TPC Benchmark C
Full Disclosure Report
IBM AS/400
AS/400e server model s40 with feature code 2261

September 1, 1998

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Revised September 1, 1998

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Abstract

This report documents the full disclosure information required by the TPC Benchmark C Standard Specification dated April 8, 1997 for measurements on the IBM AS/400e server model s40 with feature code 2261.

The software used on the AS/400 systems includes OS/400 Version 4, Release 1, Modification 0, operating system, OS/400 Version 4, Release 1, Modification 0, DB2 for AS/400 Version 4, Release 1, Modification 0, INT LNG ENV COBOL OS/400 V3 R7, INT LNG ENV C OS/400 V3 R7, DB2 Query Manager and SQL Development Kit, CICS for OS/400 V3 R6, and Application Development Tools.

IBM AS/400e server model s40 with feature code 2261

Company Name	System Name	Data Base Software	Operating System Software
IBM®	AS/400e server s40-2261 C/S	DB2 for AS/400 Version 4 Release 1	OS/400 Version 4 Release 1
Availability Date: August 29, 1997			

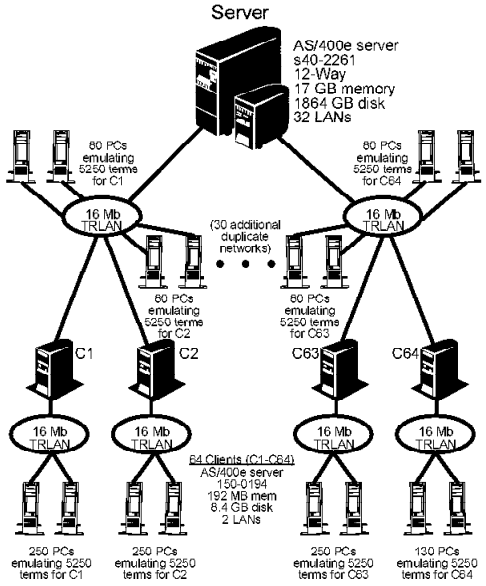
Total System Cost	TPC-C Throughput	Price/Performance
- Hardware - Software -5 Years Maintenance	Sustained maximum throughput of system running TPC-C expressed in transactions per minute	Total system cost/tpmC ($3,459,875)
$3,459,875	10825.4 tpmC	$136.06 per tpmC

IBM	AS/400e server model s40 with feature code 2261	TPC-C Rev. 3.3 Report Date: August 19, 1997/September 1, 1998

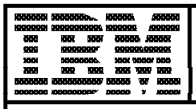
Total System Cost	TPC-C Throughput	Price/Performance	Availability Date
$3,459,675	25149.75	$138.06	August 29, 1997

Processors	Database Manager	Operating System	Other Software	Number of Users
1 AS/400e s40-2261 (12-way) 64 AS/400e 150-0194	DB2 for AS/400 Version 4 Release 1	OS/400 Version 4 Release 1	CICS for OS/400 V3 R6 INT LNG ENV COBOL OS/400 V3 R7 INT LNG ENV C OS/400 V3 R7	21,000

AS/400e server s40-2261 C/S Priced Configuration



System components:	Qty:	Description:
Server	1	
Processors	4	AS/400e server s30-2259
Memory		7 GB main memory
Disk controllers	5	6532 DASD IOP
	1	Integrated multifunction IOP
Disk drives	92	8589 MB DASD
Total storage		790 GB
Clients (each):	24	
Processor	1	AS/400e server 150-0194
Memory		192 MB main memory
Disk controller	1	Integrated multifunction IOP
Disk	2	4194 MB DASD



