;
        LOADER_TIME_STRUCT      new_order_time_start;
        LOADER_TIME_STRUCT      order_line_time_start;
        short                           w_id;
    short                       d_id;
        DWORD                           dwThreadID[MAX_ORDER_THREADS];
        HANDLE                          hThread[MAX_ORDER_THREADS];
        char                            name[20];
        RETCODE                                 rc;
        char                                    bcphint[128];

        // seed with unique number
        seed(6);

        printf("Loading orders...\n");

        // if build index before load...
        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                        BuildIndex("idxordcl");
                        BuildIndex("idxnodcl");
                        BuildIndex("idxodlcl");
        }

        // initialize bulk copy
        sprintf(name, "%s..%s", aptr->database, "orders");

        rc = bcp_init(o_hdbc1, name, NULL, "logs\\orders.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (o_w_id, o_d_id, o_id),
ROWS_PER_BATCH = %u", (aptr->num_warehouses * 30000));
                rc = bcp_control(o_hdbc1, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(o_hdbc1);
        }

        sprintf(name, "%s..%s", aptr->database, "new_order");

        rc = bcp_init(o_hdbc2, name, NULL, "logs\\neword.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc2);

        if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (no_w_id, no_d_id,
no_o_id), ROWS_PER_BATCH = %u", (aptr->num_warehouses * 9000));
                rc = bcp_control(o_hdbc2, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(o_hdbc2);
        }

        sprintf(name, "%s..%s", aptr->database, "order_line");

        rc = bcp_init(o_hdbc3, name, NULL, "logs\\ordline.err", DB_IN);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    if ((aptr->build_index == 1) && (aptr->index_order == 1))
        {
                sprintf(bcphint, "tablock, order (ol_w_id, ol_d_id,
ol_o_id, ol_number), ROWS_PER_BATCH = %u", (aptr->num_warehouses *
300000));
                rc = bcp_control(o_hdbc3, BCPHINTS, (void*) bcphint);
                if (rc != SUCCEED)
                        HandleErrorDBC(o_hdbc3);
        }

        orders_rows_loaded      = 0;
```

```
        new_order_rows_loaded   = 0;
        order_line_rows_loaded  = 0;

        OrdersBufInit();

        orders_time_start.time_start = (TimeNow() / MILLI);
        new_order_time_start.time_start = (TimeNow() / MILLI);
        order_line_time_start.time_start = (TimeNow() / MILLI);

        for (w_id = (short)aptr->starting_warehouse; w_id <= aptr-
>num_warehouses; w_id++)
        {
                for (d_id = 1; d_id <= DISTRICT_PER_WAREHOUSE; d_id++)
                {

                        OrdersBufLoad(d_id, w_id);

                        // start parallel loading threads here...

                        // start Orders table thread

                        printf("...Loading Order Table for: d_id = %d, w_id
= %d\n", d_id, w_id);

                        hThread[0] = CreateThread(NULL,
                                                                        0,

(LPTHREAD_START_ROUTINE) LoadOrdersTable,

&orders_time_start,
                                                                        0,

&dwThreadID[0]);

                        if (hThread[0] == NULL)
                        {
                                printf("Error, failed in creating creating
thread = 0.\n");
                                exit(-1);
                        }

                        // start NewOrder table thread

                        printf("...Loading New-Order Table for: d_id = %d,
w_id = %d\n", d_id, w_id);

                        hThread[1] = CreateThread(NULL,
                                                                        0,

(LPTHREAD_START_ROUTINE) LoadNewOrderTable,

&new_order_time_start,
                                                                        0,

&dwThreadID[1]);

                        if (hThread[1] == NULL)
                        {
                                printf("Error, failed in creating creating
thread = 1.\n");
                                exit(-1);
                        }

                        // start Order-Line table thread

                        printf("...Loading Order-Line Table for: d_id = %d,
w_id = %d\n", d_id, w_id);

                        hThread[2] = CreateThread(NULL,
                                                                        0,

(LPTHREAD_START_ROUTINE) LoadOrderLineTable,

&order_line_time_start,
                                                                        0,

&dwThreadID[2]);

                        if (hThread[2] == NULL)
                        {
                                printf("Error, failed in creating creating
thread = 2.\n");
                                exit(-1);
                        }

                        WaitForSingleObject( hThread[0], INFINITE );
                        WaitForSingleObject( hThread[1], INFINITE );
                        WaitForSingleObject( hThread[2], INFINITE );

                        if (CloseHandle(hThread[0]) == FALSE)
                        {
                                printf("Error, failed in closing Orders
thread handle with errno: %d\n", GetLastError());
                        }

                        if (CloseHandle(hThread[1]) == FALSE)
                        {
                                printf("Error, failed in closing NewOrder
thread handle with errno: %d\n", GetLastError());
                        }

                        if (CloseHandle(hThread[2]) == FALSE)
                        {
                                printf("Error, failed in closing OrderLine
thread handle with errno: %d\n", GetLastError());
                        }

                }
        }

        printf("Finished loading orders.\n");


    return;
}


//==============================================================================
//
// Function   : OrdersBufInit
//
// Clears shared buffer for ORDERS, NEWORDER, and ORDERLINE
```

```
//
//============================================================================

void OrdersBufInit()
{
        int     i;
        int             j;

        for (i=0;i<orders_per_district;i++)
        {
                orders_buf[i].o_id = 0;
                orders_buf[i].o_d_id = 0;
                orders_buf[i].o_w_id = 0;
                orders_buf[i].o_c_id = 0;
                orders_buf[i].o_carrier_id = 0;
                orders_buf[i].o_ol_cnt = 0;
                orders_buf[i].o_all_local = 0;

                for (j=0;j<=14;j++)
                {
                        orders_buf[i].o_ol[j].ol = 0;
                        orders_buf[i].o_ol[j].ol_i_id = 0;
                        orders_buf[i].o_ol[j].ol_supply_w_id = 0;
                        orders_buf[i].o_ol[j].ol_quantity = 0;
                        orders_buf[i].o_ol[j].ol_amount = 0;
                        strcpy(orders_buf[i].o_ol[j].ol_dist_info,"");
                }
        }


}


//============================================================================
//
// Function   : OrdersBufLoad
//
// Fills shared buffer for ORDERS, NEWORDER, and ORDERLINE
//
//============================================================================

void OrdersBufLoad(int d_id, int w_id)
{

        int     cust[ORDERS_PER_DIST+1];
        long    o_id;
        short   ol;

        printf("...Loading Order Buffer for: d_id = %d, w_id = %d\n",
                        d_id, w_id);

        GetPermutation(cust, ORDERS_PER_DIST);

        for (o_id=0;o_id<orders_per_district;o_id++)
        {

                // Generate ORDER and NEW-ORDER data

                orders_buf[o_id].o_d_id = d_id;
                orders_buf[o_id].o_w_id = w_id;
                orders_buf[o_id].o_id = o_id+1;
                orders_buf[o_id].o_c_id = cust[o_id+1];
                orders_buf[o_id].o_ol_cnt = (short)RandomNumber(5L, 15L);

                if (o_id < first_new_order)
                {
                        orders_buf[o_id].o_carrier_id =
(short)RandomNumber(1L, 10L);
                        orders_buf[o_id].o_all_local  = 1;
                }
                else
                {
                        orders_buf[o_id].o_carrier_id = 0;
                        orders_buf[o_id].o_all_local  = 1;
                }

                for (ol=0; ol<orders_buf[o_id].o_ol_cnt; ol++)
                {

                        orders_buf[o_id].o_ol[ol].ol = ol+1;
                        orders_buf[o_id].o_ol[ol].ol_i_id =
RandomNumber(1L, max_items);
                        orders_buf[o_id].o_ol[ol].ol_supply_w_id = w_id;
                        orders_buf[o_id].o_ol[ol].ol_quantity = 5;
                        MakeAlphaString(24, 24, OL_DIST_INFO_LEN,
&orders_buf[o_id].o_ol[ol].ol_dist_info);

                        // Generate ORDER-LINE data
                        if (o_id < first_new_order)
                        {
                                orders_buf[o_id].o_ol[ol].ol_amount = 0;
                                // Added to insure ol_delivery_d set
properly during load


        FormatDate(&orders_buf[o_id].o_ol[ol].ol_delivery_d);

                        }
                        else
                        {
                                orders_buf[o_id].o_ol[ol].ol_amount =
RandomNumber(1,999999)/100.0;
                                // Added to insure ol_delivery_d set
properly during load

                                // odbc datetime format

        strcpy(orders_buf[o_id].o_ol[ol].ol_delivery_d,"1899-12-31
12:00:00.000");

                        }
                }
        }
}


//============================================================================
//
// Function   : LoadOrdersTable
//
//============================================================================
```

```
void LoadOrdersTable(LOADER_TIME_STRUCT *orders_time_start)
{
        int         i;
    long        o_id;
        short           o_d_id;
        short           o_w_id;
    long        o_c_id;
    short       o_carrier_id;
    short       o_ol_cnt;
    short       o_all_local;
        char            o_entry_d[O_ENTRY_D_LEN+1];
        RETCODE         rc;
        DBINT           rcint;

        // bind ORDER data
    rc = bcp_bind(o_hdbc1, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_c_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

        rc = bcp_bind(o_hdbc1, (BYTE *) &o_entry_d, 0, O_ENTRY_D_LEN,
NULL, 0, SQLCHARACTER, 5);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_carrier_id, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 6);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_ol_cnt, 0, SQL_VARLEN_DATA, NULL,
0, SQLINT2, 7);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    rc = bcp_bind(o_hdbc1, (BYTE *) &o_all_local, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 8);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

    for (i = 0; i < orders_per_district; i++)
    {
                o_id         = orders_buf[i].o_id;
                o_d_id       = orders_buf[i].o_d_id;
                o_w_id       = orders_buf[i].o_w_id;
                o_c_id       = orders_buf[i].o_c_id;
                o_carrier_id = orders_buf[i].o_carrier_id;
                o_ol_cnt     = orders_buf[i].o_ol_cnt;
                o_all_local  = orders_buf[i].o_all_local;

                FormatDate(&o_entry_d);

                // send data to server
                rc = bcp_sendrow(o_hdbc1);
                if (rc != SUCCEED)
                        HandleErrorDBC(o_hdbc1);

                orders_rows_loaded++;
                CheckForCommit(o_hdbc1, o_hstmt1, orders_rows_loaded,
"orders", &orders_time_start->time_start);
    }

        // rcint = bcp_batch(o_hdbc1);
        // if (rcint < 0)
        //      HandleErrorDBC(o_hdbc1);

        if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
        {
                rcint = bcp_done(o_hdbc1);
                if (rcint < 0)
                        HandleErrorDBC(o_hdbc1);

                SQLFreeStmt(o_hstmt1, SQL_DROP);
                SQLDisconnect(o_hdbc1);
                SQLFreeConnect(o_hdbc1);

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                        BuildIndex("idxordcl");

                // build non-clustered index
                if (aptr->build_index == 1)
                        BuildIndex("idxordnc");
        }

}


//============================================================================
//
// Function   : LoadNewOrderTable
//
//============================================================================

void LoadNewOrderTable(LOADER_TIME_STRUCT *new_order_time_start)
{
    int         i;
    long        o_id;
    short       o_d_id;
    short       o_w_id;
        RETCODE         rc;
        DBINT           rcint;

        // Bind NEW-ORDER data

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
```

```
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc2);

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc2);

    rc = bcp_bind(o_hdbc2, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc2);

        for (i = first_new_order; i < last_new_order; i++)
        {
                o_id    = orders_buf[i].o_id;
                o_d_id  = orders_buf[i].o_d_id;
                o_w_id  = orders_buf[i].o_w_id;

                rc = bcp_sendrow(o_hdbc2);
                if (rc != SUCCEED)
                        HandleErrorDBC(o_hdbc2);

                new_order_rows_loaded++;
                CheckForCommit(o_hdbc2, o_hstmt2, new_order_rows_loaded,
"new_order", &new_order_time_start->time_start);
        }

        // rcint = bcp_batch(o_hdbc2);
        // if (rcint < 0)
        //      HandleErrorDBC(o_hdbc2);

        if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
        {
                rcint = bcp_done(o_hdbc2);
                if (rcint < 0)
                        HandleErrorDBC(o_hdbc2);

                SQLFreeStmt(o_hstmt2, SQL_DROP);
                SQLDisconnect(o_hdbc2);
                SQLFreeConnect(o_hdbc2);

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                        BuildIndex("idxnodcl");

        }

}


//================================================================================
//
// Function   : LoadOrderLineTable
//
//================================================================================

void LoadOrderLineTable(LOADER_TIME_STRUCT *order_line_time_start)
{
        int         i,j;
    long        o_id;
        short           o_d_id;
        short           o_w_id;
    long        ol;
        long            ol_i_id;
    short       ol_supply_w_id;
    short       ol_quantity;
    double      ol_amount;
    char        ol_dist_info[DIST_INFO_LEN+1];
        char            ol_delivery_d[OL_DELIVERY_D_LEN+1];
        RETCODE         rc;
        DBINT           rcint;

        // bind ORDER-LINE data
    rc = bcp_bind(o_hdbc3, (BYTE *) &o_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 1);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &o_d_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 2);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &o_w_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT2, 3);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 4);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_i_id, 0, SQL_VARLEN_DATA, NULL, 0,
SQLINT4, 5);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_supply_w_id, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 6);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

        rc = bcp_bind(o_hdbc3, (BYTE *) &ol_delivery_d, 0,
OL_DELIVERY_D_LEN, NULL, 0, SQLCHARACTER, 7);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_quantity, 0, SQL_VARLEN_DATA,
NULL, 0, SQLINT2, 8);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) &ol_amount, 0, SQL_VARLEN_DATA, NULL,
0, SQLFLT8, 9);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

    rc = bcp_bind(o_hdbc3, (BYTE *) ol_dist_info, 0, DIST_INFO_LEN, NULL,
0, 0, 10);
        if (rc != SUCCEED)
```

```
                HandleErrorDBC(o_hdbc3);

        for (i = 0; i < orders_per_district; i++)
    {
                o_id    = orders_buf[i].o_id;
                o_d_id  = orders_buf[i].o_d_id;
                o_w_id  = orders_buf[i].o_w_id;

                for (j=0; j < orders_buf[i].o_ol_cnt; j++)
                {
                        ol              = orders_buf[i].o_ol[j].ol;
                        ol_i_id         = orders_buf[i].o_ol[j].ol_i_id;
                        ol_supply_w_id =
orders_buf[i].o_ol[j].ol_supply_w_id;
                        ol_quantity     = orders_buf[i].o_ol[j].ol_quantity;
                        ol_amount       = orders_buf[i].o_ol[j].ol_amount;


        strcpy(ol_delivery_d,orders_buf[i].o_ol[j].ol_delivery_d);


        strcpy(ol_dist_info,orders_buf[i].o_ol[j].ol_dist_info);

                        rc = bcp_sendrow(o_hdbc3);
                        if (rc != SUCCEED)
                                HandleErrorDBC(o_hdbc3);

                        order_line_rows_loaded++;
                        CheckForCommit(o_hdbc3, o_hstmt3,
order_line_rows_loaded, "order_line", &order_line_time_start->time_start);
                }

        }

        // rcint = bcp_batch(o_hdbc3);
        // if (rcint < 0)
        //      HandleErrorDBC(o_hdbc3);

        if ((o_w_id == aptr->num_warehouses) && (o_d_id == 10))
        {
                rcint = bcp_done(o_hdbc3);
                if (rcint < 0)
                        HandleErrorDBC(o_hdbc3);

                SQLFreeStmt(o_hstmt3, SQL_DROP);
                SQLDisconnect(o_hdbc3);
                SQLFreeConnect(o_hdbc3);

                // if build index after load...
                if ((aptr->build_index == 1) && (aptr->index_order == 0))
                        BuildIndex("idxodlcl");

        }

}


//==============================================================================
//
// Function   : GetPermutation
//
//==============================================================================

void GetPermutation(int perm[], int n)
{
        int i, r, t;

        for (i=1;i<=n;i++)
                perm[i] = i;

        for (i=1;i<=n;i++)
        {
                r = RandomNumber(i,n);
                t = perm[i];
                perm[i] = perm[r];
                perm[r] = t;
        }

}


//==============================================================================
//
// Function   : CheckForCommit
//
//==============================================================================

void CheckForCommit(HDBC hdbc,
                                        HSTMT hstmt,
                                int rows_loaded,
                                        char *table_name,
                                long *time_start)
{

    long        time_end, time_diff;
        // DBINT       rcint;

    if ( !(rows_loaded % aptr->batch) )
    {

                // rcint = bcp_batch(hdbc);
                // if (rcint < 0)
                //      HandleErrorDBC(hdbc);

                time_end = (TimeNow() / MILLI);
                time_diff = time_end - *time_start;

                printf("-> Loaded %ld rows into %s in %ld sec - Total = %d
(%.2f rps)\n",
                        aptr->batch,
                        table_name,
                                time_diff,
                        rows_loaded,
                                (float) aptr->batch / (time_diff ? time_diff
: 1L));

                *time_start = time_end;
    }

    return;
}
```

```
//========================================================================
//
// Function   : OpenConnections
//
//========================================================================

void OpenConnections()
{

        RETCODE         rc;

        char                    szDriverString[300];
        char                    szDriverStringOut[1024];
        SQLSMALLINT             cbDriverStringOut;


        SQLAllocHandle(SQL_HANDLE_ENV, SQL_NULL_HANDLE, &henv );

        SQLSetEnvAttr(henv, SQL_ATTR_ODBC_VERSION, (void*)SQL_OV_ODBC3, 0
);

        SQLAllocHandle(SQL_HANDLE_DBC, henv , &i_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &w_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &c_hdbc2);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc1);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc2);
        SQLAllocHandle(SQL_HANDLE_DBC, henv , &o_hdbc3);

        SQLSetConnectAttr(i_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
        SQLSetConnectAttr(w_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
        SQLSetConnectAttr(c_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
        SQLSetConnectAttr(c_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
        SQLSetConnectAttr(o_hdbc1, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
        SQLSetConnectAttr(o_hdbc2, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );
        SQLSetConnectAttr(o_hdbc3, SQL_COPT_SS_BCP, (void *)SQL_BCP_ON,
SQL_IS_INTEGER );

        // Open connections to SQL Server

        // Connection 1

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password,
                                                aptr->database );

        rc = SQLSetConnectOption (i_hdbc1, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        rc = SQLDriverConnect ( i_hdbc1,
                                                NULL,
                                                    (SQLCHAR*)&szDriverString[0]
,
                                                SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],
                                                sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
                                                SQL_DRIVER_NOPROMPT );
        if (rc != SUCCEED)
                HandleErrorDBC(i_hdbc1);

        // Connection 2

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                  aptr->server,
                                                  aptr->user,
                                                  aptr->password,
                                                  aptr->database );

        rc = SQLSetConnectOption (w_hdbc1, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        rc = SQLDriverConnect ( w_hdbc1,
                                                        NULL,

        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                        &cbDriverStringOut,
                                                        SQL_DRIVER_NOPROMPT
);
        if (rc != SUCCEED)
                HandleErrorDBC(w_hdbc1);

        // Connection 3

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                                aptr->server,
                                                aptr->user,
                                                aptr->password,
                                                aptr->database );

        rc = SQLSetConnectOption (c_hdbc1, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        rc = SQLDriverConnect ( c_hdbc1,
                                                        NULL,

        (SQLCHAR*)&szDriverString[0] ,
                                                        SQL_NTS,
```

```
        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
                                                SQL_DRIVER_NOPROMPT
);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc1);

        // Connection 4

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                            aptr->server,
                                            aptr->user,
                                            aptr->password,
                                            aptr->database );

        rc = SQLSetConnectOption (c_hdbc2, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        rc = SQLDriverConnect ( c_hdbc2,
                                                NULL,

        (SQLCHAR*)&szDriverString[0] ,
                                                SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
                                                SQL_DRIVER_NOPROMPT
);
        if (rc != SUCCEED)
                HandleErrorDBC(c_hdbc2);

        // Connection 5

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                            aptr->server,
                                            aptr->user,
                                            aptr->password,
                                            aptr->database );

        rc = SQLSetConnectOption (o_hdbc1, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

        rc = SQLDriverConnect ( o_hdbc1,
                                                NULL,

        (SQLCHAR*)&szDriverString[0] ,
                                                SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
                                                SQL_DRIVER_NOPROMPT
);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc1);

        // Connection 6

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                            aptr->server,
                                            aptr->user,
                                            aptr->password,
                                            aptr->database );

        rc = SQLSetConnectOption (o_hdbc2, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc2);

        rc = SQLDriverConnect ( o_hdbc2,
                                                NULL,

        (SQLCHAR*)&szDriverString[0] ,
                                                SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
                                                SQL_DRIVER_NOPROMPT
);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc2);

        // Connection 7

        sprintf( szDriverString , "DRIVER={SQL
Server};SERVER=%s;UID=%s;PWD=%s;DATABASE=%s" ,
                                            aptr->server,
                                            aptr->user,
                                            aptr->password,
                                            aptr->database );

        rc = SQLSetConnectOption (o_hdbc3, SQL_PACKET_SIZE, aptr-
>pack_size);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

        rc = SQLDriverConnect ( o_hdbc3,
                                                NULL,

        (SQLCHAR*)&szDriverString[0] ,
                                                SQL_NTS,

        (SQLCHAR*)&szDriverStringOut[0],

        sizeof(szDriverStringOut),
                                                &cbDriverStringOut,
```

```
                                                        SQL_DRIVER_NOPROMPT
);
        if (rc != SUCCEED)
                HandleErrorDBC(o_hdbc3);

}

//============================================================================
//
// Function name: BuildIndex
//
//============================================================================

void BuildIndex(char   *index_script)
{
        char    cmd[256];

        printf("Starting index creation:  %s\n",index_script);

        sprintf(cmd, "isql -S%s -U%s -P%s -e -i%s\\%s.sql > logs\\%s.log",
                                aptr->server,
                                aptr->user,
                                aptr->password,
                                aptr->index_script_path,
                                index_script,
                                index_script);

        system(cmd);

        printf("Finished index creation:  %s\n",index_script);
}


void HandleErrorDBC (SQLHDBC  hdbc1)
{

        SQLCHAR        SqlState[6], Msg[SQL_MAX_MESSAGE_LENGTH];
        SQLINTEGER  NativeError;
        SQLSMALLINT i, MsgLen;
        SQLRETURN   rc2;
        char           timebuf[128];
        char           datebuf[128];
        FILE           *fp1;

        i = 1;
        while (( rc2 = SQLGetDiagRec(SQL_HANDLE_DBC , hdbc1, i, SqlState ,
&NativeError,
                                Msg, sizeof(Msg) , &MsgLen )) !=
SQL_NO_DATA )
        {

                sprintf( szLastError , "%s" ,  Msg );

                _strtime(timebuf);
                _strdate(datebuf);

                printf( "[%s : %s] %s\n" , datebuf, timebuf, szLastError);

                fp1 = fopen("logs\\tpccldr.err","w");
                if (fp1 == NULL)
                        printf("ERROR:  Unable to open errorlog file.\n");
                else
                {
                        fprintf(fp1, "[%s : %s] %s\n" , datebuf, timebuf,
szLastError);
                        fclose(fp1);
                }

                i++;

        }
}


void FormatDate ( char* szTimeCOutput )
{

        struct tm when;
        time_t now;

        time( &now );
        when  = *localtime( &now );

        mktime( &when );

        // odbc datetime format
        strftime( szTimeCOutput , 30 , "%Y-%m-%d %H:%M:%S.000", &when );

        return;

}
```

Appendix C - Tunable Parameters

Microsoft SQL Server Startup Parameters

C:\MSSQL\BINN\SQLSERVR.EXE -c -x -t3502 -g38

Where:

- -c Start SQL Server independently of the Service Control Manager
- -x Disables the keeping of CPU time and cache hit ratio statistics
- -t3502 Writes a message to the SQL Server Errorlog showing the beginning and ending time of each checkpoint
- -g38 Specifies the amount of virtual address space, in MB, SQL Server will leave available for memory allocations, excluding the buffer pool and thread stacks, such as dynamically-loaded DLLs, extended procedure calls, etc.. If this option is not specified, SQL Server will use a value that is suitable for a wide range of runtime environments. Use of this option may be appropriate in 2GB (3GB Enterprise Edition) configurations in which the memory usage requirements of SQL Server are atypical and the virtual address space of the SQL Server process is totally in use. Incorrect use of this option can lead to conditions under which SQL Server may not start or may encounter runtime errors.

SQL Server Stack Size

The default stack size for Microsoft SQL Server 7.0 was changed using the EDITBIN utility. The EDITBIN utility ships with Microsoft Visual C++ V6.0. The command used to change the stack size is:

editbin /S: 131072 sqlservr.exe

This command is fully documented as an article in the Microsoft Knowledge Base on the Microsoft Web Site at www.microsoft.com/support.

BOOT.INI

The /3gb switch was added to the boot.ini file to cause Windows NT 4.0, Enterprise Editions to allow 3GB of user and 1GB of kernel virtual address space, rather than the usual 2GB of virtual address space for each.

Microsoft SQL Server Configuration Parameters

```
1> 2> 3> 4> 5> 6> 7> 8> 9> 10> 11>
--  File:     VERSION.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Returns SQL Server version string



print " "
select convert(char(30), getdate(),9)
print " "

 ------------------------------
 Sep  2 1999  9:38:12:513AM

(1 row affected)

1> 2> 3>
select @@version




 --------------------------------------------------------------------------
-----
       ------------------------------------------------------------------
-----
       ------------------------------------------------------------------
-----
       ----------------------------------
 Microsoft SQL Server  7.00 - 7.00.805 (Intel X86)
       Jun 11 1999 11:48:12
       Cop
       yright (c) 1988-1998 Microsoft Corporation
       Enterprise Edition on Windo
       ws NT 4.0 (Build 1381: Service Pack 4)
```

```
(1 row affected)
1> 2>
1> 2> 3> 4> 5> 6> 7> 8> 9> 10>
--  File:     CONFIG.SQL
--            Microsoft TPC-C Benchmark Kit Ver. 4.00
--            Copyright Microsoft, 1996
--  Purpose:  Collects SQL Server configuration parameters


print " "
select convert(char(30), getdate(),9)
print " "

 ------------------------------
 Sep  2 1999  9:38:13:310AM

(1 row affected)

1> 2> 3> DBCC execution completed. If DBCC printed error messages, contact
your system administrator.
Configuration option changed. Run the RECONFIGURE statement to install.

sp_configure "show advanced",1
1> 2> reconfigure with override
1> 2> sp_configure
 name
minimum     maximum     config_value run_value
 ------------------------------------------------------------------------ --
--------- ----------- ------------ -----------
 affinity mask
0  2147483647            3           3
 allow updates
0           1            0           0
 cost threshold for parallelism
0       32767            5           5
 cursor threshold
-1  2147483647           -1          -1
 default language
0        9999            0           0
 default sortorder id
0         255           50          50
 extended memory size (MB)
0  2147483647            0           0
 fill factor (%)
0         100            0           0
 index create memory (KB)
704     1600000            0           0
 language in cache
3         100            3           3
 language neutral full-text
0           1            0           0
 lightweight pooling
0           1            1           1
 locks
5000  2147483647           0           0
 max async IO
1         255          255         255
 max degree of parallelism
0          32            1           1
 max server memory (MB)
4  2147483647   2147483647  2147483647
 max text repl size (B)
0  2147483647        65536       65536
 max worker threads
10        1024          120         120
 media retention
0         365            0           0
 min memory per query (KB)
512  2147483647          512         512
 min server memory (MB)
0  2147483647            0           0
 nested triggers
0           1            0           0
 network packet size (B)
512       65535         4096        4096
 open objects
0  2147483647            0           0
 priority boost
0           1            1           1
 query governor cost limit
0  2147483647            0           0
 query wait (s)
-1  2147483647           -1          -1
 recovery interval (min)
0       32767        32767       32767
 remote access
0           1            0           0
 remote login timeout (s)
0  2147483647            5           5
 remote proc trans
0           1            0           0
 remote query timeout (s)
0  2147483647            0           0
 resource timeout (s)
5  2147483647           10          10
 scan for startup procs
0           1            0           0
 set working set size
0           1            0           0
 show advanced options
0           1            1           1
 spin counter
1  2147483647        10000       10000
 time slice (ms)
50        1000          100         100
 two digit year cutoff
1753        9999         2049        2049
 Unicode comparison style
0  2147483647            0           0
 Unicode locale id
0  2147483647        33280       33280
 user connections
0       32767            0           0
 user options
0        4095            0           0

1>
```

RAID Configuration Parameters

```
************************************************************************
*        MYLEX Disk Array Controller - Configuration Utility           *
*                          Version 4.78-20                             *
************************************************************************

     CONFIGURATION INFORMATION OF :
     ==============================

     3 Channel - 15 Target  DAC1164P   #1    Firmware version  5.07-0-2

     Auto Rebuild Management          : Enabled
     Storage Works Fault Management   : Disabled
     Rebuild/Add Capacity Rate        : 50
     Stripe Size                      : 64K
     Cache Segment Size               : 8K

     SCSI Transfer Parameters
     ------------------------

     Data Transfer Rate for channel 0: 40 Mhz
     Data Bus Width for channel 0     : 16 Bit
     Command Tags for channel 0       : Enabled

     Data Transfer Rate for channel 1: 40 Mhz
     Data Bus Width for channel 1     : 16 Bit
     Command Tags for channel 1       : Enabled

     Data Transfer Rate for channel 2: 40 Mhz
     Data Bus Width for channel 2     : 16 Bit
     Command Tags for channel 2       : Enabled

     Startup Parameters
     ------------------
     Spin Up Option                   : Automatic
     Number of devices per spin up    : 2
     Length of delay                  : 6 seconds
     Sequence delay                   : 6 seconds

     PHYSICAL PACK INFORMATION :
     ===========================
     Number of Packs = 8
     Pack  0 : [2:0]  [2:1]  [2:2]  [2:3]  [2:4]  [2:5]  [2:6]
     Pack  1 : [2:8]  [2:9]  [2:10]  [2:11]  [2:12]  [2:13]  [2:14]
     Pack  2 : [1:0]  [1:1]  [1:2]  [1:3]  [1:4]
     Pack  3 : [1:8]  [1:9]  [1:10]  [1:11]  [1:12]
     Pack  4 : [0:8]  [0:9]
     Pack  5 : [0:10]  [0:11]
     Pack  6 : [0:12]  [0:13]
     Pack  7 : [1:5]  [1:13]

     SYSTEM DRIVE INFORMATION :
     ==========================
     Number of System Drives = 4

     Sys Drv# Phy. Size   Raid Level Eff. Size  Write Policy State
     ======== =========   ========== =========  ============ =====
      0        122472 MB      5        104976 MB  Write Back   Online
      1         87480 MB      0         87480 MB  Write Thru   Online
      2         52488 MB      1         26244 MB  Write Thru   Online
      3         17496 MB      1          8748 MB  Write Thru   Online

     Device Information
     ------------------
     Chnl/Targ Vendor   Model            Version  Size     State
     --------- ------   -----            -------  ----     -----
        0-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-0    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-1    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-2    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-3    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-4    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-5    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-0    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-1    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-2    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-3    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-4    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-5    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-6    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-14   UNISYS   007114ST39102LC  B603     8748 MB  Online

************************************************************************



************************************************************************
*        MYLEX Disk Array Controller - Configuration Utility           *
*                          Version 4.78-20                             *
************************************************************************

     CONFIGURATION INFORMATION OF :
     ==============================

     3 Channel - 15 Target  DAC1164P   #2    Firmware version  5.07-0-2

     Auto Rebuild Management          : Enabled
     Storage Works Fault Management   : Disabled
```

```
Rebuild/Add Capacity Rate       : 50
Stripe Size                     : 64K
Cache Segment Size              : 8K

SCSI Transfer Parameters
------------------------

Data Transfer Rate for channel 0: 40 Mhz
Data Bus Width for channel 0    : 16 Bit
Command Tags for channel 0      : Enabled

Data Transfer Rate for channel 1: 40 Mhz
Data Bus Width for channel 1    : 16 Bit
Command Tags for channel 1      : Enabled

Data Transfer Rate for channel 2: 40 Mhz
Data Bus Width for channel 2    : 16 Bit
Command Tags for channel 2      : Enabled

Startup Parameters
------------------
Spin Up Option                  : Automatic
Number of devices per spin up   : 2
Length of delay                 : 6 seconds
Sequence delay                  : 6 seconds

PHYSICAL PACK INFORMATION :
===========================
Number of Packs = 5
Pack  0 : [0:8]   [0:9]   [0:10]   [0:11]   [0:12]   [0:13]
Pack  1 : [0:14]  [0:15]  [1:8]   [1:9]   [1:10]   [1:11]
Pack  2 : [1:12]  [1:13]  [1:14]   [1:15]  [2:8]
Pack  3 : [2:9]   [2:10]  [2:11]   [2:12]  [2:13]
Pack  4 : [2:14]  [2:15]

SYSTEM DRIVE INFORMATION :
==========================
Number of System Drives = 3

Sys Drv# Phy. Size   Raid Level Eff. Size  Write Policy State
======== =========   ========== =========  ============ =====
 0       104976 MB      0       104976 MB  Write Thru   Online
 1        87480 MB      0        87480 MB  Write Thru   Online
 2        17496 MB      0        17496 MB  Write Thru   Online

Device Information
------------------
Chnl/Targ Vendor   Model            Version  Size     State
--------- ------   -----            -------  ----     -----
   0-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-15   UNISYS   007114ST39102LC  B603     8748 MB  Online

**************************************************************************



**************************************************************************
*        MYLEX Disk Array Controller - Configuration Utility             *
*                           Version 4.78-20                              *
**************************************************************************

     CONFIGURATION INFORMATION OF :
     ==============================

     3 Channel - 15 Target  DAC1164P   #3    Firmware version  5.07-0-2

     Auto Rebuild Management         : Enabled
     Storage Works Fault Management  : Disabled
     Rebuild/Add Capacity Rate       : 50
     Stripe Size                     : 64K
     Cache Segment Size              : 8K

     SCSI Transfer Parameters
     ------------------------

     Data Transfer Rate for channel 0: 40 Mhz
     Data Bus Width for channel 0    : 16 Bit
     Command Tags for channel 0      : Enabled

     Data Transfer Rate for channel 1: 40 Mhz
     Data Bus Width for channel 1    : 16 Bit
     Command Tags for channel 1      : Enabled

     Data Transfer Rate for channel 2: 40 Mhz
     Data Bus Width for channel 2    : 16 Bit
     Command Tags for channel 2      : Enabled

     Startup Parameters
     ------------------
     Spin Up Option                  : Automatic
     Number of devices per spin up   : 2
     Length of delay                 : 6 seconds
     Sequence delay                  : 6 seconds

     PHYSICAL PACK INFORMATION :
     ===========================
```

```
Number of Packs = 5
Pack  0 : [0:8]  [0:9]  [0:10]  [0:11]  [0:12]  [0:13]
Pack  1 : [0:14]  [0:15]  [1:8]  [1:9]  [1:10]  [1:11]
Pack  2 : [1:12]  [1:13]  [1:14]  [1:15]  [2:8]
Pack  3 : [2:9]  [2:10]  [2:11]  [2:12]  [2:13]
Pack  4 : [2:14]  [2:15]

SYSTEM DRIVE INFORMATION :
==========================
Number of System Drives = 3

Sys Drv# Phy. Size   Raid Level Eff. Size  Write Policy State
======== =========   ========== =========  ============ =====
 0       104976 MB      0       104976 MB  Write Thru   Online
 1        87480 MB      0        87480 MB  Write Thru   Online
 2        17496 MB      0        17496 MB  Write Thru   Online

Device Information
------------------
Chnl/Targ Vendor   Model            Version  Size     State
--------- ------   -----            -------  ----     -----
   0-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
   0-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
   1-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
   2-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
**********************************************************************



**********************************************************************
*        MYLEX Disk Array Controller - Configuration Utility         *
*                          Version 4.78-20                           *
**********************************************************************

     CONFIGURATION INFORMATION OF :
     ==============================

     3 Channel - 15 Target  DAC1164P   #4    Firmware version  5.07-0-2

     Auto Rebuild Management          : Enabled
     Storage Works Fault Management   : Disabled
     Rebuild/Add Capacity Rate        : 50
     Stripe Size                      : 64K
     Cache Segment Size               : 8K

     SCSI Transfer Parameters
     ------------------------

     Data Transfer Rate for channel 0: 40 Mhz
     Data Bus Width for channel 0     : 16 Bit
     Command Tags for channel 0       : Enabled

     Data Transfer Rate for channel 1: 40 Mhz
     Data Bus Width for channel 1     : 16 Bit
     Command Tags for channel 1       : Enabled

     Data Transfer Rate for channel 2: 40 Mhz
     Data Bus Width for channel 2     : 16 Bit
     Command Tags for channel 2       : Enabled

     Startup Parameters
     ------------------
     Spin Up Option                   : Automatic
     Number of devices per spin up    : 2
     Length of delay                  : 6 seconds
     Sequence delay                   : 6 seconds

     PHYSICAL PACK INFORMATION :
     ===========================
     Number of Packs = 5
     Pack  0 : [0:8]  [0:9]  [0:10]  [0:11]  [0:12]  [0:13]
     Pack  1 : [0:14]  [0:15]  [1:8]  [1:9]  [1:10]  [1:11]
     Pack  2 : [1:12]  [1:13]  [1:14]  [1:15]  [2:8]
     Pack  3 : [2:9]  [2:10]  [2:11]  [2:12]  [2:13]
     Pack  4 : [2:14]  [2:15]

     SYSTEM DRIVE INFORMATION :
     ==========================
     Number of System Drives = 3

     Sys Drv# Phy. Size   Raid Level Eff. Size  Write Policy State
     ======== =========   ========== =========  ============ =====
      0       104976 MB      0       104976 MB  Write Thru   Online
      1        87480 MB      0        87480 MB  Write Thru   Online
      2        17496 MB      0        17496 MB  Write Thru   Online

     Device Information
     ------------------
     Chnl/Targ Vendor   Model            Version  Size     State
     --------- ------   -----            -------  ----     -----
        0-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
        0-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
```

```
        0-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
        1-15   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-8    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-9    UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-10   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-11   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-12   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-13   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-14   UNISYS   007114ST39102LC  B603     8748 MB  Online
        2-15   UNISYS   007114ST39102LC  B603     8748 MB  Online

**********************************************************************
```

NT Server Configuration Information

```
Microsoft Diagnostics Report For \\ES2025
------------------------------------------------------------------------

OS Version Report
------------------------------------------------------------------------
Microsoft (R) Windows NT (TM) Server
Version 4.0 (Build 1381: Service Pack 4) x86 Multiprocessor Free
Registered Owner: SAMM, Unisys Corp.
Product Number: 28997-OEM-0026051-97737
------------------------------------------------------------------------

System Report
------------------------------------------------------------------------
System: AT/AT COMPATIBLE
Hardware Abstraction Layer: MPS 1.4 - APIC platform
BIOS Date: 08/17/99
BIOS Version: 4.0 Release 6.00.34
              4.0 Release

Processor list:
   0:  x86 Family 6 Model 7 Stepping 3 GenuineIntel ~547 Mhz
   1:  x86 Family 6 Model 7 Stepping 3 GenuineIntel ~547 Mhz
------------------------------------------------------------------------

Video Display Report
------------------------------------------------------------------------
BIOS Date: 10/27/96
BIOS Version: CL-GD5440 VGA BIOS Version 1.07

Adapter:
   Setting: 1024 x 768 x 256
            75 Hz
   Type: cirrus compatible display adapter
   String: Cirrus Logic Compatible
   Memory: 2 MB
   Chip Type: CL 5430
   DAC Type: Integrated RAMDAC
Driver:
   Vendor: Microsoft Corporation
   File(s): cirrus.sys, vga.dll, cirrus.dll, vga256.dll, vga64K.dll
   Version: 4.00, 4.0.0


Drives Report
------------------------------------------------------------------------
C:\  (Local - FAT)  Total: 2,096,160 KB, Free: 1,705,440 KB
   Serial Number: DE37 - D286
   Bytes per cluster: 512
   Sectors per cluster: 64
   Filename length: 255
D:\  (Local - NTFS)  Total: 3,068,412 KB, Free: 1,354,548 KB
   Serial Number: CC6A - 1386
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
E:\  (Local - NTFS)  Total: 3,068,412 KB, Free: 3,062,884 KB
   Serial Number: 71 - 6C8F
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255
G:\  (Local - NTFS) Backup Total: 107,495,404 KB, Free: 44,305,084 KB
   Serial Number: 608C - 3E33
   Bytes per cluster: 512
   Sectors per cluster: 8
   Filename length: 255

Memory Report
------------------------------------------------------------------------
Handles: 1,721
Threads: 101
Processes: 15

Physical Memory (K)
   Total: 1,047,920
   Available: 4,944
   File Cache: 13,020

Kernel Memory (K)
   Total: 13,156
   Paged: 8,656
   Nonpaged: 4,500

Commit Charge (K)
   Total: 1,003,756
   Limit: 1,524,260
   Peak: 1,014,668

Pagefile Space (K)
   Total: 524,288
   Total in use: 8,220
   Peak: 10,208
```

```
   D:\pagefile.sys
      Total: 524,288
      Total in use: 8,220
      Peak: 10,208



Services Report
----------------------------------------------------------------------
Alerter                                    Stopped   (Manual)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
Computer Browser                           Stopped   (Manual)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
      LmHosts
ClipBook Server                            Stopped   (Manual)
   D:\WINNT2\system32\clipsrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      NetDDE
DHCP Client (TDI)                          Stopped   (Disabled)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      Tcpip
      Afd
      NetBT
EventLog (Event log)                       Running   (Automatic)
   D:\WINNT2\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Server                                     Running   (Automatic)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
Workstation (NetworkProvider)              Running   (Automatic)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
License Logging Service                    Stopped   (Manual)
   D:\WINNT2\System32\llssrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TCP/IP NetBIOS Helper                      Stopped   (Manual)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      NetworkProvider
Messenger                                  Stopped   (Manual)
   D:\WINNT2\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      NetBios
MSDTC (MS Transactions)                    Stopped   (Manual)
   D:\WINNT2\System32\msdtc.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      RPCSS
      NTLMSSP
MSSQLServer                                Stopped   (Manual)
   D:\MSSQL7\binn\sqlservr.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Network DDE (NetDDEGroup)                  Stopped   (Manual)
   D:\WINNT2\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      NetDDEDSDM
Network DDE DSDM                           Stopped   (Manual)
   D:\WINNT2\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Net Logon (RemoteValidation)               Stopped   (Manual)
   D:\WINNT2\System32\lsass.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LmHosts
NT LM Security Support Provider            Running   (Manual)
   D:\WINNT2\System32\SERVICES.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
```

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   Service Flags: Shared Process
Plug and Play (PlugPlay)                    Running   (Automatic)
   D:\WINNT2\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Protected Storage                           Running   (Automatic)
   d:\winnt2\system32\pstores.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
   Service Dependencies:
      RpcSs
Directory Replicator                        Stopped   (Manual)
   D:\WINNT2\System32\lmrepl.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
Remote Procedure Call (RPC) Locator         Stopped   (Manual)
   D:\WINNT2\System32\LOCATOR.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      Rdr
Remote Procedure Call (RPC) Service         Running   (Automatic)
   D:\WINNT2\system32\RpcSs.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Schedule                                    Stopped   (Manual)
   D:\WINNT2\System32\AtSvc.Exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Simple TCP/IP Services                      Stopped   (Manual)
   D:\WINNT2\system32\tcpsvcs.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      Afd
   Group Dependencies:
      TDI
SNMP                                        Stopped   (Manual)
   D:\WINNT2\System32\snmp.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      Tcpip
      EventLog
SNMP Trap Service                           Stopped   (Manual)
   D:\WINNT2\System32\snmptrap.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      Tcpip
      EventLog
Spooler (SpoolerGroup)                      Stopped   (Manual)
   D:\WINNT2\system32\spoolss.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
SQLServerAgent                              Stopped   (Manual)
   D:\MSSQL7\binn\sqlagent.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      MSSQLServer
Telephony Service                           Stopped   (Manual)
   D:\WINNT2\system32\tapisrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
UPS                                         Stopped   (Manual)
   D:\WINNT2\System32\ups.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process


Drivers Report
--------------------------------------------------------------------------------
Abiosdsk (Primary disk)                     Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
AFD Networking Support Environment (TDI)    Running   (Automatic)
   D:\WINNT2\System32\drivers\afd.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha154x (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha174x (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
aic78u2 (SCSI miniport)                     Running   (Boot)
   D:\WINNT2\system32\drivers\aic78u2.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
aic78xx (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Always (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ami0nt (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
amsint (SCSI miniport)                      Stopped   (Disabled)
```

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   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Arrow (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
atapi (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Atdisk (Primary disk)                          Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ati (Video)                                    Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Beep (Base)                                    Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
BusLogic (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Busmouse (Pointer Port)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdaudio (Filter)                               Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdfs (File system)                             Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      SCSI CDROM Class
Cdrom (SCSI CDROM Class)                       Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Changer (Filter)                               Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
cirrus (Video)                                 Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Cpqarray (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
cpqfws2e (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dac960nt (SCSI miniport)                       Running   (Boot)
   D:\WINNT2\System32\drivers\dac960nt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dce376nt (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Delldsa (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Dell_DGX (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Disk (SCSI Class)                              Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Diskperf (Filter)                              Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
DptScsi (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dtc329x (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Intel(R) PRO NDIS Driver (NDIS)                Running   (Automatic)
   D:\WINNT2\System32\drivers\E100BNT.SYS
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
et4000 (Video)                                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Fastfat (Boot file system)                     Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Fd16_700 (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd7000ex (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd8xx (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
flashpnt (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Floppy (Primary disk)                          Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ftdisk (Filter)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
i8042 Keyboard and PS/2 Mouse Port Driver (Keyboard Port) Running
(System)
   System32\DRIVERS\i8042prt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Inport (Pointer Port)                          Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg300 (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg364 (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jzvxl484 (Video)                               Stopped   (Disabled)
```