AS/400e server model s40-2261

TPC-C REV 3.3 EXECUTIVE SUMMARY

Report Date: Sseptember 1, 1998

TPC Benchmark C

AS/400 9406-S40 Configuration

Item Description	Feature Number	Unit Price	3rd Party Pricing	Qty.	Extended Price	Extended Maintenance	5-Year Price
Server Hardware:							
AS/400 9406 - Model S40 12-way Processor	2261	$300,000		1	$300,000	$69,600	$369,600
Token-Ring Adapter (9249)	Bundled			1	$0		$0
Battery Backup	Bundled			1	$0		$0
Twinax Work Station Controller (5540)	Bundled			1	$0		$0
256 MB Base Memory	Bundled			4	$0		$0
Optical Link	2688	$2,000		2	$4,000		$4,000
1024 MB Main Storage	3192	$22,528		16	$360,448		$360,448
Storage Expansion Unit	5057	$5,000		1	$5,000	$10,560	$15,560
Storage Expansion Unit	5058	$5,000		6	$30,000	$63,360	$93,360
1063 Mbps System Unit Expansion Tower	5073	$14,900		2	$29,800		$29,800
1063 Mbps Storage Expansion Tower	5083	$14,900		7	$104,300	$100,800	$205,100
Token Ring Adapter	6149	$1,200		31	$37,200		$37,200
RAID Disk Unit Controller	6532	$9,900		13	$128,700		$128,700
2.5 GB 1/4-inch Tape Drive	6381	$1,500		1	$1,500		$1,500
RPQ 843804	843804	$900		1	$900		$900
LAN/WAN/Workstation IOP	2629	$2,600		16	$41,600		$41,600
V.24./EIA232 20 ft Cable	0330	$125		1	$125		$125
8.58 GB Disk Unit	6713	$2,400		216	$518,400		$518,400
Base 8.58 GB Disk Unit	8713	$900		1	$900		900
Server Subtotal					*$1,562,873*	*$244,320*	*$1,807,193*
Client Hardware:							
AS/400 9401-150 Growth Server Pkg V4R1	0194	$12,000		1	$12,000	$4,272	$16,272
4.194 GB Disk Unit	Bundled			1	$0		$0
128 MB Base Memory	Bundled			1	$0		$0
Twinax Work Station Controller	Bundled			1	$0		$0
Base Token Ring Adapter (9724)	Bundled			1	$0		$0
Tape Drive	Bundled			1	$0		$0
64 MB Additional Main Storage Memory	3110	$1,216		1	$1,216		$1,216
Token Ring Adapter	2724	$840		1	$840		$840
4.194 GB Single Disk Unit	6607	$1,500		1	$1,500		$1,500
Single Client Subtotal					*$15,556*	*$4,272*	*$19,828*
Number of Clients				64			
Client Subtotal					*$995,584*	*$273,408*	*$1,268,992*
Server Software:							
IBM Operating System/400 V4R1M0 60-user	Bundled			1	$0		$0
Client Software:							
IBM Operating System/400 V4R1M0	Bundled			64	$0		$0
CICS for OS/400	5716-DFH	$2,450		64	$156,800		$156,800
ILE COBOL	5738-CB1	$900		1	$900		$900
Application Development Toolkit	5716-PW1	$900		1	$900		$900
DB2 Query Manager Dev. Toolkit	Bundled			1	$0		$0
ILE C	5716-CX2	$900		1	$900		$900
Software Subtotal					*$159,500*		*$159,500*
User Connectivity:							
8-port Token Ring connection unit (10% spares)	8226	$545		2976	$1,621,920		$1,621,920
User Connectivity Subtotal					*$1,621,920*		*$1,621,920*
5-year System Subtotal					*$4,339,877*	*$517,728*	*$4,857,605*
Discounts:							
Revenue Allowance					($1,236,865)		*($1,236,865)*
Mid-range System Option						($88,014)	*($88,014)*
Extended Maintenance Option						($73,051)	*($73,051)*
							Total
5-year System Total							**$3,459,675**

Notes:

Revenue Allowance: Applied to hardware and software.

Extended Maintenance Option (EMO): Discount for prepayment of 5 years of maintenance costs for the system unit.

Midrange System Option: This discount is available to customers when agreement is reached for the customer to perform certain service duties.

Five-Year Cost of Ownership: $3,459,675

tpmC Rating: 10625.4

$/tpmC: $138.06

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 assumptions 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 benchmark 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 IBM AS/400e server s40-2261

MQTH, computed Maximum Qualified Throughput	25149.75 tpmC
% throughput difference, reported & reproducibility runs	0.99%

Response Times (90th percentile/Average/maximum) in seconds

– New-Order	1.75	0.92	126.82
– Payment	1.14	0.58	126.61
– Order-Status	1.65	0.90	97.03
– Delivery (interactive portion)	0.27	0.16	94.73
– Delivery (deferred portion)	6.48	2.72	36.70
– Stock-Level	3.15	1.51	62.74
– Menu	0.32	0.23	158.77

– Response time delayed for emulated components 0.0

Transaction Mix (in percent of total transactions)

– New-Order	44.28%
– Payment	43.57%
– Order-Status	4.11%
– Delivery	4.00%
– Stock-Level	4.02%

Keying/Think Times (in seconds)	Min	Average	Max
New-Order	18.0/0.01	18.09/12.23	19.24/122.07
Payment	3.0/0.01	3.03/12.21	4.78/122.03
Order-Status	2.0/0.01	2.03/10.91	2.88/102.03
Delivery	2.0/0.01	2.02/5.23	3.05/52.01
Stock-Level	2.0/0.01	2.02/5.22	2.95/52.02

Test Duration

– Ramp-up time	1 hour 27 minutes
– Measurement interval	20 minutes
– Number of checkpoints	0
– Checkpoint interval	0 minutes
– Number of transactions (all types) completed in Measurement Interval	1,135,734

Transparent file synchronization occurred more than 5 times during the measurement interval.