```
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Keyboard Class Driver (Keyboard Class)        Running   (System)
   System32\DRIVERS\kbdclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
KSecDD (Base)                                 Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
macdisk (Filter)                              Running   (Boot)
   D:\WINNT2\System32\drivers\macdisk.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mga (Video)                                   Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mga_mil (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mitsumi (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mkecr5xx (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Modem (Extended base)                         Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Mouse Class Driver (Pointer Class)            Running   (System)
   System32\DRIVERS\mouclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Msfs (File system)                            Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Mup (Network)                                 Running   (Manual)
   D:\WINNT2\System32\drivers\mup.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
NetBEUI Protocol (PNP_TDI)                    Running   (Automatic)
   D:\WINNT2\System32\drivers\nbf.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncr53c9x (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ncr77c22 (Video)                              Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ncrc700 (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncrc710 (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Microsoft NDIS System Driver (NDIS)           Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
NetBIOS Interface (NetBIOSGroup)              Stopped   (Manual)
   D:\WINNT2\System32\drivers\netbios.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      TDI
WINS Client(TCP/IP) (PNP_TDI)                 Stopped   (Automatic)
   D:\WINNT2\System32\drivers\netbt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Tcpip
NetDetect                                     Stopped   (Manual)
   D:\WINNT2\system32\drivers\netdtect.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Npfs (File system)                            Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Ntfs (File system)                            Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Null (Base)                                   Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Oliscsi (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Parallel (Extended base)                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
Parport (Parallel arbitrator)                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ParVdm (Extended base)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
PCIDump (PCI Configuration)                   Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Pcmcia (System Bus Extender)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
PnP ISA Enabler Driver (Base)                 Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
psidisp (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ql10wnt (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
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qv (Video)                                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Rdr (Network)                                   Running   (Manual)
   D:\WINNT2\System32\drivers\rdr.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
s3 (Video)                                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Scsiprnt (Extended base)                        Stopped   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Scsiscan (SCSI Class)                           Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Serial (Extended base)                          Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sermouse (Pointer Port)                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sfloppy (Primary disk)                          Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Simbad (Filter)                                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
slcd32 (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Sparrow (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Spock (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Srv (Network)                                   Running   (Manual)
   D:\WINNT2\System32\drivers\srv.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
symc810 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T128 (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T13B (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
TCP/IP Service (PNP_TDI)                        Running   (Automatic)
   D:\WINNT2\System32\drivers\tcpip.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
tga (Video)                                     Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
tmv1 (SCSI miniport)                            Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra124 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra14f (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra24f (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
update (Base)                                   Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
v7vram (Video)                                  Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaSave (Video Save)                            Stopped   (System)
   D:\WINNT2\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaStart (Video Init)                           Stopped   (System)
   D:\WINNT2\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Wd33c93 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
wd90c24a (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
wdvga (Video)                                   Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
weitekp9 (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Xga (Video)                                     Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process



IRQ and Port Report
-------------------------------------------------------------------------
Devices                         Vector Level  Affinity
-------------------------------------------------------------------------
MPS 1.4 - APIC platform              8     8 0x00000003
MPS 1.4 - APIC platform              0     0 0x00000003
MPS 1.4 - APIC platform              1     1 0x00000003
MPS 1.4 - APIC platform              2     2 0x00000003
MPS 1.4 - APIC platform              3     3 0x00000003
MPS 1.4 - APIC platform              4     4 0x00000003
MPS 1.4 - APIC platform              5     5 0x00000003
```

MPS 1.4 - APIC platform	6	6	0x00000003
MPS 1.4 - APIC platform	7	7	0x00000003
MPS 1.4 - APIC platform	8	8	0x00000003
MPS 1.4 - APIC platform	9	9	0x00000003
MPS 1.4 - APIC platform	10	10	0x00000003
MPS 1.4 - APIC platform	11	11	0x00000003
MPS 1.4 - APIC platform	12	12	0x00000003
MPS 1.4 - APIC platform	13	13	0x00000003
MPS 1.4 - APIC platform	14	14	0x00000003
MPS 1.4 - APIC platform	15	15	0x00000003
MPS 1.4 - APIC platform	16	16	0x00000003
MPS 1.4 - APIC platform	17	17	0x00000003
MPS 1.4 - APIC platform	18	18	0x00000003
MPS 1.4 - APIC platform	19	19	0x00000003
MPS 1.4 - APIC platform	20	20	0x00000003
MPS 1.4 - APIC platform	21	21	0x00000003
MPS 1.4 - APIC platform	22	22	0x00000003
MPS 1.4 - APIC platform	23	23	0x00000003
MPS 1.4 - APIC platform	24	24	0x00000003
MPS 1.4 - APIC platform	25	25	0x00000003
MPS 1.4 - APIC platform	26	26	0x00000003
MPS 1.4 - APIC platform	27	27	0x00000003
MPS 1.4 - APIC platform	28	28	0x00000003
MPS 1.4 - APIC platform	29	29	0x00000003
MPS 1.4 - APIC platform	30	30	0x00000003
MPS 1.4 - APIC platform	31	31	0x00000003
MPS 1.4 - APIC platform	32	32	0x00000003
MPS 1.4 - APIC platform	33	33	0x00000003
MPS 1.4 - APIC platform	34	34	0x00000003
MPS 1.4 - APIC platform	35	35	0x00000003
MPS 1.4 - APIC platform	36	36	0x00000003
MPS 1.4 - APIC platform	37	37	0x00000003
MPS 1.4 - APIC platform	38	38	0x00000003
MPS 1.4 - APIC platform	39	39	0x00000003
MPS 1.4 - APIC platform	40	40	0x00000003
MPS 1.4 - APIC platform	41	41	0x00000003
MPS 1.4 - APIC platform	42	42	0x00000003
MPS 1.4 - APIC platform	43	43	0x00000003
MPS 1.4 - APIC platform	44	44	0x00000003
MPS 1.4 - APIC platform	45	45	0x00000003
MPS 1.4 - APIC platform	46	46	0x00000003
MPS 1.4 - APIC platform	47	47	0x00000003
MPS 1.4 - APIC platform	61	61	0x00000003
MPS 1.4 - APIC platform	65	65	0x00000003
MPS 1.4 - APIC platform	80	80	0x00000003
MPS 1.4 - APIC platform	193	193	0x00000003
MPS 1.4 - APIC platform	225	225	0x00000003
MPS 1.4 - APIC platform	253	253	0x00000003
MPS 1.4 - APIC platform	254	254	0x00000003
MPS 1.4 - APIC platform	255	255	0x00000003
i8042prt	1	1	0xffffffff
i8042prt	12	12	0xffffffff
Serial	4	4	0x00000000
Serial	3	3	0x00000000
E100B	12	12	0x00000000
Floppy	6	6	0x00000000
aic78u2	4	4	0x00000000
aic78u2	36	36	0x00000000
dac960nt	32	32	0x00000000
dac960nt	32	32	0x00000000
dac960nt	32	32	0x00000000
dac960nt	32	32	0x00000000

Devices	Physical Address	Length
MPS 1.4 - APIC platform	0x00000000	0x0000000010
MPS 1.4 - APIC platform	0x00000020	0x0000000002
MPS 1.4 - APIC platform	0x00000040	0x0000000004
MPS 1.4 - APIC platform	0x00000048	0x0000000004
MPS 1.4 - APIC platform	0x00000061	0x0000000001
MPS 1.4 - APIC platform	0x00000070	0x0000000002
MPS 1.4 - APIC platform	0x00000080	0x0000000010
MPS 1.4 - APIC platform	0x00000092	0x0000000001
MPS 1.4 - APIC platform	0x000000a0	0x0000000002
MPS 1.4 - APIC platform	0x000000c0	0x0000000010
MPS 1.4 - APIC platform	0x000000f0	0x0000000010
i8042prt	0x00000060	0x0000000001
i8042prt	0x00000064	0x0000000001
Serial	0x000003f8	0x0000000007
Serial	0x000002f8	0x0000000007
E100B	0x00001080	0x000000001e
Floppy	0x000003f0	0x0000000006
Floppy	0x000003f7	0x0000000001
aic78u2	0x00002000	0x0000000100
aic78u2	0x00002400	0x0000000100
dac960nt	0x00003000	0x0000000080
dac960nt	0x00004000	0x0000000080
dac960nt	0x00005000	0x0000000080
dac960nt	0x00006000	0x0000000080
cirrus	0x000003b0	0x000000000c
cirrus	0x000003c0	0x0000000020

DMA and Memory Report

Devices	Channel	Port
Floppy	2	0

Devices	Physical Address	Length
MPS 1.4 - APIC platform	0xfec00000	0x00000400
MPS 1.4 - APIC platform	0xfee00000	0x00000400
E100B	0xf4600000	0x0000001e
aic78u2	0xf4100000	0x00001000
aic78u2	0xf4101000	0x00001000
dac960nt	0xf4210000	0x00000080
dac960nt	0xf6000000	0x02000000
dac960nt	0xf4310000	0x00000080
dac960nt	0xf8000000	0x02000000
dac960nt	0xf4410000	0x00000080
dac960nt	0xfa000000	0x02000000
dac960nt	0xf4510000	0x00000080
dac960nt	0xfc000000	0x02000000
cirrus	0x000a0000	0x00020000
cirrus	0xf5000000	0x01000000

```
Environment Report
------------------------------------------------------------------------



System Environment Variables
   ComSpec=D:\WINNT2\system32\cmd.exe
   NUMBER_OF_PROCESSORS=2
   OS=Windows_NT
   Os2LibPath=D:\WINNT2\system32\os2\dll;
   Path=D:\WINNT2\system32;D:\WINNT2;D:\MSSQL7\BINN
   PROCESSOR_ARCHITECTURE=x86
   PROCESSOR_IDENTIFIER=x86 Family 6 Model 7 Stepping 3, GenuineIntel
   PROCESSOR_LEVEL=6
   PROCESSOR_REVISION=0703
   windir=D:\WINNT2



Environment Variables for Current User
   TEMP=D:\TEMP
   TMP=D:\TEMP



Network Report
------------------------------------------------------------------------
Your Access Level: Admin & Local
Workgroup or Domain: WORKGROUP
Network Version: 4.0
LanRoot: WORKGROUP
Logged On Users: 1
Current User (1): Administrator
  Logon Domain: ES2025
  Logon Server: ES2025

Transport: Nbf_E100B1, 00-C0-0D-00-A0-E1, VC's: 2, Wan: Wan

Character Wait: 3,600
Collection Time: 250
Maximum Collection Count: 16
Keep Connection: 600
Maximum Commands: 5
Session Time Out: 45
Character Buffer Size: 512
Maximum Threads: 17
Lock Quota: 6,144
Lock Increment: 10
Maximum Locks: 500
Pipe Increment: 10
Maximum Pipes: 500
Cache Time Out: 40
Dormant File Limit: 45
Read Ahead Throughput: 4,294,967,295
Mailslot Buffers: 3
Server Announce Buffers: 20
Illegal Datagrams: 5
Datagram Reset Frequency: 60
Log Election Packets: False
Use Opportunistic Locking: True
Use Unlock Behind: True
Use Close Behind: True
Buffer Pipes: True
Use Lock, Read, Unlock: True
Use NT Caching: True
Use Raw Read: True
Use Raw Write: True
Use Write Raw Data: True
Use Encryption: True
Buffer Deny Write Files: True
Buffer Read Only Files: True
Force Core Creation: True
512 Byte Max Transfer: False
Bytes Received: 5,524
SMB's Received: 21
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Bytes Transmitted: 2,378
SMB's Transmitted: 23
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Initally Failed Operations: 0
Failed Completion Operations: 0
Read Operations: 0
Random Read Operations: 0
Read SMB's: 0
Large Read SMB's: 0
Small Read SMB's: 0
Write Operations: 0
Random Write Operations: 0
Write SMB's: 0
Large Write SMB's: 0
Small Write SMB's: 0
Raw Reads Denied: 0
Raw Writes Denied: 0
Network Errors: 0
Sessions: 3
Failed Sessions: 0
Reconnects: 0
Core Connects: 0
LM 2.0 Connects: 0
LM 2.x Connects: 0
Windows NT Connects: 2
Server Disconnects: 0
Hung Sessions: 0
Use Count: 4
Failed Use Count: 0
Current Commands: 2
Server File Opens: 0
Server Device Opens: 0
Server Jobs Queued: 0
Server Session Opens: 0
```

```
Server Sessions Timed Out: 0
Server Sessions Errored Out: 0
Server Password Errors: 0
Server Permission Errors: 0
Server System Errors: 0
Server Bytes Sent: 0
Server Bytes Received: 0
Server Average Response Time: 0
Server Request Buffers Needed: 0
Server Big Buffers Needed: 0
```

NT Server Registry Information

Control\Session Manager\I/O System

```
Key Name:           SYSTEM\CurrentControlSet\Control\Session Manager\I/O
System
Class Name:         <NO CLASS>
Last Write Time:    8/27/99 - 9:38 AM
Value 0
  Name:             LargeIrpStackLocations
  Type:             REG_DWORD
  Data:             0x6
```

Hardware\DeviceMap|SCSI

```
Key Name:           HARDWARE\DEVICEMAP\Scsi
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM

Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 0
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             DMAEnabled
  Type:             REG_DWORD
  Data:             0x1

Value 1
  Name:             Driver
  Type:             REG_SZ
  Data:             aic78u2

Value 2
  Name:             Interrupt
  Type:             REG_DWORD
  Data:             0x4

Value 3
  Name:             IOAddress
  Type:             REG_DWORD
  Data:             0x2000

Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 0\Scsi Bus 0
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM

Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 0\Scsi Bus
0\Initiator Id 7
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM

Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 0\Scsi Bus 0\Target
Id 1
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM

Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 0\Scsi Bus 0\Target
Id 1\Logical Unit Id 0
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             Identifier
  Type:             REG_SZ
  Data:             UNISYS  006405ST19101W  8B01

Value 1
  Name:             Type
  Type:             REG_SZ
  Data:             DiskPeripheral


Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 1
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             DMAEnabled
  Type:             REG_DWORD
  Data:             0x1

Value 1
  Name:             Driver
  Type:             REG_SZ
  Data:             aic78u2

Value 2
  Name:             Interrupt
  Type:             REG_DWORD
  Data:             0x24

Value 3
  Name:             IOAddress
  Type:             REG_DWORD
  Data:             0x2400


Key Name:           HARDWARE\DEVICEMAP\Scsi\Scsi Port 1\Scsi Bus 0
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
```

```
Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 1\Scsi Bus
0\Initiator Id 7
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 1\Scsi Bus 0\Target
Id 6
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 1\Scsi Bus 0\Target
Id 6\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            TOSHIBA CD-ROM XM-6201TA1037

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            CdRomPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            DMAEnabled
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Driver
  Type:            REG_SZ
  Data:            dac960nt

Value 2
  Name:            Interrupt
  Type:            REG_DWORD
  Data:            0x20

Value 3
  Name:            IOAddress
  Type:            REG_DWORD
  Data:            0xf4210000


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus
0\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus
1\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus
2\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus
3\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 0\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 1\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507
```

```
Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 2\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 3
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 3\Target
Id 3\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 4
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus
4\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 4\Target
Id 6
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 2\Scsi Bus 4\Target
Id 6\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   GAM DEVICE

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            OtherPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            DMAEnabled
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Driver
  Type:            REG_SZ
  Data:            dac960nt

Value 2
  Name:            Interrupt
  Type:            REG_DWORD
  Data:            0x20

Value 3
  Name:            IOAddress
  Type:            REG_DWORD
  Data:            0xf4310000


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus
0\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus
1\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
```

```
Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus
2\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus
3\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3\Target
Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3\Target
Id 0\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3\Target
Id 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3\Target
Id 1\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral
```

```
Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3\Target
Id 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 3\Target
Id 2\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 4
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus
4\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 4\Target
Id 6
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 3\Scsi Bus 4\Target
Id 6\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   GAM DEVICE

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            OtherPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            DMAEnabled
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Driver
```

```
  Type:            REG_SZ
  Data:            dac960nt

Value 2
  Name:            Interrupt
  Type:            REG_DWORD
  Data:            0x20

Value 3
  Name:            IOAddress
  Type:            REG_DWORD
  Data:            0xf4410000


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus
0\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus
1\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus
2\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus
3\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3\Target
Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3\Target
Id 0\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3\Target
Id 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3\Target
Id 1\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3\Target
Id 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 3\Target
Id 2\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 4
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus
4\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
```

```
Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 4\Target
Id 6
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 4\Scsi Bus 4\Target
Id 6\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   GAM DEVICE

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            OtherPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            DMAEnabled
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Driver
  Type:            REG_SZ
  Data:            dac960nt

Value 2
  Name:            Interrupt
  Type:            REG_DWORD
  Data:            0x20

Value 3
  Name:            IOAddress
  Type:            REG_DWORD
  Data:            0xf4510000


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus
0\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus
1\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus
2\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus
3\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3\Target
Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3\Target
Id 0\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3\Target
Id 1
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3\Target
Id 1\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
```

```
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3\Target
Id 2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 3\Target
Id 2\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   DAC1164P        0507

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            DiskPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 4
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus
4\Initiator Id 254
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 4\Target
Id 6
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 5\Scsi Bus 4\Target
Id 6\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MYLEX   GAM DEVICE

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            OtherPeripheral


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 6
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            DMAEnabled
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            Driver
  Type:            REG_SZ
  Data:            dac960nt


Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 6\Scsi Bus 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 6\Scsi Bus
0\Initiator Id 255
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 6\Scsi Bus 0\Target
Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\DEVICEMAP\Scsi\Scsi Port 6\Scsi Bus 0\Target
Id 0\Logical Unit Id 0
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            Identifier
  Type:            REG_SZ
  Data:            MylexPHPPSEUDO          0100

Value 1
  Name:            Type
  Type:            REG_SZ
  Data:            OtherPeripheral
```

Hardware\ResourceMap\OtherDrivers\E100B

```
Key Name:          HARDWARE\RESOURCEMAP\OtherDrivers\E100B
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:59 AM
Value 0
  Name:            \Device\E100B1.Raw
  Type:            REG_RESOURCE_LIST
  Data:
                   Full Resource Descriptor 0
                     Interface Type:    PCI
                     Bus Number:        0
                     Version:           0
                     Revision:          0
                     Partial Descriptor 0
                       Resource:        Memory
                       Disposition:     Device Exclusive
                       Start:           0xf4600000
                       Length:          0x1e
                       Type:            Read / Write
```

```
    Partial Descriptor 1
      Resource:        Port
      Disposition:     Device Exclusive
      Start:           0x00001080
      Length:          0x1e
      Type:            Port

    Partial Descriptor 2
      Resource:        Interrupt
      Disposition:     Shared
      Vector:          12
      Level:           12
      Affinity:        0x00000000
      Type:            Level Sensitive



Value 1
  Name:            \Device\E100B1.Translated
  Type:            REG_RESOURCE_LIST
  Data:
                   Full Resource Descriptor 0
                     Interface Type:    PCI
                     Bus Number:        0
                     Version:           0
                     Revision:          0
                     Partial Descriptor 0
                       Resource:        Memory
                       Disposition:     Device Exclusive
                       Start:           0xf4600000
                       Length:          0x1e
                       Type:            Read / Write

                     Partial Descriptor 1
                       Resource:        Port
                       Disposition:     Device Exclusive
                       Start:           0x00001080
                       Length:          0x1e
                       Type:            Port

                     Partial Descriptor 2
                       Resource:        Interrupt
                       Disposition:     Shared
                       Vector:          162
                       Level:           9
                       Affinity:        0x00000003
                       Type:            Level Sensitive
```

Hardware\ResourceMap\ScsiAdapter

```
Key Name:          HARDWARE\RESOURCEMAP\ScsiAdapter
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Key Name:          HARDWARE\RESOURCEMAP\ScsiAdapter\aic78u2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
```

```
Value 0
  Name:            \Device\ScsiPort0.Raw
  Type:            REG_RESOURCE_LIST
  Data:
                   Full Resource Descriptor 0
                     Interface Type:    PCI
                     Bus Number:        2
                     Version:           0
                     Revision:          0
                     Partial Descriptor 0
                       Resource:        Interrupt
                       Disposition:     Shared
                       Vector:          4
                       Level:           4
                       Affinity:        0x00000000
                       Type:            Level Sensitive

                     Partial Descriptor 1
                       Resource:        Port
                       Disposition:     Device Exclusive
                       Start:           0x00002000
                       Length:          0x100
                       Type:            Port

                     Partial Descriptor 2
                       Resource:        Memory
                       Disposition:     Device Exclusive
                       Start:           0xf4100000
                       Length:          0x1000
                       Type:            Read / Write



Value 1
  Name:            \Device\ScsiPort0.Translated
  Type:            REG_RESOURCE_LIST
  Data:
                   Full Resource Descriptor 0
                     Interface Type:    PCI
                     Bus Number:        2
                     Version:           0
                     Revision:          0
                     Partial Descriptor 0
                       Resource:        Interrupt
                       Disposition:     Shared
                       Vector:          81
                       Level:           4
                       Affinity:        0x00000003
                       Type:            Level Sensitive

                     Partial Descriptor 1
                       Resource:        Port
                       Disposition:     Device Exclusive
                       Start:           0x00002000
                       Length:          0x100
                       Type:            Port

                     Partial Descriptor 2
                       Resource:        Memory
```

```
                    Disposition:     Device Exclusive
                    Start:           0xf4100000
                    Length:          0x1000
                    Type:            Read / Write


Value 2
  Name:             \Device\ScsiPort1.Raw
  Type:             REG_RESOURCE_LIST
  Data:
                  Full Resource Descriptor 0
                    Interface Type:    PCI
                    Bus Number:        2
                    Version:           0
                    Revision:          0
                    Partial Descriptor 0
                      Resource:        Interrupt
                      Disposition:     Shared
                      Vector:          36
                      Level:           36
                      Affinity:        0x00000000
                      Type:            Level Sensitive

                    Partial Descriptor 1
                      Resource:        Port
                      Disposition:     Device Exclusive
                      Start:           0x00002400
                      Length:          0x100
                      Type:            Port

                    Partial Descriptor 2
                      Resource:        Memory
                      Disposition:     Device Exclusive
                      Start:           0xf4101000
                      Length:          0x1000
                      Type:            Read / Write


Value 3
  Name:             \Device\ScsiPort1.Translated
  Type:             REG_RESOURCE_LIST
  Data:
                  Full Resource Descriptor 0
                    Interface Type:    PCI
                    Bus Number:        2
                    Version:           0
                    Revision:          0
                    Partial Descriptor 0
                      Resource:        Interrupt
                      Disposition:     Shared
                      Vector:          81
                      Level:           4
                      Affinity:        0x00000003
                      Type:            Level Sensitive

                    Partial Descriptor 1
                      Resource:        Port
                      Disposition:     Device Exclusive
                      Start:           0x00002400
                      Length:          0x100
                      Type:            Port

                    Partial Descriptor 2
                      Resource:        Memory
                      Disposition:     Device Exclusive
                      Start:           0xf4101000
                      Length:          0x1000
                      Type:            Read / Write


Key Name:           HARDWARE\RESOURCEMAP\ScsiAdapter\dac960nt
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             \Device\ScsiPort2.Raw
  Type:             REG_RESOURCE_LIST
  Data:
                  Full Resource Descriptor 0
                    Interface Type:    PCI
                    Bus Number:        3
                    Version:           0
                    Revision:          0
                    Partial Descriptor 0
                      Resource:        Interrupt
                      Disposition:     Shared
                      Vector:          32
                      Level:           32
                      Affinity:        0x00000000
                      Type:            Level Sensitive

                    Partial Descriptor 1
                      Resource:        Memory
                      Disposition:     Device Exclusive
                      Start:           0xf4210000
                      Length:          0x80
                      Type:            Read / Write

                    Partial Descriptor 2
                      Resource:        Port
                      Disposition:     Device Exclusive
                      Start:           0x00003000
                      Length:          0x80
                      Type:            Port

                    Partial Descriptor 3
                      Resource:        Memory
                      Disposition:     Device Exclusive
                      Start:           0xf6000000
                      Length:          0x2000000
                      Type:            Write Only


Value 1
```

```
  Name:             \Device\ScsiPort2.Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        3
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          178
                        Level:           10
                        Affinity:        0x00000003
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4210000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00003000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf6000000
                        Length:          0x2000000
                        Type:            Read / Write



Value 2
  Name:             \Device\ScsiPort3.Raw
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        4
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          32
                        Level:           32
                        Affinity:        0x00000000
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4310000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00004000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf8000000
                        Length:          0x2000000
                        Type:            Write Only



Value 3
  Name:             \Device\ScsiPort3.Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        4
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          178
                        Level:           10
                        Affinity:        0x00000003
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4310000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00004000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf8000000
                        Length:          0x2000000
                        Type:            Read / Write
```

```
Value 4
  Name:             \Device\ScsiPort4.Raw
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        5
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          32
                        Level:           32
                        Affinity:        0x00000000
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4410000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00005000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xfa000000
                        Length:          0x2000000
                        Type:            Write Only



Value 5
  Name:             \Device\ScsiPort4.Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        5
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          81
                        Level:           4
                        Affinity:        0x00000003
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4410000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00005000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xfa000000
                        Length:          0x2000000
                        Type:            Read / Write



Value 6
  Name:             \Device\ScsiPort5.Raw
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        6
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          32
                        Level:           32
                        Affinity:        0x00000000
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4510000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00006000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xfc000000
                        Length:          0x2000000
                        Type:            Write Only
```

```
Value 7
  Name:             \Device\ScsiPort5.Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        6
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Interrupt
                        Disposition:     Shared
                        Vector:          162
                        Level:           9
                        Affinity:        0x00000003
                        Type:            Level Sensitive

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xf4510000
                        Length:          0x80
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Port
                        Disposition:     Device Exclusive
                        Start:           0x00006000
                        Length:          0x80
                        Type:            Port

                      Partial Descriptor 3
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0xfc000000
                        Length:          0x2000000
                        Type:            Read / Write



Value 8
  Name:             \Device\ScsiPort6.Raw
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        0
                      Version:           0
                      Revision:          0


Value 9
  Name:             \Device\ScsiPort6.Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    PCI
                      Bus Number:        0
                      Version:           0
                      Revision:          0
```

Hardware\ResourceMap\System Resources

```
Key Name:           HARDWARE\RESOURCEMAP\System Resources
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM

Key Name:           HARDWARE\RESOURCEMAP\System Resources\Physical Memory
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             .Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    Internal
                      Bus Number:        0
                      Version:           0
                      Revision:          0
                      Partial Descriptor 0
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0x00001000
                        Length:          0x9e000
                        Type:            Read / Write

                      Partial Descriptor 1
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0x00100000
                        Length:          0xeff000
                        Type:            Read / Write

                      Partial Descriptor 2
                        Resource:        Memory
                        Disposition:     Device Exclusive
                        Start:           0x01000000
                        Length:          0x3eff0000
                        Type:            Read / Write



Key Name:           HARDWARE\RESOURCEMAP\System Resources\Reserved
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             .Translated
  Type:             REG_RESOURCE_LIST
  Data:
                    Full Resource Descriptor 0
                      Interface Type:    Internal
                      Bus Number:        0
```

```
Version:           0
Revision:          0
Partial Descriptor 0
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0x0009f000
  Length:          0x1000
  Type:            Read / Write

Partial Descriptor 1
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0x000ed000
  Length:          0x13000
  Type:            Read / Write

Partial Descriptor 2
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0x00fff000
  Length:          0x1000
  Type:            Read / Write

Partial Descriptor 3
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0x3fff0000
  Length:          0x11000
  Type:            Read / Write

Partial Descriptor 4
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0xfec00000
  Length:          0x10000
  Type:            Read / Write

Partial Descriptor 5
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0xfee00000
  Length:          0x1000
  Type:            Read / Write

Partial Descriptor 6
  Resource:        Memory
  Disposition:     Device Exclusive
  Start:           0xfff80000
  Length:          0x80000
  Type:            Read / Write
```

Services\aic78u2

```
Key Name:          SYSTEM\CurrentControlSet\Services\aic78u2
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM

Value 0
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Group
  Type:            REG_SZ
  Data:            SCSI miniport

Value 2
  Name:            ImagePath
  Type:            REG_SZ
  Data:            system32\drivers\aic78u2.sys

Value 3
  Name:            PlugPlayServiceType
  Type:            REG_DWORD
  Data:            0x1

Value 4
  Name:            RequestedSystemResources
  Type:            REG_RESOURCE_REQUIREMENTS_LIST
  Data:
                   Interface Type:      Internal
                   Bus Number:          0
                   Slot Number:         0
                   List 0
                     Descriptor 0
                       Resource:        Interrupt
                       Option:          0x00000000
                       Disposition:     Shared
                       Type:            Level Sensitive
                       Minimum Vector:  0x24
                       Maximum Vector:  0x24

                     Descriptor 1
                       Resource:        Port
                       Option:          0x00000001
                       Disposition:     Device Exclusive
                       Type:            Port
                       Length:          0x100
                       Alignment:       0x100
                       Minimum Address: 0x00002400
                       Maximum Address: 0x000024ff

                     Descriptor 2
                       Resource:        Port
                       Option:          0x00000008
                       Disposition:     Device Exclusive
                       Type:            Port
                       Length:          0x100
                       Alignment:       0x100
                       Minimum Address: 0x00002400
                       Maximum Address: 0x000024ff

                     Descriptor 3
                       Resource:        Memory
                       Option:          0x00000001
```

```
    Disposition:     Device Exclusive
    Type:            Read / Write
    Length:          0x1000
    Alignment:       0x1000
    Minimum Address: 0xf4101000
    Maximum Address: 0xf4101fff

  Descriptor 4
    Resource:        Memory
    Option:          0x00000008
    Disposition:     Device Exclusive
    Type:            Read / Write
    Length:          0x1000
    Alignment:       0x1000
    Minimum Address: 0xf4101000
    Maximum Address: 0xf4101fff
```

```
Value 5
  Name:            Start
  Type:            REG_DWORD
  Data:            0

Value 6
  Name:            tag
  Type:            REG_DWORD
  Data:            0x20

Value 7
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\aic78u2\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Root\LEGACY_AIC78U2\0000

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1
```

Services\dac960nt

```
Key Name:          SYSTEM\CurrentControlSet\Services\dac960nt
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Group
  Type:            REG_SZ
  Data:            SCSI miniport

Value 2
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            System32\drivers\dac960nt.sys

Value 3
  Name:            PlugPlayServiceType
  Type:            REG_DWORD
  Data:            0x1

Value 4
  Name:            RequestedSystemResources
  Type:            REG_RESOURCE_REQUIREMENTS_LIST
  Data:
                   Interface Type:      Internal
                   Bus Number:          0
                   Slot Number:         0
                   List 0
                     Descriptor 0
                       Resource:        Interrupt
                       Option:          0x00000000
                       Disposition:     Shared
                       Type:            Level Sensitive
                       Minimum Vector:  0x20
                       Maximum Vector:  0x20

                     Descriptor 1
                       Resource:        Memory
                       Option:          0x00000001
                       Disposition:     Device Exclusive
                       Type:            Read / Write
                       Length:          0x80
                       Alignment:       0x80
                       Minimum Address: 0xf4510000
                       Maximum Address: 0xf451007f

                     Descriptor 2
                       Resource:        Memory
                       Option:          0x00000008
                       Disposition:     Device Exclusive
                       Type:            Read / Write
                       Length:          0x80
                       Alignment:       0x80
```

```
    Minimum Address: 0xf4510000
    Maximum Address: 0xf451007f

  Descriptor 3
    Resource:        Port
    Option:          0x00000001
    Disposition:     Device Exclusive
    Type:            Port
    Length:          0x80
    Alignment:       0x80
    Minimum Address: 0x00006000
    Maximum Address: 0x0000607f

  Descriptor 4
    Resource:        Port
    Option:          0x00000008
    Disposition:     Device Exclusive
    Type:            Port
    Length:          0x80
    Alignment:       0x80
    Minimum Address: 0x00006000
    Maximum Address: 0x0000607f

  Descriptor 5
    Resource:        Memory
    Option:          0x00000001
    Disposition:     Device Exclusive
    Type:            Write Only
    Length:          0x2000000
    Alignment:       0x2000000
    Minimum Address: 0xfc000000
    Maximum Address: 0xfdffffff

  Descriptor 6
    Resource:        Memory
    Option:          0x00000009
    Disposition:     Device Exclusive
    Type:            Write Only
    Length:          0x2000000
    Alignment:       0x2000000
    Minimum Address: 0xfc000000
    Maximum Address: 0xfdffffff

  Descriptor 7
    Resource:        Memory
    Option:          0x00000008
    Disposition:     Device Exclusive
    Type:            Write Only
    Length:          0x2000000
    Alignment:       0x2000000
    Minimum Address: 0xf4510000
    Maximum Address: 0xf451007f

Value 5
  Name:            Start
  Type:            REG_DWORD
  Data:            0

Value 6
  Name:            Tag
  Type:            REG_DWORD
  Data:            0x63

Value 7
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\dac960nt\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Root\SCSIADAPTER\OEM0.INF&DAC960NT

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1
```

Services\E100B

```
Key Name:          SYSTEM\CurrentControlSet\Services\E100B
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:59 AM
Value 0
  Name:            DisplayName
  Type:            REG_SZ
  Data:            Intel(R) PRO NDIS Driver

Value 1
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            Group
  Type:            REG_SZ
  Data:            NDIS

Value 3
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            \SystemRoot\System32\drivers\E100BNT.SYS

Value 4
```

```
Name:               RequestedSystemResources
Type:               REG_RESOURCE_REQUIREMENTS_LIST
Data:
                    Interface Type:      Internal
                    Bus Number:          0
                    Slot Number:         0
                    List 0
                      Descriptor 0
                        Resource:        Interrupt
                        Option:          0x00000000
                        Disposition:     Shared
                        Type:            Level Sensitive
                        Minimum Vector:  0xc
                        Maximum Vector:  0xc

                      Descriptor 1
                        Resource:        Memory
                        Option:          0x00000001
                        Disposition:     Device Exclusive
                        Type:            Write Only
                        Length:          0x1000
                        Alignment:       0x1000
                        Minimum Address: 0xf4600000
                        Maximum Address: 0xf4600fff

                      Descriptor 2
                        Resource:        Memory
                        Option:          0x00000009
                        Disposition:     Device Exclusive
                        Type:            Write Only
                        Length:          0x1000
                        Alignment:       0x1000
                        Minimum Address: 0xf4600000
                        Maximum Address: 0xf4600fff

                      Descriptor 3
                        Resource:        Memory
                        Option:          0x00000008
                        Disposition:     Device Exclusive
                        Type:            Write Only
                        Length:          0x1000
                        Alignment:       0x1000
                        Minimum Address: 0xf4000000
                        Maximum Address: 0xf40fffff

                      Descriptor 4
                        Resource:        Port
                        Option:          0x00000001
                        Disposition:     Device Exclusive
                        Type:            Port
                        Length:          0x20
                        Alignment:       0x20
                        Minimum Address: 0x00001080
                        Maximum Address: 0x0000109f

                      Descriptor 5
                        Resource:        Port
                        Option:          0x00000008
                        Disposition:     Device Exclusive
                        Type:            Port
                        Length:          0x20
                        Alignment:       0x20
                        Minimum Address: 0x00001080
                        Maximum Address: 0x0000109f

                      Descriptor 6
                        Resource:        Memory
                        Option:          0x00000001
                        Disposition:     Device Exclusive
                        Type:            Read / Write
                        Length:          0x100000
                        Alignment:       0x100000
                        Minimum Address: 0xf4000000
                        Maximum Address: 0xf40fffff

                      Descriptor 7
                        Resource:        Memory
                        Option:          0x00000008
                        Disposition:     Device Exclusive
                        Type:            Read / Write
                        Length:          0x100000
                        Alignment:       0x100000
                        Minimum Address: 0xf4000000
                        Maximum Address: 0xf40fffff

Value 5
  Name:             Start
  Type:             REG_DWORD
  Data:             0x2

Value 6
  Name:             Type
  Type:             REG_DWORD
  Data:             0x1


Key Name:           SYSTEM\CurrentControlSet\Services\E100B\Enum
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             0
  Type:             REG_SZ
  Data:             Root\LEGACY_E100B\0000

Value 1
  Name:             Count
  Type:             REG_DWORD
  Data:             0x1

Value 2
  Name:             NextInstance
  Type:             REG_DWORD
  Data:             0x1


Key Name:           SYSTEM\CurrentControlSet\Services\E100B\Linkage
```

```
Class Name:         <NO CLASS>
Last Write Time:    8/23/99 - 11:10 AM
Value 0
  Name:             Bind
  Type:             REG_MULTI_SZ
  Data:             \Device\E100B1


Value 1
  Name:             Export
  Type:             REG_MULTI_SZ
  Data:             \Device\E100B1


Value 2
  Name:             Route
  Type:             REG_MULTI_SZ
  Data:             "E100B1"



Key Name:
SYSTEM\CurrentControlSet\Services\E100B\Linkage\Disabled
Class Name:         <NO CLASS>
Last Write Time:    8/23/99 - 11:10 AM
Value 0
  Name:             Bind
  Type:             REG_MULTI_SZ
  Data:

Value 1
  Name:             Export
  Type:             REG_MULTI_SZ
  Data:

Value 2
  Name:             Route
  Type:             REG_MULTI_SZ
  Data:


Key Name:           SYSTEM\CurrentControlSet\Services\E100B\Parameters
Class Name:         <NO CLASS>
Last Write Time:    8/23/99 - 11:07 AM

Key Name:           SYSTEM\CurrentControlSet\Services\E100B\Security
Class Name:         <NO CLASS>
Last Write Time:    8/23/99 - 11:07 AM
Value 0
  Name:             Security
  Type:             REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00 00 00
................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80 18 00  4.....
........
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00 18 00
................
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000050   00 00 00 01 00 00 1c 00 - fd 01 02 00 01 02 00 00
................
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 00 00 00 00  ....
...#....
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
................
00000080   20 00 00 00 20 02 00 00 - 00 00 00 00 00 00 1c 00   ...
............
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00 00 00  ............
...
000000a0   25 02 00 00 00 00 00 00 - 00 00 18 00 fd 01 02 00
%...............
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02 00 00
............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000d0   00 00 00 05 12 00 00 00 -                          ........
```

Services\E100B1

```
Key Name:           SYSTEM\CurrentControlSet\Services\E100B1
Class Name:         <NO CLASS>
Last Write Time:    8/23/99 - 11:07 AM
Value 0
  Name:             ErrorControl
  Type:             REG_DWORD
  Data:             0x1

Value 1
  Name:             Start
  Type:             REG_DWORD
  Data:             0x3

Value 2
  Name:             type
  Type:             REG_DWORD
  Data:             0x4


Key Name:           SYSTEM\CurrentControlSet\Services\E100B1\Linkage
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:59 AM
Value 0
  Name:             Bind
  Type:             REG_MULTI_SZ
  Data:             \Device\E100B1


Value 1
  Name:             Export
  Type:             REG_MULTI_SZ
  Data:             \Device\E100B1
```

```
Value 2
  Name:            Route
  Type:            REG_MULTI_SZ
  Data:            "E100B1"



Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\Linkage\Disabled
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM

Key Name:          SYSTEM\CurrentControlSet\Services\E100B1\Parameters
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 6:16 PM
Value 0
  Name:            Adaptive_IFS
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            BoardHasBridge
  Type:            REG_DWORD
  Data:            0

Value 2
  Name:            BusNumber
  Type:            REG_DWORD
  Data:            0

Value 3
  Name:            BusType
  Type:            REG_DWORD
  Data:            0x5

Value 4
  Name:            BusTypeLocal
  Type:            REG_DWORD
  Data:            0x5

Value 5
  Name:            Coalesce
  Type:            REG_DWORD
  Data:            0

Value 6
  Name:            CPUSaver
  Type:            REG_DWORD
  Data:            0x600

Value 7
  Name:            ForceDpx
  Type:            REG_DWORD
  Data:            0

Value 8
  Name:            Location
  Type:            REG_SZ
  Data:            1800

Value 9
  Name:            MediaType
  Type:            REG_DWORD
  Data:            0x1

Value 10
  Name:            MWIEnable
  Type:            REG_DWORD
  Data:            0

Value 11
  Name:            NetworkAddress
  Type:            REG_SZ
  Data:

Value 12
  Name:            NumCoalesce
  Type:            REG_DWORD
  Data:            0x20

Value 13
  Name:            NumRfd
  Type:            REG_DWORD
  Data:            0x60

Value 14
  Name:            NumTbdPerTcb
  Type:            REG_DWORD
  Data:            0xc

Value 15
  Name:            NumTcb
  Type:            REG_DWORD
  Data:            0x40

Value 16
  Name:            PacketTagging
  Type:            REG_DWORD
  Data:            0

Value 17
  Name:            PcNic
  Type:            REG_DWORD
  Data:            0x1

Value 18
  Name:            RxDmaCount
  Type:            REG_DWORD
  Data:            0
```

```
Value 19
  Name:            RxFifo
  Type:            REG_DWORD
  Data:            0x8

Value 20
  Name:            SlotNumber
  Type:            REG_DWORD
  Data:            0x3

Value 21
  Name:            Speed
  Type:            REG_DWORD
  Data:            0

Value 22
  Name:            Threshold
  Type:            REG_DWORD
  Data:            0x10

Value 23
  Name:            TxDmaCount
  Type:            REG_DWORD
  Data:            0

Value 24
  Name:            TxFifo
  Type:            REG_DWORD
  Data:            0x8

Value 25
  Name:            Txmitwait
  Type:            REG_DWORD
  Data:            0x1

Value 26
  Name:            UcodeSW
  Type:            REG_DWORD
  Data:            0x1

Value 27
  Name:            UnderrunRetry
  Type:            REG_DWORD
  Data:            0x1

Value 28
  Name:            UseIo
  Type:            REG_DWORD
  Data:            0x2

Value 29
  Name:            UseManualPCIAssign
  Type:            REG_DWORD
  Data:            0

Value 30
  Name:            VLanMode
  Type:            REG_DWORD
  Data:            0
```

```
Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\Parameters\Tcpip
Class Name:        GenericClass
Last Write Time:   8/30/99 - 11:59 AM
Value 0
  Name:            DefaultGateway
  Type:            REG_MULTI_SZ
  Data:


Value 1
  Name:            EnableDHCP
  Type:            REG_DWORD
  Data:            0

Value 2
  Name:            IPAddress
  Type:            REG_MULTI_SZ
  Data:            192.168.91.212


Value 3
  Name:            IPInterfaceContext
  Type:            REG_DWORD
  Data:            0x1

Value 4
  Name:            IPInterfaceContextMax
  Type:            REG_DWORD
  Data:            0x1

Value 5
  Name:            LLInterface
  Type:            REG_SZ
  Data:

Value 6
  Name:            PPTPFiltering
  Type:            REG_DWORD
  Data:            0

Value 7
  Name:            RawIPAllowedProtocols
  Type:            REG_MULTI_SZ
  Data:            0


Value 8
  Name:            SubnetMask
  Type:            REG_MULTI_SZ
  Data:            255.255.0.0


Value 9
  Name:            TCPAllowedPorts
  Type:            REG_MULTI_SZ
  Data:            0
```

```
Value 10
  Name:            UDPAllowedPorts
  Type:            REG_MULTI_SZ
  Data:            0


Value 11
  Name:            UseZeroBroadcast
  Type:            REG_DWORD
  Data:            0


Key Name:          SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM

Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM

Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\Adaptive_IFS
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            1

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            255

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            0

Value 4
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 5
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Inter-Frame Spacing

Value 6
  Name:            Scale
  Type:            REG_SZ
  Data:            1

Value 7
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 8
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\Coalesce
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            PCI Bus Efficiency

Value 3
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\Coalesce\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\CPUSaver
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
```

```
  Name:            Default
  Type:            REG_SZ
  Data:            1536

Value 1
  Name:            LeftLabel
  Type:            REG_SZ
  Data:            Adapter Bandwidth

Value 2
  Name:            MiniHelp
  Type:            REG_SZ
  Data:            Sets optimal point of CPU/Adapter performance for this
system.  See help.