Preface

TPC Benchmark C Standard Specification was developed by the Transaction Processing Performance Council (TPC) and released August 13, 1992.

This is the full disclosure report for benchmark testing of the IBM AS/400 systems according to the TPC Benchmark C Standard Specification. Measurements were done on the AS/400e server s40-2261.

TPC Benchmark C exercises the system components necessary to perform tasks associated with that class of on-line transaction processing (OLTP) environments emphasizing a mixture of read-only and update intensive transactions. This is a complex OLTP application environment exercising a breadth of system components associated with such environments 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).
- Nonuniform distribution of data access through primary and secondary keys.
- Data bases consisting of many tables with a wide variety of sizes, attributes, and relationships.
- Contention on data access and update.

The benchmark defines four on-line transactions and one deferred transaction, intended to emulate functions that are common to many OLTP applications. However, this benchmark does not reflect the entire range of OLTP requirements. 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 work loads or environments. Extrapolations to any other environment are not recommended.

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

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.

Contents

General Items

Application Code Disclosure

The application 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 D contains the AS/400 application code for the five TPC Benchmark C transactions and the terminal functions.

Benchmark Sponsor

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

This benchmark was sponsored by **International Business Machines** Corporation.

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.

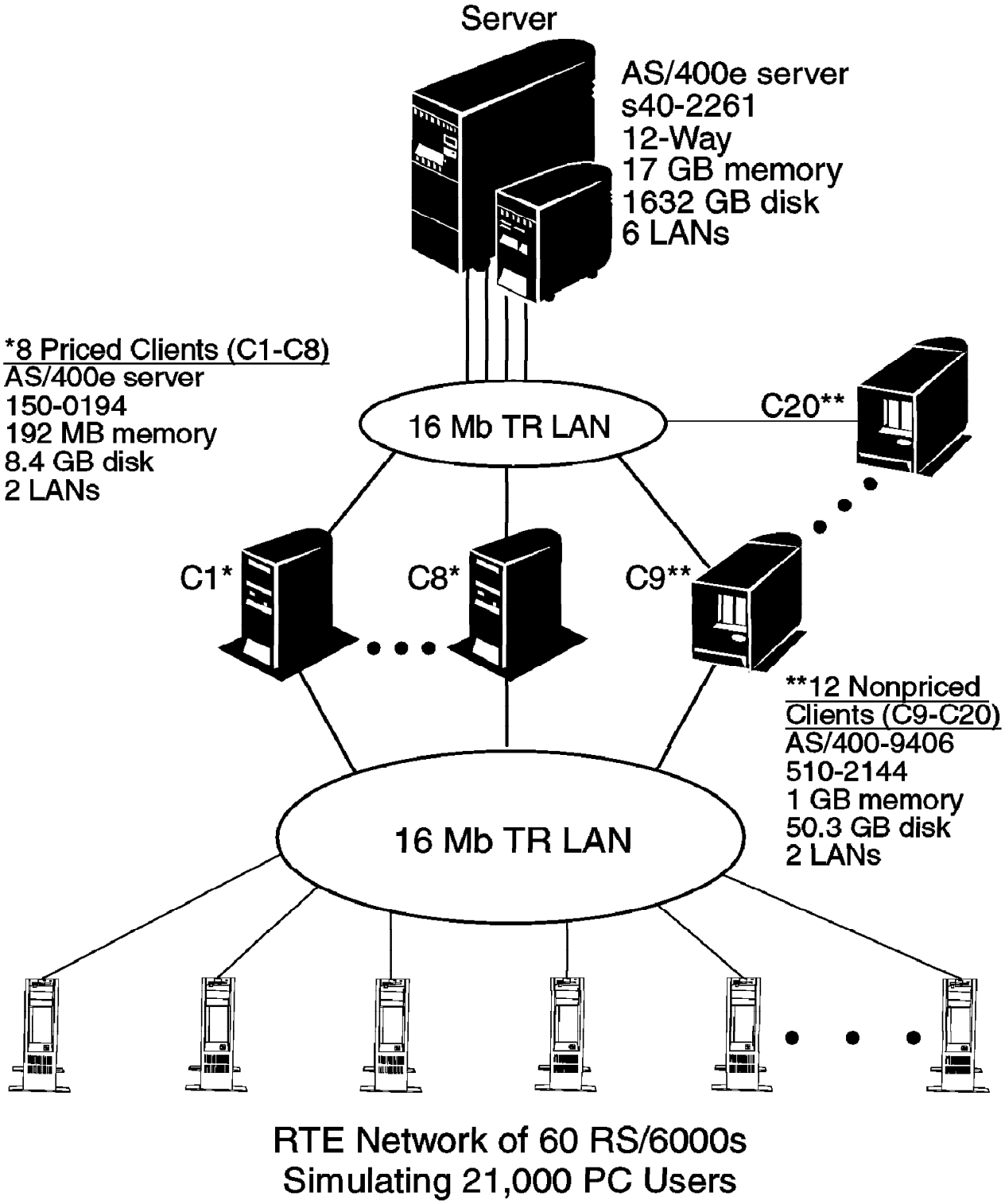
Appendix A contains the system, data base, and application parameters changed from their default values used in these TPC Benchmark C tests.