Value 3
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Performance Tuning

Value 4
  Name:            RightLabel
  Type:            REG_SZ
  Data:            CPU Utilization

Value 5
  Name:            Type
  Type:            REG_SZ
  Data:            slider


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\CPUSaver\Values
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            256

Value 2
  Name:            10
  Type:            REG_SZ
  Data:            2560

Value 3
  Name:            11
  Type:            REG_SZ
  Data:            2816

Value 4
  Name:            12
  Type:            REG_SZ
  Data:            3072

Value 5
  Name:            13
  Type:            REG_SZ
  Data:            3328

Value 6
  Name:            14
  Type:            REG_SZ
  Data:            3584

Value 7
  Name:            15
  Type:            REG_SZ
  Data:            3840

Value 8
  Name:            16
  Type:            REG_SZ
  Data:            4096

Value 9
  Name:            2
  Type:            REG_SZ
  Data:            512

Value 10
  Name:            3
  Type:            REG_SZ
  Data:            768

Value 11
  Name:            4
  Type:            REG_SZ
  Data:            1024

Value 12
  Name:            5
  Type:            REG_SZ
  Data:            1280

Value 13
  Name:            6
  Type:            REG_SZ
  Data:            1536

Value 14
  Name:            7
  Type:            REG_SZ
  Data:            1792

Value 15
  Name:            8
  Type:            REG_SZ
  Data:            2048

Value 16
  Name:            9
  Type:            REG_SZ
```

```
  Data:            2304


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\ForceDpx
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Duplex

Value 3
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\ForceDpx\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Auto Detect

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Half-Duplex

Value 2
  Name:            2
  Type:            REG_SZ
  Data:            Full-Duplex


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\NetworkAddress
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:

Value 1
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Locally Administered Address

Value 3
  Name:            Type
  Type:            REG_SZ
  Data:            edit


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\NumCoalesce
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            8

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            32

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 5
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Coalesce Buffers

Value 6
  Name:            Scale
  Type:            REG_SZ
  Data:            1

Value 7
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 8
```

```
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\NumRfd
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            48

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            1024

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 5
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Receive Buffers

Value 6
  Name:            Scale
  Type:            REG_SZ
  Data:            1

Value 7
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 8
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\NumTcb
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            32

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            80

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            1

Value 4
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 5
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Transmit Control Blocks

Value 6
  Name:            Scale
  Type:            REG_SZ
  Data:            1

Value 7
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 8
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\PacketTagging
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            MiniHelp
  Type:            REG_SZ
  Data:
```

```
Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            802.1p/802.1q Tagging

Value 3
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\PacketTagging\En
um
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Disabled

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            Enabled


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\Speed
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            0

Value 1
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Speed

Value 3
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\Speed\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Auto Detect

Value 1
  Name:            10
  Type:            REG_SZ
  Data:            10 Mbps

Value 2
  Name:            100
  Type:            REG_SZ
  Data:            100 Mbps


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\Threshold
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Base
  Type:            REG_SZ
  Data:            10

Value 1
  Name:            Default
  Type:            REG_SZ
  Data:            16

Value 2
  Name:            Max
  Type:            REG_SZ
  Data:            200

Value 3
  Name:            Min
  Type:            REG_SZ
  Data:            0

Value 4
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 5
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Transmit Threshold

Value 6
  Name:            Scale
  Type:            REG_SZ
  Data:            1

Value 7
  Name:            Step
  Type:            REG_SZ
  Data:            1

Value 8
```

```
  Name:            Type
  Type:            REG_SZ
  Data:            int


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\UcodeSW
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Default
  Type:            REG_SZ
  Data:            1

Value 1
  Name:            MiniHelp
  Type:            REG_SZ
  Data:

Value 2
  Name:            ParamDesc
  Type:            REG_SZ
  Data:            Adaptive Technology

Value 3
  Name:            Type
  Type:            REG_SZ
  Data:            enum


Key Name:
SYSTEM\CurrentControlSet\Services\E100B1\ProsetNdi\Params\UcodeSW\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Off

Value 1
  Name:            1
  Type:            REG_SZ
  Data:            On
```

Services\macdisk

```
Key Name:          SYSTEM\CurrentControlSet\Services\macdisk
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 10:37 AM
Value 0
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Group
  Type:            REG_SZ
  Data:            Filter

Value 2
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            System32\drivers\macdisk.sys

Value 3
  Name:            PlugPlayServiceType
  Type:            REG_DWORD
  Data:            0x1

Value 4
  Name:            Start
  Type:            REG_DWORD
  Data:            0

Value 5
  Name:            Tag
  Type:            REG_DWORD
  Data:            0x1

Value 6
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\macdisk\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Root\SCSIADAPTER\OEM1.INF&MACDISK

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\macdisk\Security
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 10:37 AM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00 00 00
................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80 18 00  4.....
........
```

```
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00 18 00
................
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000050   63 00 37 00 00 00 1c 00 - fd 01 02 00 01 02 00 00
c.7.............
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 38 00 75 00  ....
...#...8.u.
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
................
00000080   20 00 00 00 20 02 00 00 - 38 00 75 00 00 00 1c 00   ...
...8.u.....
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00 00 00  ............
...
000000a0   25 02 00 00 38 00 75 00 - 00 00 18 00 fd 01 02 00
%...8.u.........
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02 00 00
............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000d0   00 00 00 05 12 00 00 00 -                          ........
```

Services\MSDTC

```
Key Name:          SYSTEM\CurrentControlSet\Services\MSDTC
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 10:05 AM
Value 0
  Name:            DependOnGroup
  Type:            REG_MULTI_SZ
  Data:

Value 1
  Name:            DependOnService
  Type:            REG_MULTI_SZ
  Data:            RPCSS
                   NTLMSSP


Value 2
  Name:            DisplayName
  Type:            REG_SZ
  Data:            MSDTC

Value 3
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 4
  Name:            Group
  Type:            REG_SZ
  Data:            MS Transactions

Value 5
  Name:            ImagePath
  Type:            REG_EXPAND_SZ
  Data:            D:\WINNT2\System32\msdtc.exe

Value 6
  Name:            ObjectName
  Type:            REG_SZ
  Data:            LocalSystem

Value 7
  Name:            Start
  Type:            REG_DWORD
  Data:            0x3

Value 8
  Name:            Tag
  Type:            REG_DWORD
  Data:            0x1

Value 9
  Name:            Type
  Type:            REG_DWORD
  Data:            0x10


Key Name:          SYSTEM\CurrentControlSet\Services\MSDTC\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Root\LEGACY_MSDTC\0000

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\MSDTC\Security
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 9:12 AM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00 00 00
................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80 18 00  4.....
.........
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
```

```
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00 18 00
................
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000050   00 00 00 00 00 00 1c 00 - fd 01 02 00 01 02 00 00
................
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 00 00 00 00  ....
...#........
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
................
00000080   20 00 00 00 20 02 00 00 - 00 00 00 00 00 00 1c 00   ...
............
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00 00 00  ............
...
000000a0   25 02 00 00 00 00 00 00 - 00 00 18 00 fd 01 02 00
%................
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02 00 00
............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000d0   00 00 00 05 12 00 00 00 -                          ........
```

Services\MSSQLServer

```
Key Name:           SYSTEM\CurrentControlSet\Services\MSSQLServer
Class Name:         <NO CLASS>
Last Write Time:    8/27/99 - 9:47 AM
Value 0
  Name:             DisplayName
  Type:             REG_SZ
  Data:             MSSQLServer

Value 1
  Name:             ErrorControl
  Type:             REG_DWORD
  Data:             0x1

Value 2
  Name:             ImagePath
  Type:             REG_EXPAND_SZ
  Data:             D:\MSSQL7\binn\sqlservr.exe

Value 3
  Name:             ObjectName
  Type:             REG_SZ
  Data:             LocalSystem

Value 4
  Name:             Start
  Type:             REG_DWORD
  Data:             0x3

Value 5
  Name:             Type
  Type:             REG_DWORD
  Data:             0x10
```

```
Key Name:           SYSTEM\CurrentControlSet\Services\MSSQLServer\Enum
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             0
  Type:             REG_SZ
  Data:             Root\LEGACY_MSSQLSERVER\0000

Value 1
  Name:             Count
  Type:             REG_DWORD
  Data:             0x1

Value 2
  Name:             NextInstance
  Type:             REG_DWORD
  Data:             0x1


Key Name:
SYSTEM\CurrentControlSet\Services\MSSQLServer\Performance
Class Name:         <NO CLASS>
Last Write Time:    8/27/99 - 9:47 AM
Value 0
  Name:             Close
  Type:             REG_SZ
  Data:             CloseSQLPerformanceData

Value 1
  Name:             Collect
  Type:             REG_SZ
  Data:             CollectSQLPerformanceData

Value 2
  Name:             First Counter
  Type:             REG_DWORD
  Data:             0x738

Value 3
  Name:             First Help
  Type:             REG_DWORD
  Data:             0x739

Value 4
  Name:             Last Counter
  Type:             REG_DWORD
  Data:             0x83a

Value 5
  Name:             Last Help
  Type:             REG_DWORD
  Data:             0x83b

Value 6
  Name:             Library
  Type:             REG_SZ
  Data:             SQLCTR70.DLL
```

```
Value 7
  Name:            Open
  Type:            REG_SZ
  Data:            OpenSQLPerformanceData


Key Name:          SYSTEM\CurrentControlSet\Services\MSSQLServer\Security
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:45 AM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00 00 00
................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80 18 00  4.....
........
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00 18 00
............
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000050   74 00 73 00 00 00 1c 00 - fd 01 02 00 01 02 00 00
t.s............
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 76 00 63 00  ....
...#...v.c.
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
................
00000080   20 00 00 00 20 02 00 00 - 76 00 63 00 00 00 1c 00   ...
...v.c.....
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00 00 00  ............
...
000000a0   25 02 00 00 76 00 63 00 - 00 00 18 00 fd 01 02 00
%...v.c.........
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02 00 00
............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000d0   00 00 00 05 12 00 00 00 -                         ........
```

Services\NDIS

```
Key Name:          SYSTEM\CurrentControlSet\Services\NDIS
Class Name:        <NO CLASS>
Last Write Time:   10/10/96 - 1:09 AM
Value 0
  Name:            DisplayName
  Type:            REG_SZ
  Data:            Microsoft NDIS System Driver

Value 1
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            Group
  Type:            REG_SZ
  Data:            NDIS

Value 3
  Name:            Start
  Type:            REG_DWORD
  Data:            0x1

Value 4
  Name:            Type
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\NDIS\Enum
Class Name:        <NO CLASS>
Last Write Time:   8/30/99 - 11:58 AM
Value 0
  Name:            0
  Type:            REG_SZ
  Data:            Root\LEGACY_NDIS\0000

Value 1
  Name:            Count
  Type:            REG_DWORD
  Data:            0x1

Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\NDIS\MediaTypes
Class Name:        <NO CLASS>
Last Write Time:   10/10/96 - 1:09 AM

Key Name:          SYSTEM\CurrentControlSet\Services\NDIS\Parameters
Class Name:        <NO CLASS>
Last Write Time:   10/10/96 - 1:09 AM
Value 0
  Name:            ProcessorAffinityMask
  Type:            REG_DWORD
  Data:            0xffffffff
```

Services\PROSet

```
Key Name:          SYSTEM\CurrentControlSet\Services\PROSet
Class Name:        GenericClass
Last Write Time:   6/10/98 - 4:01 AM

Key Name:          SYSTEM\CurrentControlSet\Services\PROSet\Adapters
Class Name:        GenericClass
```

```
Last Write Time:   2/1/99 - 10:09 AM
Value 0
  Name:            EPRO100
  Type:            REG_SZ
  Data:            Intel EtherExpress PRO Adapter


Key Name:          SYSTEM\CurrentControlSet\Services\PROSet\EPRO100
Class Name:        GenericClass
Last Write Time:   2/1/99 - 10:09 AM
Value 0
  Name:            AdapterDescription
  Type:            REG_SZ
  Data:            EPRO100_GetAdapterDescription

Value 1
  Name:            Configure
  Type:            REG_SZ
  Data:            EPRO100_Configure

Value 2
  Name:            Detect
  Type:            REG_SZ
  Data:            EPRO100_Detect

Value 3
  Name:            DeviceExist
  Type:            REG_SZ
  Data:            EPRO100_DeviceExist

Value 4
  Name:            Diagnose
  Type:            REG_SZ
  Data:            EPRO100_Diagnose

Value 5
  Name:            DLL
  Type:            REG_SZ
  Data:            EPRO100.DLL

Value 6
  Name:            GetExtendedFeatures
  Type:            REG_SZ
  Data:            EPRO100_GetExtendedFeatures

Value 7
  Name:            Help
  Type:            REG_SZ
  Data:            E100SET.HLP

Value 8
  Name:            InstallAnyway
  Type:            REG_SZ
  Data:            EPRO100_InstallAnyway

Value 9
  Name:            RegistryKey
  Type:            REG_SZ
  Data:            EPRO100_GetRegistryKey

Value 10
  Name:            Summary
  Type:            REG_SZ
  Data:            EPRO100_Resource_Summary


Key Name:
SYSTEM\CurrentControlSet\Services\PROSet\EPRO100\Parameters
Class Name:        GenericClass
Last Write Time:   2/1/99 - 10:09 AM
Value 0
  Name:            Adaptive_IFS
  Type:            REG_SZ
  Data:            1,7,Adaptive Inter-Frame Spacing,0,2,1,0,255,1

Value 1
  Name:            BusNumber
  Type:            REG_SZ
  Data:            0,7,BusNumber,0,2,0,0,16,1

Value 2
  Name:            BusType
  Type:            REG_SZ
  Data:            0,7,BusType,0,2,5,2,5,1

Value 3
  Name:            BusTypeLocal
  Type:            REG_SZ
  Data:            0,7,BusTypeLocal,0,2,5,2,5,1

Value 4
  Name:            Eid
  Type:            REG_SZ
  Data:            0,7,Eid,0,2,0,0,4294967295,1

Value 5
  Name:            Fifo
  Type:            REG_SZ
  Data:            0,3,Fifo Depth,0,2,12,0,15,1

Value 6
  Name:            ForceDpx
  Type:            REG_SZ
  Data:            1,4,Duplex Mode,0,1,Auto,Auto,Half,Full

Value 7
  Name:            MapRegisters
  Type:            REG_SZ
  Data:

Value 8
  Name:            MediaType
  Type:            REG_SZ
  Data:            0,7,MediaType,0,2,1,1,1,1

Value 9
  Name:            MsPciScan
  Type:            REG_SZ
```

```
  Data:             0,4,MsPciScan,0,2,1,0,1,1

Value 10
  Name:             NetworkAddress
  Type:             REG_SZ
  Data:             1,7,Locally Administered Address,0,5,0,0,1,1

Value 11
  Name:             NumCoalesce
  Type:             REG_SZ
  Data:             1,7,Coalesce Buffers,0,2,8,1,32,1

Value 12
  Name:             NumRfd
  Type:             REG_SZ
  Data:             1,7,Receive Buffers,0,2,32,1,1024,1

Value 13
  Name:             NumTbd
  Type:             REG_SZ
  Data:             0,3,Transmit Buffer Descriptors,0,2,64,1,65535,1

Value 14
  Name:             NumTbdPerTcb
  Type:             REG_SZ
  Data:             0,4,Transmit Buffers per Frame,0,2,12,1,16,1

Value 15
  Name:             NumTcb
  Type:             REG_SZ
  Data:             1,7,Transmit Control Blocks,0,2,16,1,80,1

Value 16
  Name:             Off
  Type:             REG_SZ
  Data:             1,3,Off Timer,0,2,2,1,65535,1

Value 17
  Name:             On
  Type:             REG_SZ
  Data:             1,3,On Timer,0,2,32768,1,65535,1

Value 18
  Name:             PerfOptims
  Type:             REG_SZ
  Data:             0,4,PerfOptims,0,2,0,0,65535,1

Value 19
  Name:             RxDmaCount
  Type:             REG_SZ
  Data:             0,4,RxDmaCount,0,2,0,0,63,1

Value 20
  Name:             RxFifo
  Type:             REG_SZ
  Data:             0,4,Receive Fifo Depth,0,2,8,0,15,1

Value 21
  Name:             Slot
  Type:             REG_SZ
  Data:

Value 22
  Name:             Speed
  Type:             REG_SZ
  Data:             1,7,Network Speed,0,4,Auto,Auto,0,10Mbps,10,100Mbps,100

Value 23
  Name:             Threshold
  Type:             REG_SZ
  Data:             0,7,Transmit Threshold,0,2,16,0,200,1

Value 24
  Name:             TxDmaCount
  Type:             REG_SZ
  Data:             0,4,TxDmaCount,0,2,0,0,63,1

Value 25
  Name:             TxFifo
  Type:             REG_SZ
  Data:             0,4,Transmit Fifo Depth,0,2,8,0,15,1

Value 26
  Name:             Txmitwait
  Type:             REG_SZ
  Data:             0,7,Txmitwait,0,2,1,0,255,1

Value 27
  Name:             UcodeSW
  Type:             REG_SZ
  Data:             0,7,UcodeSW,0,2,1,0,1,1

Value 28
  Name:             UnderrunRetry
  Type:             REG_SZ
  Data:             0,4,UnderrunRetry,0,2,1,0,3,1
```

Services\SQLServerAgent

```
Key Name:           SYSTEM\CurrentControlSet\Services\SQLServerAgent
Class Name:         <NO CLASS>
Last Write Time:    8/27/99 - 9:47 AM
Value 0
  Name:             DependOnGroup
  Type:             REG_MULTI_SZ
  Data:

Value 1
  Name:             DependOnService
  Type:             REG_MULTI_SZ
  Data:             MSSQLServer


Value 2
  Name:             DisplayName
  Type:             REG_SZ
```

```
  Data:             SQLServerAgent

Value 3
  Name:             ErrorControl
  Type:             REG_DWORD
  Data:             0x1

Value 4
  Name:             ImagePath
  Type:             REG_EXPAND_SZ
  Data:             D:\MSSQL7\binn\sqlagent.exe

Value 5
  Name:             ObjectName
  Type:             REG_SZ
  Data:             LocalSystem

Value 6
  Name:             Start
  Type:             REG_DWORD
  Data:             0x3

Value 7
  Name:             Type
  Type:             REG_DWORD
  Data:             0x10


Key Name:
SYSTEM\CurrentControlSet\Services\SQLServerAgent\Security
Class Name:         <NO CLASS>
Last Write Time:    8/27/99 - 9:47 AM
Value 0
  Name:             Security
  Type:             REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00 00 00
................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80 18 00  4.....
.........
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00 18 00
................
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000050   76 00 63 00 00 00 1c 00 - fd 01 02 00 01 02 00 00
v.c.............
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 00 00 16 00  ....
...#.......
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
................
00000080   20 00 00 00 20 02 00 00 - 00 00 16 00 00 00 1c 00   ...
...........
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00 00 00  ............
...
000000a0   25 02 00 00 00 00 16 00 - 00 00 18 00 fd 01 02 00
%...............
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02 00 00
............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000d0   00 00 00 05 12 00 00 00 -                          ........
```

Services\Tcpip

```
Key Name:           SYSTEM\CurrentControlSet\Services\Tcpip
Class Name:         <NO CLASS>
Last Write Time:    8/23/99 - 11:07 AM
Value 0
  Name:             DisplayName
  Type:             REG_SZ
  Data:             TCP/IP Service

Value 1
  Name:             ErrorControl
  Type:             REG_DWORD
  Data:             0x1

Value 2
  Name:             Group
  Type:             REG_SZ
  Data:             PNP_TDI

Value 3
  Name:             ImagePath
  Type:             REG_EXPAND_SZ
  Data:             \SystemRoot\System32\drivers\tcpip.sys

Value 4
  Name:             Start
  Type:             REG_DWORD
  Data:             0x2

Value 5
  Name:             Type
  Type:             REG_DWORD
  Data:             0x1


Key Name:           SYSTEM\CurrentControlSet\Services\Tcpip\Enum
Class Name:         <NO CLASS>
Last Write Time:    8/30/99 - 11:58 AM
Value 0
  Name:             0
  Type:             REG_SZ
  Data:             Root\LEGACY_TCPIP\0000

Value 1
  Name:             Count
  Type:             REG_DWORD
  Data:             0x1
```

```
Value 2
  Name:            NextInstance
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Linkage
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:10 AM
Value 0
  Name:            Bind
  Type:            REG_MULTI_SZ
  Data:            \Device\E100B1


Value 1
  Name:            Export
  Type:            REG_MULTI_SZ
  Data:            \Device\Tcpip\E100B1


Value 2
  Name:            Route
  Type:            REG_MULTI_SZ
  Data:            "E100B" "E100B1"



Key Name:
SYSTEM\CurrentControlSet\Services\Tcpip\Linkage\Disabled
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:10 AM
Value 0
  Name:            Bind
  Type:            REG_MULTI_SZ
  Data:

Value 1
  Name:            Export
  Type:            REG_MULTI_SZ
  Data:

Value 2
  Name:            Route
  Type:            REG_MULTI_SZ
  Data:


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Parameters
Class Name:        GenericClass
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            DataBasePath
  Type:            REG_EXPAND_SZ
  Data:            %SystemRoot%\System32\drivers\etc

Value 1
  Name:            Domain
  Type:            REG_SZ
  Data:            mv.unisys.com

Value 2
  Name:            EnableSecurityFilters
  Type:            REG_DWORD
  Data:            0

Value 3
  Name:            ForwardBroadcasts
  Type:            REG_DWORD
  Data:            0

Value 4
  Name:            Hostname
  Type:            REG_SZ
  Data:            es2025

Value 5
  Name:            IPEnableRouter
  Type:            REG_DWORD
  Data:            0

Value 6
  Name:            KeepAliveInterval
  Type:            REG_DWORD
  Data:            0x2710

Value 7
  Name:            KeepAliveTime
  Type:            REG_DWORD
  Data:            0x493e0

Value 8
  Name:            NameServer
  Type:            REG_SZ
  Data:

Value 9
  Name:            SearchList
  Type:            REG_SZ
  Data:

Value 10
  Name:            TcpAverageRTT
  Type:            REG_DWORD
  Data:            0x3e8


Key Name:
SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\PersistentRoutes
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM

Key Name:
SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\Winsock
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            HelperDllName
```

```
  Type:            REG_EXPAND_SZ
  Data:            %SystemRoot%\System32\wshtcpip.dll

Value 1
  Name:            Mapping
  Type:            REG_BINARY
  Data:
00000000   0b 00 00 00 03 00 00 00 - 02 00 00 00 01 00 00 00
................
00000010   06 00 00 00 02 00 00 00 - 01 00 00 00 00 00 00 00
................
00000020   02 00 00 00 00 00 00 00 - 06 00 00 00 00 00 00 00
................
00000030   00 00 00 00 06 00 00 00 - 00 00 00 00 01 00 00 00
................
00000040   06 00 00 00 02 00 00 00 - 02 00 00 00 11 00 00 00
................
00000050   02 00 00 00 02 00 00 00 - 00 00 00 00 02 00 00 00
................
00000060   00 00 00 00 11 00 00 00 - 00 00 00 00 00 00 00 00
................
00000070   11 00 00 00 00 00 00 00 - 02 00 00 00 11 00 00 00
................
00000080   02 00 00 00 03 00 00 00 - 00 00 00 00             ............

Value 2
  Name:            MaxSockAddrLength
  Type:            REG_DWORD
  Data:            0x10

Value 3
  Name:            MinSockAddrLength
  Type:            REG_DWORD
  Data:            0x10


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Performance
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Close
  Type:            REG_SZ
  Data:            CloseTcpIpPerformanceData

Value 1
  Name:            Collect
  Type:            REG_SZ
  Data:            CollectTcpIpPerformanceData

Value 2
  Name:            Library
  Type:            REG_SZ
  Data:            Perfctrs.dll

Value 3
  Name:            Open
  Type:            REG_SZ
  Data:            OpenTcpIpPerformanceData


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\Security
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Security
  Type:            REG_BINARY
  Data:
00000000   01 00 14 80 c0 00 00 00 - cc 00 00 00 14 00 00 00
................
00000010   34 00 00 00 02 00 20 00 - 01 00 00 00 02 80 18 00  4.....
........
00000020   ff 01 0f 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000030   20 02 00 00 02 00 8c 00 - 05 00 00 00 00 00 18 00
................
00000040   8d 01 02 00 01 01 00 00 - 00 00 00 01 00 00 00 00
................
00000050   6d 00 00 00 00 00 1c 00 - fd 01 02 00 01 02 00 00
m...............
00000060   00 00 00 05 20 00 00 00 - 23 02 00 00 20 00 4e 00  .... ...#...
.N.
00000070   00 00 1c 00 ff 01 0f 00 - 01 02 00 00 00 00 00 05
................
00000080   20 00 00 00 20 02 00 00 - 20 00 4e 00 00 00 1c 00   ... ...
.N.....
00000090   ff 01 0f 00 01 02 00 00 - 00 00 00 05 20 00 00 00  ............
...
000000a0   25 02 00 00 20 00 4e 00 - 00 00 18 00 fd 01 02 00  %...
.N.........
000000b0   01 01 00 00 00 00 00 05 - 12 00 00 00 25 02 00 00
............%...
000000c0   01 01 00 00 00 00 00 05 - 12 00 00 00 01 01 00 00
................
000000d0   00 00 00 05 12 00 00 00 -                          ........


Key Name:          SYSTEM\CurrentControlSet\Services\Tcpip\ServiceProvider
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Class
  Type:            REG_DWORD
  Data:            0x8

Value 1
  Name:            DnsPriority
  Type:            REG_DWORD
  Data:            0x7d0

Value 2
  Name:            HostsPriority
  Type:            REG_DWORD
  Data:            0x1f4

Value 3
  Name:            LocalPriority
  Type:            REG_DWORD
  Data:            0x1f3
```

```
Value 4
  Name:            Name
  Type:            REG_SZ
  Data:            TCP/IP

Value 5
  Name:            NetbtPriority
  Type:            REG_DWORD
  Data:            0x7d1

Value 6
  Name:            ProviderPath
  Type:            REG_EXPAND_SZ
  Data:            %SystemRoot%\System32\wsock32.dll
```

Services\WinSock

```
Key Name:          SYSTEM\CurrentControlSet\Services\WinSock
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            ErrorControl
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            Start
  Type:            REG_DWORD
  Data:            0x3

Value 2
  Name:            Type
  Type:            REG_DWORD
  Data:            0x4


Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Autodial
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 8:26 AM
Value 0
  Name:            AutodialDllName32
  Type:            REG_SZ
  Data:            wininet.dll

Value 1
  Name:            AutodialFcnName32
  Type:            REG_SZ
  Data:            InternetAutodialCallback


Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Linkage
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM

Key Name:
SYSTEM\CurrentControlSet\Services\WinSock\Linkage\Disabled
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM

Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Parameters
Class Name:        GenericClass
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Transports
  Type:            REG_MULTI_SZ
  Data:            Tcpip
                   NetBIOS



Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Setup
Migration
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:10 AM
Value 0
  Name:            Known Static Providers
  Type:            REG_MULTI_SZ
  Data:            Tcpip
                   NwlnkIpx
                   NwlnkSpx
                   AppleTalk
                   IsoTp


Value 1
  Name:            Provider List
  Type:            REG_MULTI_SZ
  Data:            Tcpip
                   NetBIOS


Value 2
  Name:            Setup Version
  Type:            REG_DWORD
  Data:            0x1009


Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Setup
Migration\Providers
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM

Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Setup
Migration\Providers\NetBIOS
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:10 AM
Value 0
  Name:            WinSock 1.1 Provider Data
  Type:            REG_BINARY
  Data:
00000000   0e 10 00 00 11 00 00 00 - 14 00 00 00 14 00 00 00
................
```

```
00000010   05 00 00 00 ff ff ff ff - 00 fa 00 00 66 00 00 00
............f...
00000020   09 12 00 00 11 00 00 00 - 14 00 00 00 14 00 00 00
................
00000030   02 00 00 00 ff ff ff ff - 00 fa 00 00 40 00 00 00
............@...
00000040   5c 00 44 00 65 00 76 00 - 69 00 63 00 65 00 5c 00
\.D.e.v.i.c.e.\.
00000050   4e 00 62 00 66 00 5f 00 - 45 00 31 00 30 00 30 00
N.b.f._.E.1.0.0.
00000060   42 00 31 00 00 00 5c 00 - 44 00 65 00 76 00 69 00
B.1...\.D.e.v.i.
00000070   63 00 65 00 5c 00 4e 00 - 62 00 66 00 5f 00 45 00
c.e.\.N.b.f._.E.
00000080   31 00 30 00 30 00 42 00 - 31 00 00 00              1.0.0.B.1...

Value 1
  Name:            WinSock 2.0 Provider ID
  Type:            REG_BINARY
  Data:
00000000   30 18 5f 8d 73 c2 cf 11 - 95 c8 00 80 5f 48 a1 92
0._.s.......H..


Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Setup
Migration\Providers\Tcpip
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            WinSock 2.0 Provider ID
  Type:            REG_BINARY
  Data:
00000000   a0 1a 0f e7 8b ab cf 11 - 8c a3 00 80 5f 48 a1 92
............_H..


Key Name:          SYSTEM\CurrentControlSet\Services\WinSock\Setup
Migration\Well Known Guids
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            AppleTalk
  Type:            REG_BINARY
  Data:
00000000   a0 17 3b 2c df c6 cf 11 - 95 c8 00 80 5f 48 a1 92
..;,........_H..

Value 1
  Name:            IsoTp
  Type:            REG_BINARY
  Data:
00000000   b0 cb e4 89 c1 b9 cf 11 - 95 c8 00 80 5f 48 a1 92
............_H..

Value 2
  Name:            McsXns
  Type:            REG_BINARY
  Data:
00000000   b1 cb e4 89 c1 b9 cf 11 - 95 c8 00 80 5f 48 a1 92
............_H..
```

Software\Intel

```
Key Name:          SOFTWARE\Intel
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM

Key Name:          SOFTWARE\Intel\E100B
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM

Key Name:          SOFTWARE\Intel\E100B\CurrentVersion
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            Description
  Type:            REG_SZ
  Data:            Intel(R) PRO NDIS Driver

Value 1
  Name:            InstallDate
  Type:            REG_DWORD
  Data:            0x37c18dd2

Value 2
  Name:            MajorVersion
  Type:            REG_DWORD
  Data:            0x30003

Value 3
  Name:            MinorVersion
  Type:            REG_DWORD
  Data:            0

Value 4
  Name:            OperationsSupport
  Type:            REG_DWORD
  Data:            0xff

Value 5
  Name:            RefCount
  Type:            REG_DWORD
  Data:            0x1

Value 6
  Name:            Review
  Type:            REG_DWORD
  Data:            0

Value 7
  Name:            ServiceName
  Type:            REG_SZ
  Data:            E100B

Value 8
```

```
  Name:            SoftwareType
  Type:            REG_SZ
  Data:            driver

Value 9
  Name:            Title
  Type:            REG_SZ
  Data:            Intel(R) PRO NDIS Driver


Key Name:          SOFTWARE\Intel\E100B\CurrentVersion\NetRules
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 11:07 AM
Value 0
  Name:            bindable
  Type:            REG_MULTI_SZ
  Data:            E100BDriver E100BAdapter non exclusive 100


Value 1
  Name:            bindform
  Type:            REG_SZ
  Data:            "E100BSys" yes no container

Value 2
  Name:            class
  Type:            REG_MULTI_SZ
  Data:            E100BDriver basic


Value 3
  Name:            InfName
  Type:            REG_SZ
  Data:            oemnad0.inf

Value 4
  Name:            InfOption
  Type:            REG_SZ
  Data:            E100B

Value 5
  Name:            type
  Type:            REG_SZ
  Data:            E100BSys ndisDriver E100BDriver

Value 6
  Name:            use
  Type:            REG_SZ
  Data:            driver


Key Name:          SOFTWARE\Intel\PROSet
Class Name:        <NO CLASS>
Last Write Time:   8/23/99 - 6:26 PM
Value 0
  Name:            InfName
  Type:            REG_SZ
  Data:            oemnad0.inf

Value 1
  Name:            MaxVLANs
  Type:            REG_DWORD
  Data:            0x37

Value 2
  Name:            TrayIcon
  Type:            REG_DWORD
  Data:            0
```

Software\Microsoft\MSDTC

```
Key Name:          SOFTWARE\Microsoft\MSDTC
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:49 AM
Value 0
  Name:            MaxLogSize
  Type:            REG_DWORD
  Data:            0x200


Key Name:          SOFTWARE\Microsoft\MSDTC\Setup
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:49 AM
Value 0
  Name:            InstallState
  Type:            REG_DWORD
  Data:            0x1

Value 1
  Name:            MajorVersion
  Type:            REG_DWORD
  Data:            0x20000

Value 2
  Name:            MinorVersion
  Type:            REG_DWORD
  Data:            0x32a


Key Name:          SOFTWARE\Microsoft\MSDTC\Setup\ExitStatus
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:49 AM
Value 0
  Name:            CompletionComment
  Type:            REG_SZ
  Data:            Source = DtcComplete, ExitType = Success, Successful
Install

Value 1
  Name:            ErrorCode
  Type:            REG_DWORD
  Data:            0

Value 2
```

```
  Name:            ExitCode
  Type:            REG_DWORD
  Data:            0

Value 3
  Name:            Source
  Type:            REG_DWORD
  Data:            0x1
```

Software\Microsoft\MSSQLServer

```
Key Name:          SOFTWARE\Microsoft\MSSQLServer
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 9:13 AM

Key Name:          SOFTWARE\Microsoft\MSSQLServer\Client
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 9:13 AM

Key Name:          SOFTWARE\Microsoft\MSSQLServer\Client\ConnectTo
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            DSQUERY
  Type:            REG_SZ
  Data:            DBNMPNTW


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Client\DB-Lib
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AutoAnsiToOem
  Type:            REG_SZ
  Data:            ON

Value 1
  Name:            UseIntlSettings
  Type:            REG_SZ
  Data:            ON


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Client\TDS
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 10:08 AM
Value 0
  Name:            <NO NAME>
  Type:            REG_SZ
  Data:            7.0

Value 1
  Name:            .
  Type:            REG_SZ
  Data:            7.0

Value 2
  Name:            ES2025
  Type:            REG_SZ
  Data:            7.0


Key Name:          SOFTWARE\Microsoft\MSSQLServer\MSSQLServer
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 10:11 AM
Value 0
  Name:            AuditLevel
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            BackupDirectory
  Type:            REG_SZ
  Data:            D:\MSSQL7\BACKUP

Value 2
  Name:            DefaultCompStyle
  Type:            REG_SZ
  Data:            0

Value 3
  Name:            DefaultDomain
  Type:            REG_SZ
  Data:            ES2025

Value 4
  Name:            DefaultLocaleID
  Type:            REG_SZ
  Data:            8200

Value 5
  Name:            DefaultLogin
  Type:            REG_SZ
  Data:            guest

Value 6
  Name:            DefaultSortID
  Type:            REG_SZ
  Data:            50

Value 7
  Name:            ListenOn
  Type:            REG_MULTI_SZ
  Data:            SSNMPN70,\\.\pipe\sql\query
                   SSMSSO70,1433


Value 8
  Name:            LoginMode
  Type:            REG_DWORD
  Data:            0

Value 9
  Name:            Map#
  Type:            REG_SZ
  Data:            -
```

```
Value 10
  Name:            Map$
  Type:            REG_SZ
  Data:

Value 11
  Name:            Map_
  Type:            REG_SZ
  Data:            \

Value 12
  Name:            ResourceMgrID
  Type:            REG_SZ
  Data:            {CC1904FA-5C9E-11D3-96BE-00C00D00A0E1}

Value 13
  Name:            RWSListenAddress
  Type:            REG_SZ
  Data:

Value 14
  Name:            SetHostName
  Type:            REG_DWORD
  Data:            0

Value 15
  Name:            Tapeloadwaittime
  Type:            REG_DWORD
  Data:            0xffffffff


Key Name:
SOFTWARE\Microsoft\MSSQLServer\MSSQLServer\CurrentVersion
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:50 AM
Value 0
  Name:            checksum
  Type:            REG_BINARY
  Data:
00000000   37 35 32 32 63 31 35 38 - 61 65 37 64 34 63 64 37
7522c158ae7d4cd7
00000010   35 30 64 61 30 33 34 62 - 36 30 31 35 62 33 61 64
50da034b6015b3ad
00000020   32 32 30 63 63 39 37 38 - 34 65 65 65 61 63 65 66
220cc9784eeeacef
00000030   66 62 36 37 64 65 36 62 - 32 32 34 31 63 61 34 31
fb67de6b2241ca41
00000040   36 66 31 38 62 33 64 35 - 61 31 37 62 63 30 62 39
6f18b3d5a17bc0b9
00000050   66 39 30 62 38 63 63 65 - 39 61 37 34 65 30 38 66
f90b8cce9a74e08f
00000060   64 38 66 36 39 64 62 32 - 61 34 35 64 33 37 64 36
d8f69db2a45d37d6
00000070   31 30 33 64 63 66 65 64 - 63 35 35 63 32 37 33 37
103dcfedc55c2737
00000080   64 39 62 62 33 37 34 61 - 31 37 37 61 66 62 64 33
d9bb374a177afbd3
00000090   30 36 39 35 36 39 65 37 - 00                      069569e7.
```

```
Value 1
  Name:            CSDVersion
  Type:            REG_SZ
  Data:            7.00.805

Value 2
  Name:            CSDVersionNumber
  Type:            REG_DWORD
  Data:            0x100

Value 3
  Name:            CurrentVersion
  Type:            REG_SZ
  Data:            7.00.623

Value 4
  Name:            Language
  Type:            REG_DWORD
  Data:            0x409

Value 5
  Name:            RegisteredOwner
  Type:            REG_SZ
  Data:            SAMM

Value 6
  Name:            SerialNumber
  Type:            REG_DWORD
  Data:            0x812d0040


Key Name:          SOFTWARE\Microsoft\MSSQLServer\MSSQLServer\Parameters
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 10:09 AM
Value 0
  Name:            SQLArg0
  Type:            REG_SZ
  Data:            -dD:\MSSQL7\data\master.mdf

Value 1
  Name:            SQLArg1
  Type:            REG_SZ
  Data:            -eD:\MSSQL7\log\ERRORLOG

Value 2
  Name:            SQLArg2
  Type:            REG_SZ
  Data:            -lD:\MSSQL7\data\mastlog.ldf

Value 3
  Name:            SQLArg3
  Type:            REG_SZ
  Data:            -T3502

Value 4
  Name:            SQLArg4
  Type:            REG_SZ
  Data:            -g38
```

```
Key Name:          SOFTWARE\Microsoft\MSSQLServer\MSSQLServer\RPCNetLib
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:45 AM
Value 0
  Name:            Security
  Type:            REG_SZ
  Data:


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\ADSDSOObject
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\DTSPackageDSO
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:
SOFTWARE\Microsoft\MSSQLServer\Providers\Microsoft.Jet.OLEDB.4.0
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\MSDAORA
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\MSDASQL
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\MSIDXS
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\MSOLAP
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:50 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\MSQLImpProv
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\MSSEARCHSQL
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Providers\SQLOLEDB
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            AllowInProcess
  Type:            REG_DWORD
  Data:            0x1


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Replication
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 9:14 AM

Key Name:
SOFTWARE\Microsoft\MSSQLServer\Replication\MergeReplicationProvider
Class Name:        <NO CLASS>
```

```
Last Write Time:   8/24/99 - 9:14 AM

Key Name:
SOFTWARE\Microsoft\MSSQLServer\Replication\MergeReplicationProvider\7.0
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 9:14 AM

Key Name:
SOFTWARE\Microsoft\MSSQLServer\Replication\MergeReplicationProvider\7.0\Ms
Jet
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:50 AM
Value 0
  Name:            <NO NAME>
  Type:            REG_SZ
  Data:            {f159cf30-0db4-11d1-b272-00aa00b8de95}


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Setup
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:45 AM
Value 0
  Name:            SourcePath
  Type:            REG_SZ
  Data:            D:\SQL70623

Value 1
  Name:            SQLDataRoot
  Type:            REG_SZ
  Data:            D:\MSSQL7

Value 2
  Name:            SQLPath
  Type:            REG_SZ
  Data:            D:\MSSQL7


Key Name:          SOFTWARE\Microsoft\MSSQLServer\SNMP
Class Name:        <NO CLASS>
Last Write Time:   8/24/99 - 9:14 AM

Key Name:          SOFTWARE\Microsoft\MSSQLServer\SNMP\CurrentVersion
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            Pathname
  Type:            REG_EXPAND_SZ
  Data:            D:\MSSQL7\BINN\sqlsnmp.dll


Key Name:          SOFTWARE\Microsoft\MSSQLServer\SQL Service Manager
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            Action Verify
  Type:            REG_DWORD
  Data:            0

Value 1
  Name:            DefaultSvc
  Type:            REG_SZ
  Data:            MSSQLServer

Value 2
  Name:            Remote
  Type:            REG_DWORD
  Data:            0x1

Value 3
  Name:            Services
  Type:            REG_MULTI_SZ
  Data:            MSSQLServer
                   SQLServerAgent
                   MSDTC


Key Name:          SOFTWARE\Microsoft\MSSQLServer\SQLEW
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM

Key Name:          SOFTWARE\Microsoft\MSSQLServer\SQLEW\Replication
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            PerfmonFile
  Type:            REG_SZ
  Data:            D:\MSSQL7\BINN\REPLMON.PMC


Key Name:          SOFTWARE\Microsoft\MSSQLServer\SQLEW\Wizards
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            Web Assistant
  Type:            REG_SZ
  Data:            D:\MSSQL7\BINN\semwebwz.DLL^WebWizardEntry


Key Name:          SOFTWARE\Microsoft\MSSQLServer\SQLServerAgent
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            DownloadedMaxRows
  Type:            REG_DWORD
  Data:            0x64

Value 1
  Name:            ErrorLogFile
  Type:            REG_SZ
  Data:            D:\MSSQL7\LOG\SQLAGENT.OUT

Value 2
  Name:            ErrorLoggingLevel
  Type:            REG_DWORD
  Data:            0x3

Value 3
```

```
  Name:            JobHistoryMaxRows
  Type:            REG_DWORD
  Data:            0x3e8

Value 4
  Name:            JobHistoryMaxRowsPerJob
  Type:            REG_DWORD
  Data:            0x64

Value 5
  Name:            MSXServerName
  Type:            REG_SZ
  Data:

Value 6
  Name:            NonAlertableErrors
  Type:            REG_SZ
  Data:            1204,4002

Value 7
  Name:            RestartSQLServer
  Type:            REG_DWORD
  Data:            0x1

Value 8
  Name:            ServerHost
  Type:            REG_SZ
  Data:

Value 9
  Name:            WorkingDirectory
  Type:            REG_SZ
  Data:            D:\MSSQL7\JOBS


Key Name:
SOFTWARE\Microsoft\MSSQLServer\SQLServerAgent\Subsystems
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            ActiveScripting
  Type:            REG_SZ
  Data:
D:\MSSQL7\BINN\SQLATXSS.DLL,NULL,ActiveScriptStart,ActiveScriptEvent,Activ
eScriptStop,10

Value 1
  Name:            CmdExec
  Type:            REG_SZ
  Data:
D:\MSSQL7\BINN\SQLCMDSS.DLL,NULL,CmdExecStart,CmdEvent,CmdExecStop,10

Value 2
  Name:            Distribution
  Type:            REG_SZ
  Data:
D:\MSSQL7\BINN\SQLREPSS.DLL,D:\MSSQL7\BINN\DISTRIB.EXE,ReplStart,ReplEvent
,ReplStop,100

Value 3
  Name:            LogReader
  Type:            REG_SZ
  Data:
D:\MSSQL7\BINN\SQLREPSS.DLL,D:\MSSQL7\BINN\LOGREAD.EXE,ReplStart,ReplEvent
,ReplStop,25

Value 4
  Name:            Merge
  Type:            REG_SZ
  Data:
D:\MSSQL7\BINN\SQLREPSS.DLL,D:\MSSQL7\BINN\REPLMERG.EXE,ReplStart,ReplEven
t,ReplStop,100

Value 5
  Name:            Snapshot
  Type:            REG_SZ
  Data:
D:\MSSQL7\BINN\SQLREPSS.DLL,D:\MSSQL7\BINN\SNAPSHOT.EXE,ReplStart,ReplEven
t,ReplStop,100


Key Name:          SOFTWARE\Microsoft\MSSQLServer\Tracking
Class Name:        <NO CLASS>
Last Write Time:   8/27/99 - 9:47 AM
Value 0
  Name:            {E07FDDA4-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 1
  Name:            {E07FDDA8-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 2
  Name:            {E07FDDA9-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 3
  Name:            {E07FDDAA-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 4
  Name:            {E07FDDAB-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 5
  Name:            {E07FDDAC-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 6
  Name:            {E07FDDAD-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:
```

```
Value 7
  Name:            {E07FDDAF-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 8
  Name:            {E07FDDBE-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 9
  Name:            {E07FDDBF-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 10
  Name:            {E07FDDC0-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:

Value 11
  Name:            {E07FDDC8-5A21-11d2-9DAD-00C04F79D434}
  Type:            REG_SZ
  Data:
```

NT Client Configuration Information

```
Microsoft Diagnostics Report For \\CLIENT1
------------------------------------------------------------------------

OS Version Report
------------------------------------------------------------------------
Microsoft (R) Windows NT (TM) Server
Version 4.0 (Build 1381: Service Pack 4) x86 Multiprocessor Free
Registered Owner: Unisys, Unisys
Product Number: 28997-OEM-0026051-97737
------------------------------------------------------------------------

System Report
------------------------------------------------------------------------
System: AT/AT COMPATIBLE
Hardware Abstraction Layer: MPS 1.4 - APIC platform
BIOS Date: 01/11/99
BIOS Version: <unavailable>

Processor list:
   0:  x86 Family 6 Model 5 Stepping 2 GenuineIntel ~449 Mhz
   1:  x86 Family 6 Model 5 Stepping 2 GenuineIntel ~449 Mhz
------------------------------------------------------------------------

Video Display Report
------------------------------------------------------------------------
BIOS Date: 05/21/97
BIOS Version: CL-GD5446 PCI VGA BIOS Version 1.33

Adapter:
   Setting: 800 x 600 x 256
            60 Hz
   Type: cirrus compatible display adapter
   String: Cirrus Logic Compatible
   Memory: 1 MB
   Chip Type: Cirrus Logic 5446
   DAC Type: Integrated RAMDAC
Driver:
   Vendor: Microsoft Corporation
   File(s): cirrus.sys, vga.dll, cirrus.dll, vga256.dll, vga64K.dll
   Version: 4.00, 4.0.0


Drives Report
------------------------------------------------------------------------
C:\  (Local - NTFS)  Total: 4,160,803 KB, Free: 3,505,177 KB
   Serial Number: 5C93 - 5932
   Bytes per cluster: 512
   Sectors per cluster: 1
   Filename length: 255

Memory Report
------------------------------------------------------------------------
Handles: 913
Threads: 97
Processes: 15

Physical Memory (K)
   Total: 392,624
   Available: 342,164
   File Cache: 11,292