Configuration Diagrams

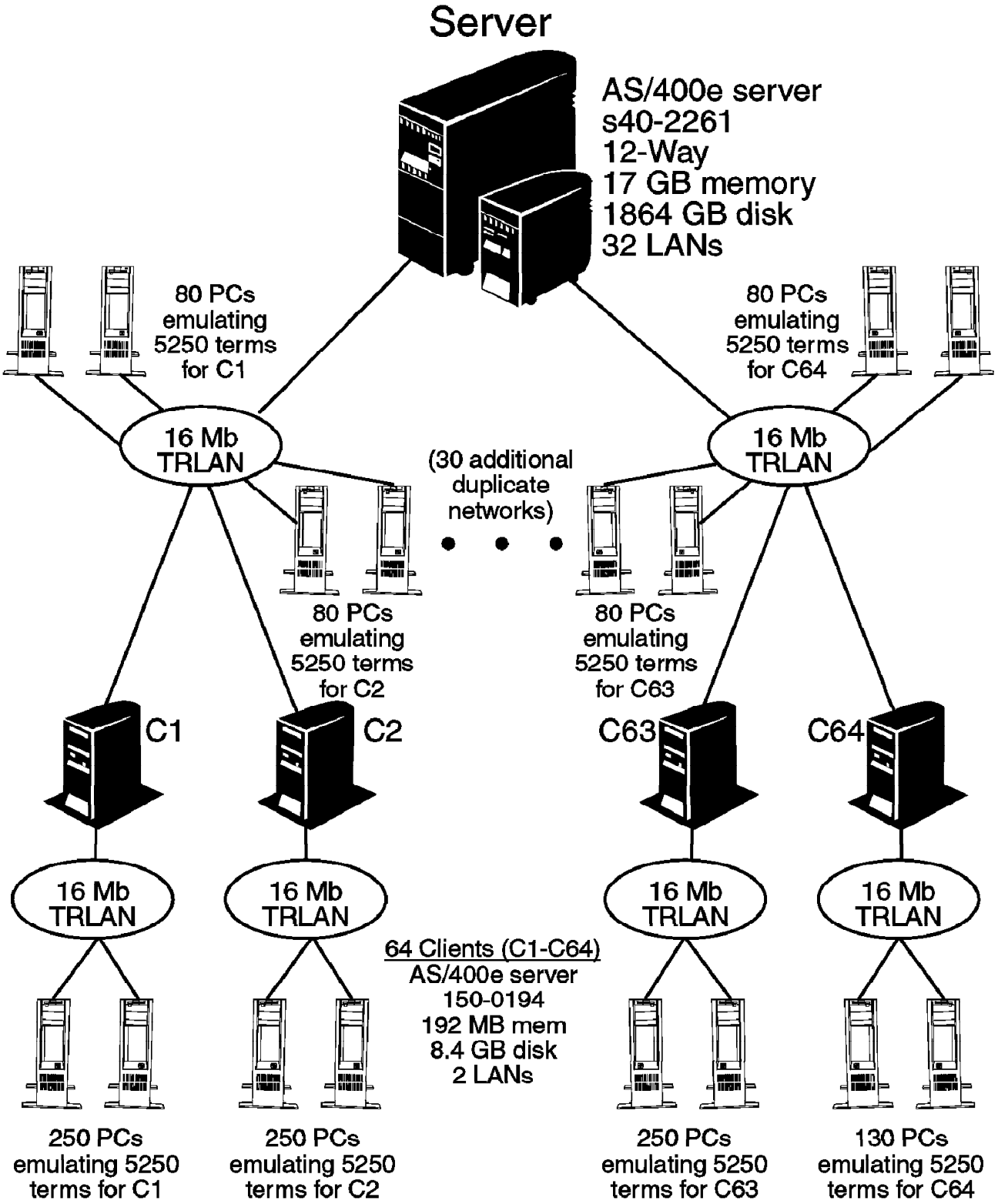
Diagrams of both measured and priced configurations must be provided, accompanied by a description of the differences. This includes, but is not limited to:

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 the protocol type.
Number of LAN (eg, 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 run-time execution location of software components (eg, DBMS, client processes, transaction monitors, software drivers, etc).