Kernel Memory (K)
   Total: 9,520
   Paged: 6,936
   Nonpaged: 2,584

Commit Charge (K)
   Total: 30,120
   Limit: 762,916
   Peak: 30,124

Pagefile Space (K)
   Total: 393,216
   Total in use: 0
   Peak: 0

   C:\pagefile.sys
      Total: 393,216
      Total in use: 0
      Peak: 0


Services Report
------------------------------------------------------------------------
```

```
Alerter                                 Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
Computer Browser                        Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
      LmHosts
ClipBook Server                         Stopped   (Manual)
   C:\WINNT\system32\clipsrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      NetDDE
DHCP Client (TDI)                       Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      Tcpip
      Afd
      NetBT
EventLog (Event log)                    Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Server                                  Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
Workstation (NetworkProvider)           Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      TDI
License Logging Service                 Stopped   (Disabled)
   C:\WINNT\System32\llssrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TCP/IP NetBIOS Helper                   Running   (Automatic)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Group Dependencies:
      NetworkProvider
Messenger                               Stopped   (Disabled)
   C:\WINNT\System32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
Network DDE (NetDDEGroup)               Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      NetDDEDSDM
Network DDE DSDM                        Stopped   (Manual)
   C:\WINNT\system32\netdde.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Net Logon (RemoteValidation)            Stopped   (Manual)
   C:\WINNT\System32\lsass.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
   Service Dependencies:
      LanmanWorkstation
      LmHosts
NT LM Security Support Provider         Stopped   (Manual)
   C:\WINNT\System32\SERVICES.EXE
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Plug and Play (PlugPlay)                Running   (Automatic)
   C:\WINNT\system32\services.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Shared Process
Protected Storage                       Running   (Automatic)
   c:\winnt\system32\pstores.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
   Service Dependencies:
      RpcSs
Directory Replicator                    Stopped   (Manual)
   C:\WINNT\System32\lmrepl.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      LanmanServer
Remote Procedure Call (RPC) Locator     Stopped   (Manual)
   C:\WINNT\System32\LOCATOR.EXE
   Service Account Name: LocalSystem
```

```
   Error Severity: Normal
   Service Flags: Own Process
   Service Dependencies:
      LanmanWorkstation
      Rdr
Remote Procedure Call (RPC) Service          Running   (Automatic)
   C:\WINNT\system32\RpcSs.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Schedule                                     Stopped   (Manual)
   C:\WINNT\System32\AtSvc.Exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
Spooler (SpoolerGroup)                       Stopped   (Disabled)
   C:\WINNT\system32\spoolss.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process, Interactive
Telephony Service                            Stopped   (Manual)
   C:\WINNT\system32\tapisrv.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TUXEDO IPC Helper                            Running   (Automatic)
   C:\TUXEDO\bin\tuxipc.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
TListen (Port: 3050)                         Stopped   (Disabled)
   C:\TUXEDO\bin\slisten.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
UPS                                          Stopped   (Manual)
   C:\WINNT\System32\ups.exe
   Service Account Name: LocalSystem
   Error Severity: Normal
   Service Flags: Own Process
World Wide Web Publishing Service            Stopped   (Manual)
   C:\WINNT\System32\inetsrv\inetinfo.exe
   Service Account Name: LocalSystem
   Error Severity: Ignore
   Service Flags: Shared Process
   Service Dependencies:
      RPCSS
      NTLMSSP



Drivers Report
--------------------------------------------------------------------------
Abiosdsk (Primary disk)                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
AFD Networking Support Environment (TDI)     Running   (Automatic)
   C:\WINNT\System32\drivers\afd.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha154x (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Aha174x (SCSI miniport)                      Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
aic78xx (SCSI miniport)                      Running   (Boot)
   C:\WINNT\System32\DRIVERS\aic78xx.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Always (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
ami0nt (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
amsint (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Arrow (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
atapi (SCSI miniport)                        Running   (Boot)
   C:\WINNT\System32\DRIVERS\atapi.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Atdisk (Primary disk)                        Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ati (Video)                                  Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Beep (Base)                                  Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
BusLogic (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Busmouse (Pointer Port)                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdaudio (Filter)                             Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Cdfs (File system)                           Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
   Group Dependencies:
      SCSI CDROM Class
Cdrom (SCSI CDROM Class)                     Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Changer (Filter)                             Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
cirrus (Video)                               Running   (System)
```

```
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Cpqarray (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
cpqfws2e (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dac960nt (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dce376nt (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Delldsa (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Dell_DGX (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Disk (SCSI Class)                           Running   (Boot)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Diskperf (Filter)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
DptScsi (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
dtc329x (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
et4000 (Video)                              Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Fastfat (Boot file system)                  Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Fd16_700 (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd7000ex (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Fd8xx (SCSI miniport)                       Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
flashpnt (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Floppy (Primary disk)                       Running   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ftdisk (Filter)                             Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
HP 10/100TX PCI Ethernet Adapter Driver (NDIS) Running   (Automatic)
   C:\WINNT\System32\drivers\hptxnt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
i8042 Keyboard and PS/2 Mouse Port Driver (Keyboard Port) Running
(System)
   System32\DRIVERS\i8042prt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Inport (Pointer Port)                       Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg300 (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jazzg364 (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Jzvxl484 (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Keyboard Class Driver (Keyboard Class)      Running   (System)
   System32\DRIVERS\kbdclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
KSecDD (Base)                               Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mga (Video)                                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mga_mil (Video)                             Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
mitsumi (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
mkecr5xx (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Modem (Extended base)                       Stopped   (Manual)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Mouse Class Driver (Pointer Class)          Running   (System)
   System32\DRIVERS\mouclass.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Msfs (File system)                          Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Mup (Network)                               Running   (Manual)
   C:\WINNT\System32\drivers\mup.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
NetBEUI Protocol (PNP_TDI)                  Running   (Automatic)
   C:\WINNT\System32\drivers\nbf.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncr53c9x (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
```

```
   Service Flags: Kernel Driver, Shared Process
ncr77c22 (Video)                                Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ncrc700 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ncrc710 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Microsoft NDIS System Driver (NDIS)             Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
WINS Client(TCP/IP) (PNP_TDI)                   Stopped   (Automatic)
   C:\WINNT\System32\drivers\netbt.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Tcpip
NetDetect                                       Stopped   (Manual)
   C:\WINNT\system32\drivers\netdtect.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Npfs (File system)                              Running   (System)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Ntfs (File system)                              Running   (Disabled)
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
Null (Base)                                     Running   (System)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Oliscsi (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Parallel (Extended base)                        Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
Parport (Parallel arbitrator)                   Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
ParVdm (Extended base)                          Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Service Dependencies:
      Parport
   Group Dependencies:
      Parallel arbitrator
PCIDump (PCI Configuration)                     Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Pcmcia (System Bus Extender)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
PnP ISA Enabler Driver (Base)                   Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
psidisp (Video)                                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Ql10wnt (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
qv (Video)                                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Rdr (Network)                                   Running   (Manual)
   C:\WINNT\System32\drivers\rdr.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
s3 (Video)                                      Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Scsiprnt (Extended base)                        Stopped   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Scsiscan (SCSI Class)                           Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Serial (Extended base)                          Running   (Automatic)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sermouse (Pointer Port)                         Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Sfloppy (Primary disk)                          Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
   Group Dependencies:
      SCSI miniport
Simbad (Filter)                                 Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
slcd32 (SCSI miniport)                          Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Sparrow (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Spock (SCSI miniport)                           Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Srv (Network)                                   Running   (Manual)
   C:\WINNT\System32\drivers\srv.sys
   Error Severity: Normal
   Service Flags: File System Driver, Shared Process
symc810 (SCSI miniport)                         Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T128 (SCSI miniport)                            Stopped   (Disabled)
```

```
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
T13B (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
TCP/IP Service (PNP_TDI)                    Running   (Automatic)
   C:\WINNT\System32\drivers\tcpip.sys
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
tga (Video)                                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
tmv1 (SCSI miniport)                        Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra124 (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra14f (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
Ultra24f (SCSI miniport)                    Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
update (Base)                               Stopped   (System)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
v7vram (Video)                              Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaSave (Video Save)                        Stopped   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
VgaStart (Video Init)                       Stopped   (System)
   C:\WINNT\System32\drivers\vga.sys
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Wd33c93 (SCSI miniport)                     Stopped   (Disabled)
   Error Severity: Normal
   Service Flags: Kernel Driver, Shared Process
wd90c24a (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
wdvga (Video)                               Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
weitekp9 (Video)                            Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process
Xga (Video)                                 Stopped   (Disabled)
   Error Severity: Ignore
   Service Flags: Kernel Driver, Shared Process



IRQ and Port Report
-------------------------------------------------------------------------
Devices                         Vector Level  Affinity
-------------------------------------------------------------------------
MPS 1.4 - APIC platform              8     8 0x00000003
MPS 1.4 - APIC platform              0     0 0x00000003
MPS 1.4 - APIC platform              1     1 0x00000003
MPS 1.4 - APIC platform              2     2 0x00000003
MPS 1.4 - APIC platform              3     3 0x00000003
MPS 1.4 - APIC platform              4     4 0x00000003
MPS 1.4 - APIC platform              5     5 0x00000003
MPS 1.4 - APIC platform              6     6 0x00000003
MPS 1.4 - APIC platform              7     7 0x00000003
MPS 1.4 - APIC platform              8     8 0x00000003
MPS 1.4 - APIC platform              9     9 0x00000003
MPS 1.4 - APIC platform             10    10 0x00000003
MPS 1.4 - APIC platform             11    11 0x00000003
MPS 1.4 - APIC platform             12    12 0x00000003
MPS 1.4 - APIC platform             13    13 0x00000003
MPS 1.4 - APIC platform             14    14 0x00000003
MPS 1.4 - APIC platform             15    15 0x00000003
MPS 1.4 - APIC platform             16    16 0x00000003
MPS 1.4 - APIC platform             17    17 0x00000003
MPS 1.4 - APIC platform             18    18 0x00000003
MPS 1.4 - APIC platform             19    19 0x00000003
MPS 1.4 - APIC platform             20    20 0x00000003
MPS 1.4 - APIC platform             21    21 0x00000003
MPS 1.4 - APIC platform             22    22 0x00000003
MPS 1.4 - APIC platform             23    23 0x00000003
MPS 1.4 - APIC platform             24    24 0x00000003
MPS 1.4 - APIC platform             25    25 0x00000003
MPS 1.4 - APIC platform             26    26 0x00000003
MPS 1.4 - APIC platform             27    27 0x00000003
MPS 1.4 - APIC platform             28    28 0x00000003
MPS 1.4 - APIC platform             29    29 0x00000003
MPS 1.4 - APIC platform             30    30 0x00000003
MPS 1.4 - APIC platform             31    31 0x00000003
MPS 1.4 - APIC platform             32    32 0x00000003
MPS 1.4 - APIC platform             33    33 0x00000003
MPS 1.4 - APIC platform             34    34 0x00000003
MPS 1.4 - APIC platform             35    35 0x00000003
MPS 1.4 - APIC platform             36    36 0x00000003
MPS 1.4 - APIC platform             37    37 0x00000003
MPS 1.4 - APIC platform             38    38 0x00000003
MPS 1.4 - APIC platform             39    39 0x00000003
MPS 1.4 - APIC platform             40    40 0x00000003
MPS 1.4 - APIC platform             41    41 0x00000003
MPS 1.4 - APIC platform             42    42 0x00000003
MPS 1.4 - APIC platform             43    43 0x00000003
MPS 1.4 - APIC platform             44    44 0x00000003
MPS 1.4 - APIC platform             45    45 0x00000003
MPS 1.4 - APIC platform             46    46 0x00000003
MPS 1.4 - APIC platform             47    47 0x00000003
MPS 1.4 - APIC platform             61    61 0x00000003
MPS 1.4 - APIC platform             65    65 0x00000003
MPS 1.4 - APIC platform             80    80 0x00000003
MPS 1.4 - APIC platform            193   193 0x00000003
MPS 1.4 - APIC platform            225   225 0x00000003
MPS 1.4 - APIC platform            253   253 0x00000003
MPS 1.4 - APIC platform            254   254 0x00000003
MPS 1.4 - APIC platform            255   255 0x00000003
i8042prt                             1     1 0xffffffff
```

```
i8042prt                          12    12 0xffffffff
Serial                             4     4 0x00000000
Serial                             3     3 0x00000000
Floppy                             6     6 0x00000000
HPTX                              36    36 0x00000000
HPTX                              32    32 0x00000000
aic78xx                           40    40 0x00000000
atapi                              0    14 0x00000000
------------------------------------------------------------------------
Devices                       Physical Address  Length
------------------------------------------------------------------------
MPS 1.4 - APIC platform         0x00000000  0x0000000010
MPS 1.4 - APIC platform         0x00000020  0x0000000002
MPS 1.4 - APIC platform         0x00000040  0x0000000004
MPS 1.4 - APIC platform         0x00000048  0x0000000004
MPS 1.4 - APIC platform         0x00000061  0x0000000001
MPS 1.4 - APIC platform         0x00000070  0x0000000002
MPS 1.4 - APIC platform         0x00000080  0x0000000010
MPS 1.4 - APIC platform         0x00000092  0x0000000001
MPS 1.4 - APIC platform         0x000000a0  0x0000000002
MPS 1.4 - APIC platform         0x000000c0  0x0000000010
MPS 1.4 - APIC platform         0x000000f0  0x0000000010
i8042prt                        0x00000060  0x0000000001
i8042prt                        0x00000064  0x0000000001
Parport                         0x00000378  0x0000000003
Serial                          0x000003f8  0x0000000007
Serial                          0x000002f8  0x0000000007
Floppy                          0x000003f0  0x0000000006
Floppy                          0x000003f7  0x0000000001
HPTX                            0x0000fca0  0x000000001c
HPTX                            0x0000fcc0  0x000000001c
aic78xx                         0x0000f800  0x0000000100
atapi                           0x000001f0  0x0000000008
atapi                           0x000003f6  0x0000000001
cirrus                          0x000003b0  0x000000000c
cirrus                          0x000003c0  0x0000000020


DMA and Memory Report
------------------------------------------------------------------------
Devices                       Channel    Port
------------------------------------------------------------------------
Floppy                            2     0
------------------------------------------------------------------------
Devices                       Physical Address  Length
------------------------------------------------------------------------
MPS 1.4 - APIC platform         0xfec00000  0x00000400
MPS 1.4 - APIC platform         0xfee00000  0x00000400
HPTX                            0xfecfc000  0x0000001c
HPTX                            0xfecfd000  0x0000001c
aic78xx                         0xfecff000  0x00001000
cirrus                          0x000a0000  0x00020000
cirrus                          0xfc000000  0x02000000



Environment Report
------------------------------------------------------------------------
```

```
System Environment Variables
   APPDIR=c:\tuxedo\runtime
   ComSpec=C:\WINNT\system32\cmd.exe
   LIBPATH=c:\tuxedo\lib
   NUMBER_OF_PROCESSORS=2
   OS=Windows_NT
   Os2LibPath=C:\WINNT\system32\os2\dll;
   Path=C:\WINNT\system32;C:\WINNT;C:\TUXEDO\bin;C:\MSSQL7\BINN
   PROCESSOR_ARCHITECTURE=x86
   PROCESSOR_IDENTIFIER=x86 Family 6 Model 5 Stepping 2, GenuineIntel
   PROCESSOR_LEVEL=6
   PROCESSOR_REVISION=0502
   TMCONTEXTS=1
   TUXCONFIG=c:\tuxedo\runtime\tuxconfig
   TUXDIR=c:\tuxedo
   windir=C:\WINNT



Environment Variables for Current User
   TEMP=C:\TEMP
   TMP=C:\TEMP



Network Report
------------------------------------------------------------------------
Your Access Level: Admin & Local
Workgroup or Domain: WORKGROUP
Network Version: 4.0
LanRoot: WORKGROUP
Logged On Users: 1
Current User (1): Administrator
  Logon Domain: CLIENT1
  Logon Server: CLIENT1

Transport: Nbf_HPTX1, 00-90-27-72-5C-15, VC's: 0, Wan: Wan
Transport: Nbf_HPTX2, 00-90-27-72-5B-E3, VC's: 0, Wan: Wan

Character Wait: 3,600
Collection Time: 250
Maximum Collection Count: 16
Keep Connection: 600
Maximum Commands: 5
Session Time Out: 45
Character Buffer Size: 512
Maximum Threads: 17
Lock Quota: 6,144
Lock Increment: 10
Maximum Locks: 500
Pipe Increment: 10
Maximum Pipes: 500
Cache Time Out: 40
Dormant File Limit: 45
Read Ahead Throughput: 4,294,967,295
Mailslot Buffers: 3
```

```
Server Announce Buffers: 20
Illegal Datagrams: 5
Datagram Reset Frequency: 60
Log Election Packets: False
Use Opportunistic Locking: True
Use Unlock Behind: True
Use Close Behind: True
Buffer Pipes: True
Use Lock, Read, Unlock: True
Use NT Caching: True
Use Raw Read: True
Use Raw Write: True
Use Write Raw Data: True
Use Encryption: True
Buffer Deny Write Files: True
Buffer Read Only Files: True
Force Core Creation: True
512 Byte Max Transfer: False
Bytes Received: 269
SMB's Received: 3
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Bytes Transmitted: 485
SMB's Transmitted: 3
Paged Read Bytes Requested: 0
Non Paged Read Bytes Requested: 0
Cache Read Bytes Requested: 0
Network Read Bytes Requested: 0
Initally Failed Operations: 0
Failed Completion Operations: 0
Read Operations: 0
Random Read Operations: 0
Read SMB's: 0
Large Read SMB's: 0
Small Read SMB's: 0
Write Operations: 0
Random Write Operations: 0
Write SMB's: 0
Large Write SMB's: 0
Small Write SMB's: 0
Raw Reads Denied: 0
Raw Writes Denied: 0
Network Errors: 0
Sessions: 1
Failed Sessions: 0
Reconnects: 0
Core Connects: 0
LM 2.0 Connects: 0
LM 2.x Connects: 0
Windows NT Connects: 1
Server Disconnects: 0
Hung Sessions: 0
Use Count: 0
Failed Use Count: 0
Current Commands: 0
Server File Opens: 0
Server Device Opens: 0
Server Jobs Queued: 0
Server Session Opens: 0
Server Sessions Timed Out: 0
Server Sessions Errored Out: 0
Server Password Errors: 0
Server Permission Errors: 0
Server System Errors: 0
Server Bytes Sent: 269
Server Bytes Received: 485
Server Average Response Time: 0
Server Request Buffers Needed: 0
Server Big Buffers Needed: 0
```

Internet Information Server Registry Parameters

```
\registry\machine\system\currentcontrolset\services\inetinfo
    Parameters
        BandwidthLevel = REG_DWORD 0xffffffff
        ListenBackLog = REG_DWORD 0x00000019
        DisableMemoryCache = REG_DWORD 0x00000001
        MemoryCacheSize = REG_DWORD 0x00000000
        PoolThreadLimit = REG_DWORD 0x000000ba
        ObjectCacheTTL = REG_DWORD 0xffffffff
        Filter
            FilterType = REG_DWORD 0x00000000
            NumGrantSites = REG_DWORD 0x00000000
            NumDenySites = REG_DWORD 0x00000000
        MimeMap
            text/html,htm,,h =
            image/gif,gif,,g =
            image/jpeg,jpg,,: =
            text/plain,txt,,0 =
            text/html,html,,h =
            image/jpeg,jpeg,,: =
            image/jpeg,jpe,,: =
            image/bmp,bmp,,: =
            application/octet-stream,*,,5 =
            application/pdf,pdf,,5 =
            application/octet-stream,bin,,5 =
            application/oda,oda,,5 =
            application/zip,zip,,9 =
            application/rtf,rtf,,5 =
            application/postscript,ps,,5 =
            application/postscript,ai,,5 =
            application/postscript,eps,,5 =
            application/mac-binhex40,hqx,,4 =
            application/msword,doc,,5 =
            application/msword,dot,,5 =
            application/winhlp,hlp,,5 =
            video/mpeg,mpeg,,; =
            video/mpeg,mpg,,; =
            video/mpeg,mpe,,; =
            video/x-msvideo,avi,,< =
            video/quicktime,qt,,; =
            video/quicktime,mov,,; =
            video/x-sgi-movie,movie,,< =
```

```
x-world/x-vrml,wrl,,5 =
x-world/x-vrml,xaf,,5 =
x-world/x-vrml,xof,,5 =
x-world/x-vrml,flr,,5 =
x-world/x-vrml,wrz,,5 =
application/x-director,dcr,,5 =
application/x-director,dir,,5 =
application/x-director,dxr,,5 =
image/cis-cod,cod,,5 =
image/x-cmx,cmx,,5 =
application/envoy,evy,,5 =
application/x-msaccess,mdb,,5 =
application/x-mscardfile,crd,,5 =
application/x-msclip,clp,,5 =
application/octet-stream,exe,,5 =
application/x-msexcel,xla,,5 =
application/x-msexcel,xlc,,5 =
application/x-msexcel,xlm,,5 =
application/x-msexcel,xls,,5 =
application/x-msexcel,xlt,,5 =
application/x-msexcel,xlw,,5 =
application/x-msmediaview,m13,,5 =
application/x-msmediaview,m14,,5 =
application/x-msmoney,mny,,5 =
application/x-mspowerpoint,ppt,,5 =
application/x-msproject,mpp,,5 =
application/x-mspublisher,pub,,5 =
application/x-msterminal,trm,,5 =
application/x-msworks,wks,,5 =
application/x-mswrite,wri,,5 =
application/x-msmetafile,wmf,,5 =
application/x-csh,csh,,5 =
application/x-dvi,dvi,,5 =
application/x-hdf,hdf,,5 =
application/x-latex,latex,,5 =
application/x-netcdf,nc,,5 =
application/x-netcdf,cdf,,5 =
application/x-sh,sh,,5 =
application/x-tcl,tcl,,5 =
application/x-tex,tex,,5 =
application/x-texinfo,texinfo,,5 =
application/x-texinfo,texi,,5 =
application/x-troff,t,,5 =
application/x-troff,tr,,5 =
application/x-troff,roff,,5 =
application/x-troff-man,man,,5 =
application/x-troff-me,me,,5 =
application/x-troff-ms,ms,,5 =
application/x-wais-source,src,,7 =
application/x-bcpio,bcpio,,5 =
application/x-cpio,cpio,,5 =
application/x-gtar,gtar,,9 =
application/x-shar,shar,,5 =
application/x-sv4cpio,sv4cpio,,5 =
application/x-sv4crc,sv4crc,,5 =
application/x-tar,tar,,5 =
application/x-ustar,ustar,,5 =
audio/basic,au,,< =
audio/basic,snd,,< =
audio/x-aiff,aif,,< =
audio/x-aiff,aiff,,< =
audio/x-aiff,aifc,,< =
audio/x-wav,wav,,< =
audio/x-pn-realaudio,ram,,< =
image/ief,ief,,: =
image/tiff,tiff,,: =
image/tiff,tif,,: =
image/x-cmu-raster,ras,,: =
image/x-portable-anymap,pnm,,: =
image/x-portable-bitmap,pbm,,: =
image/x-portable-graymap,pgm,,: =
image/x-portable-pixmap,ppm,,: =
image/x-rgb,rgb,,: =
image/x-xbitmap,xbm,,: =
image/x-xpixmap,xpm,,: =
image/x-xwindowdump,xwd,,: =
text/html,stm,,h =
text/plain,bas,,0 =
text/plain,c,,0 =
text/plain,h,,0 =
text/richtext,rtx,,0 =
text/tab-separated-values,tsv,,0 =
text/x-setext,etx,,0 =
application/x-perfmon,pmc,,5 =
application/x-perfmon,pma,,5 =
application/x-perfmon,pmr,,5 =
application/x-perfmon,pml,,5 =
application/x-perfmon,pmw,,5 =
    Performance
        Library = infoctrs.DLL
        Open = OpenINFOPerformanceData
        Close = CloseINFOPerformanceData
        Collect = CollectINFOPerformanceData
        Last Counter = REG_DWORD 0x00000756
        Last Help = REG_DWORD 0x00000757
        First Counter = REG_DWORD 0x00000738
        First Help = REG_DWORD 0x00000739
```

World Wide Web Server Registry Parameters

```
\registry\machine\system\currentcontrolset\services\w3svc [17 1]
    Type = REG_DWORD 0x00000020
    Start = REG_DWORD 0x00000003
    ErrorControl = REG_DWORD 0x00000000
    ImagePath = REG_EXPAND_SZ C:\WINNT\System32\inetsrv\inetinfo.exe
    DisplayName = World Wide Web Publishing Service
    DependOnService = REG_MULTI_SZ "RPCSS"  \
                                   "NTLMSSP"
    DependOnGroup = REG_MULTI_SZ
    ObjectName = LocalSystem
    Parameters
        MajorVersion = REG_DWORD 0x00000002
        MinorVersion = REG_DWORD 0x00000000
        AdminName = Administrator
        AdminEmail = Admin@corp.com
```

```
        MaxConnections = REG_DWORD 0x00002710
        LogType = REG_DWORD 0x00000000
        LogFileDirectory = REG_EXPAND_SZ %SystemRoot%\System32\LogFiles
        LogFileTruncateSize = REG_DWORD 0x01388000
        LogFilePeriod = REG_DWORD 0x00000001
        LogFileFormat = REG_DWORD 0x00000000
        LogSqlDataSource = HTTPLOG
        LogSqlTableName = Internetlog
        LogSqlUserName = InternetAdmin
        LogSqlPassword = sqllog
        Authorization = REG_DWORD 0x00000005
        AnonymousUserName = IUSR_CLIENT1
        Default Load File = Default.htm
        Dir Browse Control = REG_DWORD 0x4000001e
        CheckForWAISDB = REG_DWORD 0x00000000
        CacheExtensions = REG_DWORD 0x00000001
        GlobalExpire = REG_DWORD 0xffffffff
        ServerSideIncludesEnabled = REG_DWORD 0x00000001
        ServerSideIncludesExtension = .stm
        DebugFlags = REG_DWORD 0x00000008
        ScriptTimeout = REG_DWORD 0x00000384
        ConnectionTimeOut = REG_DWORD 0x00001c20
        InstallPath = C:\WINNT\System32\inetsrv
        SecurePort = REG_DWORD 0x000001bb
        Filter DLLs = C:\WINNT\System32\inetsrv\sspifilt.dll
        AccessDeniedMessage = Error: Access is Denied.
        NTAuthenticationProviders = NTLM
        ServerComment =
        ADCLaunch
            AdvancedDataFactory
            RDSServer.DataFactory
        Script Map
            .idc = C:\WINNT\System32\inetsrv\httpodbc.dll
        Virtual Roots
            /, = C:\InetPub\wwwroot,,5
            /Scripts, = C:\InetPub\scripts,,4
            /MSADC, = C:\Program Files\Common Files\System\MSADC,,5
            /iisadmin, = C:\WINNT\System32\inetsrv\iisadmin,,1
    Performance
        Library = w3ctrs.DLL
        Open = OpenW3PerformanceData
        Close = CloseW3PerformanceData
        Collect = CollectW3PerformanceData
        Last Counter = REG_DWORD 0x00000790
        Last Help = REG_DWORD 0x00000791
        First Counter = REG_DWORD 0x00000758
        First Help = REG_DWORD 0x00000759
    Security [17 1]
        Security = REG_BINARY 0x000000d8 0x80140001 0x000000c0 0x000000cc
0x00000014 0x00000034 0x00200002 0x00000001 0x00188002 0x000f01ff
0x00000101 0x01000000 0x00000000 0x00000220 0x008c0002 0x00000005
0x00180000 0x0002018d 0x00000101 \
                0x01000000 0x00000000 0x00000000 0x001c0000 0x000201fd
0x00000201 0x05000000 0x00000020 0x00000223 0x00000000 0x001c0000
0x000f01ff 0x00000201 0x05000000 0x00000020 0x00000220 0x00000000
0x001c0000 0x000f01ff 0x00000201 \
                0x05000000 0x00000020 0x00000225 0x00000000 0x00180000
0x000201fd 0x00000101 0x05000000 0x00000012 0x00000225 0x00000101
0x05000000 0x00000012 0x00000101 0x05000000 0x00000012
```

```
    Enum
        0 = Root\LEGACY_W3SVC\0000
        Count = REG_DWORD 0x00000001
        NextInstance = REG_DWORD 0x00000001
```

Unisys Settings

```
\registry\machine\software\unisys
    TPCC
        MAXTERMS = 10000
```

Tuxedo Configuration

```
*RESOURCES
IPCKEY          133133

MAXACCESSERS    500
MAXSERVERS      210
MAXSERVICES     1100
MODEL           SHM
MASTER          tpcctm
LDBAL           N
SCANUNIT        60
BLOCKTIME       60
BBLQUERY        60

*MACHINES
DEFAULT:

CLIENT1         LMID=tpcctm
                TUXDIR="c:\tuxedo"
                APPDIR="c:\tuxedo\runtime"
                TUXCONFIG="c:\tuxedo\runtime\tuxconfig"
                ULOGPFX="c:\tuxedo\runtime\ulog\ULOG"
                TYPE="WinNT"
                UID=0
                GID=0

*GROUPS
GRALL
        LMID=tpcctm     GRPNO=1   OPENINFO=NONE

GRDEL
        LMID=tpcctm     GRPNO=3   OPENINFO=NONE

*SERVERS
DEFAULT:
                CLOPT="-A -- -sES2025 -dtpcc"

tpccsvr         SRVGRP=GRALL
                SRVID=100
                MIN=88 MAX=200
                RQADDR=allq REPLYQ=Y
```

```
tpccdelv        SRVGRP=GRDEL
                SRVID=300
                MIN=10 MAX=20
                RQADDR=delq REPLYQ=Y
```

```
*SERVICES
```

Appendix D - RTE Code

Admin Environment

```
if '%1'=='' goto usage
if '%2'=='' goto usage
if '%3'=='' goto usage

:paramok

set WEBDIAGLEVEL=4
set WEBEVENTLOG=0
set WEBEVENTHOST=
set WEBCHECKLEVEL=2

c:\webdriver\webadmin.exe -cweb%1.cfg -m%2 -d%3 -s160
if %ERRORLEVEL% NEQ 0 pause

goto end

:usage
@ECHO You must supply the following parameters:
@ECHO "webnnn.cmd <cfg file suffix> <min driver #> <max driver #>"
pause

:end
```

Profiles used for Performance Run

Web816.cfg

```
//
//  Common Driver Configuration
//
INITBASEPORT 4300
INITSYNCMAX 4
INITPAUSE 1
INITRSCALE 350
INITTSCALE 100
INITRWID 1, 816
INITFIXEDWID 1
INITCCLAST 208
INITCCID 208
INITCITEMID 208
//
//  Configuration Driver 1
//
1 INITIPADDR 192.168.90.31
1 INITIISADDR 192.168.10.1
1 INITIISPORT 80
1 INITBROWSERS 1020
1 INITMYWID 1,102

//
//  Configuration Driver 2
//
2 INITIPADDR 192.168.90.32
2 INITIISADDR 192.168.11.1
2 INITIISPORT 80
2 INITBROWSERS 1020
2 INITMYWID 103,204

//
//  Configuration Driver 3
//
3 INITIPADDR 192.168.90.33
3 INITIISADDR 192.168.12.1
3 INITIISPORT 80
3 INITBROWSERS 1020
3 INITMYWID 205,306

//
//  Configuration Driver 4
//
4 INITIPADDR 192.168.90.34
4 INITIISADDR 192.168.13.1
4 INITIISPORT 80
4 INITBROWSERS 1020
4 INITMYWID 307,408

//
//  Configuration Driver 5
//
5 INITIPADDR 192.168.90.35
5 INITIISADDR 192.168.14.1
5 INITIISPORT 80
5 INITBROWSERS 1020
5 INITMYWID 409,510

//
//  Configuration Driver 6
//
6 INITIPADDR 192.168.90.36
6 INITIISADDR 192.168.15.1
6 INITIISPORT 80
6 INITBROWSERS 1020
6 INITMYWID 511,612

//
//  Configuration Driver 7
//
7 INITIPADDR 192.168.90.37
7 INITIISADDR 192.168.16.1
7 INITIISPORT 80
7 INITBROWSERS 1020
```

```
7 INITMYWID 613,714

//
//  Configuration Driver 8
//
8 INITIPADDR 192.168.90.38
8 INITIISADDR 192.168.17.1
8 INITIISPORT 80
8 INITBROWSERS 1020
8 INITMYWID 715,816

//
```

Driver Environment

```
if '%1'==' goto usage

:paramok

set WEBDRIVERNO=%1
set WEBADMBASEPORT=4300
set WEBDIAGLEVEL=2
set WEBEVENTLOG=1
set WEBEVENTHOST=
set WEBLOGLEVEL=1
set WEBSINGLETRAN=0
set WEBTPCCAUDIT=0
set WEBRTFUDGETM=110
set WEBNEWORDERPROB=4484
set WEBPAYMENTPROB=4307
set WEBORDERSTATUSPROB=403
set WEBDELIVERYPROB=403
set WEBSTOCKLEVELPROB=403
set WEBTTNEWORDER=12030
set WEBTTPAYMENT=12030
set WEBTTDELIVERY=5060
set WEBTTORDERSTATUS=10070
set WEBTTSTOCKLEVEL=5060

webdriver.exe

goto end

:usage
@ECHO  You must supply the following parameters:
@ECHO  "webdriver.cmd <driver number>"
pause

:end
exit
```

Appendix E - Disk Storage

TPC-C 180-Day Disk Space Requirements

Warehouses	**816**	tpmC	**10,265.90**	tpmC/W	12.58

Table	**Initial Rows**	**Data KB**	**Index KB**	**Extra 5% KB**	**Total With 5% KB**
Warehouse	816	88	40	6	134
District	8,160	912	64	49	1,025
Customer	24,480,000	17,803,640	1,143,296	947,347	19,894,283
History (D)	24,480,000	1,360,064	0		1,360,064
Order (D)	24,480,000	750,352	414,504		1,164,856
New-Order	7,344,000	116,112	344	5,823	122,279
Order-Line (D)	244,803,773	15,300,240	38,128		15,338,368
Item	100,000	9,528	88	481	10,097
Stock	81,600,000	26,112,000	58,544	1,308,527	27,479,071
Totals KB		61,452,936	1,655,008	2,262,233	65,370,177

Db/Filegroup	**Count**	**Size MB**	**MB Allocated**	**MB Loaded +5%**	**MB for 8 Hours**
master, model & msdb		22	22	22	22
tempdb		10	10	10	10
mssql70_tpcc_root	1	10	10	10	10
mssql70_cs_fg	7	6,800	47,600	46,263	46,263
mssql70_misc_fg	7	3,400	23,800	17,575	21,776
Total Allocated MB			**71,442**	**63,880**	**68,081**

	MB	
Dynamic Space MB	17,003	Sum of data for orders, order_line & history
Static Space	46,835	Sum of data+index+5% - Dynamic Space
Free Space	7,604	Total allocated space - (Dynamic & Static Spaces)
Daily Growth	3,422	(Dynamic Space / (W * 62.5)) * tpmC
Daily Spread	2,470	Free space - 1.5 * Daily growth (zero if negative)
	0	SQL Server can be configured to eliminate Daily Spread
180 Day Space MB	662,883	Static Space + 180 * (Daily Growth + Daily Spread)
180 Day Space GB	**647.35**	
8 hr log GB	**24.70**	(need double for mirroring)

Disk Capacity MB	4372	**4.2695 GB**	Capacity of 4GB disks
	8747	**8.5420 GB**	Capacity of 9GB disks
	17496	**17.0859 GB**	Capacity of 18GB disks

Space Usage	**GB Needed**	**Disks Priced**	**GB Priced**	
180-day space DB	647.35 GB	0	0.00 GB	4GB drives
		76	649.19 GB	9GB drives
Total DB		**76**	649.19 GB	
8-hr log+mirror	49.40 GB	6	51.25 GB	9GB drives
OS, SQL Server	2.04 GB	1	4.24 GB	4GB drive
Total space	**698.78 GB**	**83**	**704.68 GB**	

TPC-C 180-Day Dynamic Table Growth Rates over 7 Hours					10,265.90 tpmC		
Tables	**Initial (KB)**	**Final (KB)**	**Change(KB)**	**Unused (KB)**	**KB / New-Order**	**8-Hr MB**	
History	1,360,064	1,602,712	242,648	1,568	0.0563	1,599.25	
Orders	1,164,856	1,838,360	673,504	1,752	0.1563	1,889.92	
Order_line	15,338,368	18,182,536	2,844,168	1,008	0.6602	18,156.09	
Dynamic	**17,863,288**	**21,623,608**	**3,760,320**	**4,328**	**0.8729**	**21,645.26**	
New_order	116,456	196,496	80,040	7,080	0.0186	203.14	
Static							
Log	198,815	22,665,048	22,466,233		**5.2153**	25,291.11	24.70 GB
SUM(d_next_o_id)	24,488,160	28,795,880	4,307,720				

Appendix F - Third-Party Price Quotations

One Microsoft Way
Redmond, WA 98052-6399
Fax 425 936 7329
http://www.microsoft.com/

Microsoft

August 31, 1999

Mr. Jerrold Buggert
Director, Systems Analysis, Modeling, Measurement
Unisys Corporation
25725 Jeronimo Road
Mission Viejo, CA 92691
949-380-5106
949-380-5539 fax

Dear Mr. Buggert:

Here is the information you requested regarding U.S. pricing of several Microsoft products that were used in a recent TPC-C benchmark:

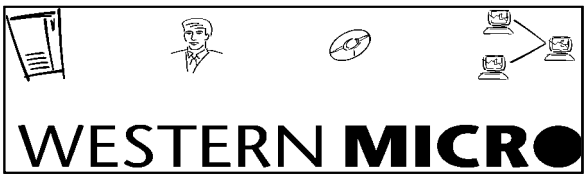
Microsoft SQL Server 7.0, Enterprise Edition (one server plus unlimited CALs)	$28,999
Microsoft Windows NT Server 4.0, Enterprise Edition (one server plus 25 CALs)	$3,999
Windows NT Server 4.0 (one server w/5 CALs, no discount for additional servers)	$809
Visual C++ Professional 6.0 (single copy)	$549
5-year maintenance for above software @ $2095/yr	$10,475

This quote is valid for the next 90 days.

If I can be of any further assistance, please contact me at 425-936-5301 or tomkr@microsoft.com.

Yours truly,

Thomas Kreyche
Product Manager
SQL Server Marketing



Western Micro Technology **9/1/99**
(800)937-8446

Quoted to: Jerry Buggert/Unisys for TPC.org
Prepared by: Tony Jacobs

Qty.	Description	Style	Price	Extended Price
1	SYS: Aquanta ES2025, w/ CDRom, 0 Proc, 0MB Mem	ES202151-GZN	$2,726	$2,726
2	PROC: 550MHz Pentium III Xeon /512 Cache & VRM	XEO3550-512	$1,437	$2,874
1	UPGRD: CPU Voltage Regulator Module	ES202151-XEU	$24	$24
2	POWER: AC P/S 400W Tower	DSA400-PWR	$258	$516
4	MEM: 256 MB Memory Upgrade	DIM10072-256	$848	$3,392
4	CTRL: RAID 3-Ch PCI	RAD5003-P64	$1,400	$5,600
4	MEM: 32MB Cache & Battery BU	RAD5323-MEB	$479	$1,916
1	DISK: 4GB Drive, Ultra SCSI SCA	HDS417-W	$442	$442
1	MONITOR:15-inch Color	EVG2100-P	$221	$221
1	KEYBD: 104 Key Spacesaver	PCK104-SKB	$26	$26
1	MOUSE: 2 Button PS2	PWM1-PS2	$15	$15
	Server Total			**$17,752**
91	DISK: 9GB Drive, 10K SCSI LVD, SCA	OSD9205-W45	$618	$56,238
12	CAB: Disk, 8 SCA w/ I/F cards, 0 Disks, 3U	OSM310300-L05	$2,118	$25,416
11	CBL: SCSI 68-pin VHD Conn's, 5 meter	CBL134-5	$142	$1,562
1	CBL: SCSI 68-pin VHD Conn's, 0.5 meter	CBL134-CAT	$69	$69
12	ACC: Deskside Pedestal	OSM3000-DSK	$26	$312
	Storage Total			**$83,597**
1	SYS: NetServer LC3, w/1 450MHz Proc & CDROM, 0MB Mem	D7029-AV	$1,660	$1,660
1	PROC:1x450MHz Pentium II/512KB Cache UPG	D7032-AV	$993	$993
2	MEM: 64 MB SDRAM Memory Upgrade	D6097-AV	$145	$290
2	MEM: 128 MB SDRAM Memory Upgrade	D6098-AV	$255	$510
1	DISK: 4GB SCSI 3.5 Internal	D4910-AV	$303	$303
2	ETHERNET: 10/100TX Mbit/sec, PCI 32-bit	D5013-AV	$68	$136
1	MONITOR:15-inch Color	EVG2100-P	$221	$221
	Client Total			**$4,113**
	Server, Storage and Client Total			**$105,462**
	Discount based on total dollar volume			**($7,382)**
Quote Total				**$98,080**

Quote valid for 90 days.
Disks come with return to factory, 5 year warranty, 7 day replenishment

BEA ENTERPRISE MIDDLEWARE SOLUTIONS

August 10, 1999

Mr. Jerrold Buggert
Director, Systems Analysis, Modeling, Measurement
Unisys Corporation
25725 Jeronimo Road
Mission Viejo, CA 92691
Fax (949) 465-2552

Dear Mr. Buggert:

Per your request I am enclosing the pricing information regarding TUXEDO 6.3 that you requested. This pricing applies to Tuxedo 6.1, 6.2, 6.3, 6.4 and 6.5. Please note that Tuxedo 6.5 is our most recent version of Tuxedo but that all 6.x releases are generally available.
Core functionality services pricing is appropriate for your activities. As per the table below Unisys Intel-based server systems are classified as either a Tier 1, Tier 2 or Tier 3 server depending on the CPU capacity of the system. The Aquanta 4 way systems are Tier 2, and the Aquanta 8-way server is Tier 3 , and the NetServer LC3 clients (2-way Pentium II technology) are Tier 1. This quote is valid for 90 days from the date of this letter.

Tuxedo Core Functionality Services (CFS) Program Product Pricing and Description

TUX-CFS provides a basic level of middleware support for distributed computing, and is best used by organizations with substantial resources and knowledge for advanced distributed computing implementations.

TUX-CFS prices are server only and are based on the overall performance characteristics of the server and uses the same five tier computer classification as TUXEDO 6.x. Prices range from $3,000 for Tier 1 to $250,000 for Tier 5. Under this pricing option EVERY system running TUX-CFS at the user site must have a TUXEDO license installed and pay the appropriate per server license fees.

Very Truly Yours,

Lewis D. Brentano,
Director, Market Planning

BEA Tux/CFS Unlimited User License Fees Per Server

Unlimited User License fees per server	Number of Users	Dollar Amount	Maintenance (5 x 8) per year	Maintenance (7 x 24) per year
Tier 1 -- PC Servers with 1 or 2 CPUs, entry level RISC Uni-processor workstations and servers (Class 1and Class 2)	Unlimited	$3,000.00	$480.00	$690.00
Tier 2 - PC Servers with 3 or 4 CPUs, Midrange RISC Uni-processor servers and workstations (class 3)	Unlimited	$12,000.00	$1,920.00	$2,760.00
Tier 3 - Midrange Multiprocessors, up to 8 CPUs per system capacity (Class 4 and 5)	Unlimited	$30,000.00	$4,800.00	$6,900.00
Tier 4 - Large (more than 8, less than 32 CPUs) and Mainframe Systems (Class 6)	Unlimited	$100,000.00	$16,000.00	$23,000.00
Tier 5 - Massively Parallel Systems, > 32 processors	Unlimited	$250,000.00	$40,000.00	$57,500.00

Intel based server tier classifications:

		Tier 1	Tier 1	Tier 2	Tier 3
Platform	**Operating System**				
Intel Pentium/ Pentium Pro PCs	Interactive R3.2 ESIX SVR 4.0 SCO UNIX 3.2.2 and 3.2.4 SCO ODT 2.x,3.x Solaris x86 2.X UnixWare, Windows NT 3.5/4.0	All 386/486 PCs are Class 1	ALL Pentium PCs with 1 or 2 CPUs capacity are Tier 1	ALL Pentium PCs with 3 or 4 CPUs capacity are Tier 2	ALL Pentium PCs with 5,6,7, or 8 CPUs Capacity are Tier 3

Software House International Pricing Proposal	Quotation #MO-990901-40949 09/01/99

Unisys
Rick Freeman
Quote good for 90 days
,
Phone: **Fax: 949-465-2552**

SHI Account Exec: Matthew O. Martin
Telephone : (408) 922-1106
Fax : (408) 526-1222

Reference:

Product	Part #	Qty	List	Your Price	Total
8port Plus 1 Hub Generic 5 Year return to warranty	Z99552	1100		$27.00	$29,700.00
Total					**$29,700.00**

Additional Comments:

NETLUX

14180 Live Oak Ave., Unit E
Baldwin Park, Ca. 91760

1-800-789-1780
Phone#626-851-9737
Fax #626-851-9837

August 6, 1999

Rick Freeman
Unisys Corporation
25725 Jeronimo Road
Mission Viejo, CA 92691
Fax: (949) 380-5539
cc: (949) 380-5344

Quotation

Quantity	Part No.	Description	Unit Price	Total
3	NX-SW8	NETLUX 8-port 10/100Mbps FAST Ethernet Switch	$229.00	$ 687.00

NOTE: The NX-FS4 has been discontinued.

Terms and Conditions:
FOB Origin
Quote Valid for 90 days
5 Year Warranty

Sincerely,
Martin Parry
NETLUX