AS/400e server s40-2261 Benchmark Configuration



AS/400e server s40-2261 C/S Priced Configuration



Clause 1: Logical Data Base Design-Related Items

Table Definitions

Listing must be provided for all table definition statements and all other statements used to set up the data base.

The listings for all file definitions to create the data base files are available in Appendix B and the programs used for loading the data base (minimal population) are provided in Appendix C.

Data base Organization

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

Physical space for each file (table) is allocated by OS/400 as the file is filled. Although the initial build and the application transactions add records (rows) to several files in the same transaction, each file's extent will reside in separate areas on physical disk. OS/400 will spread the extents for each file across all available disk units to ensure that multiple access requests to the same file may be handled simultaneously. Records are added contiguously within extents, crossing page boundaries where necessary.

Files are created in sequential order according to their primary key.

Indices are generated concurrently with data for Warehouse, District, Item, Stock, and Customer tables. All other indices are generated after the database is populated. The available space within the index is included in the space reported in this disclosure.

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.

During the course of the testing, records were inserted into the ITEM file while users were executing the defined TPC-C transactions.

All of the files used by TPC-C transactions were created with the following attributes:

Authority	*PUBLIC	(Any user can view and modify the files).
ALWUPD	*YES	(Allow update and insert of records).
ALWDLT	*YES	(Allow delete of records).
ALWWRT	*YES	(Allow write of records).

Static files were created with *NOMAX specified on the number of records allowed. This limit is therefore set by the operating system at 2,147,483,646 records. Dynamic files were created with an initial size that is slightly larger than initial data base requirement, and extent definitions that would allow expansion beyond the 180-day space requirement.

Horizontal or Vertical 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.

For the benchmark test of the AS/400e server s40-2261, IBM did not implement horizontal or vertical partitioning upon any of the benchmark files.

Clause 2: Transaction and Terminal Profiles--Related Items

Verification for the Random Number Generator

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

The srandom(), getpid(), and gettimeofday() functions are used to produce unique random seeds for each driver. The drivers use these seeds to seed the srand(), srandom(), and srand48() functions. Random numbers are produced using wrappers around the standard system random number generators.

The negative exponential distribution uses the following function to generate the distribution. This function has the property of producing a negative exponential curve with a specified average and a maximum value 4 times the average.

```
const double RANDOM_4_Z=0.89837799236185
const double RANDOM_4_K=0.97249842407114

double neg_exp_4(double average {
        return - average * (1/RANDOM_4_Z * log (1 - RANDOM_4_K * drand48())));

    }
```

The random functions used by the driver system and the data base generation program were verified. The C_LAST column was queried to verify the random values produced by the database generation program. After a measurement, the HISTORY, ORDER, and ORDER_LINE tables were queried to verify the randomness of values generated by the driver. The rows were counted and grouped by customer and item numbers.

Here is an example of one SQL query used to verify the random number generation functions:

```
create table TEMP (W_ID int, D_ID, C_LAST char(16), CNTR int);
insert into TEMP select C_W_ID, C_D_ID, C_LAST, COUNT(*) from CUSTOMER group by C_W_ID,
C_D_ID, C_LAST;
select CNTR, COUNT(*) from TEMP group by CNTR order by 1;
```

Input/Output Screens

The actuals layouts of the terminal input/output screens must be disclosed.

The Data Description Specification for the I/O screens are available in Appendix D--Application Source Code. The screens are defined as required in the TPC Benchmark C specification except for the "total amount" field of the New-Order screen. The "total amount" field has been shifted one column to the left to allow space for the attribute byte for the menu lines in the next row. This is a limitation of the implementation of the screen I/O. IBM did not gain any performance improvement from this change.

Terminal Features

The method used to verify that the terminals configured provide all the features described in Clause 2.2.2.4 must be disclosed.

The following numbered items correspond directly to the seven items listed under Clause 2.2.2.4 with a description of how the requirement was met.

1. *The input characters appear on the input/output screen as they are keyed in*:

   The RTE used in these tests (see Appendix E for a detailed description) emulates only the display attached to the SUT via a token-ring LAN. The 5250 workstations being emulated support local echo of characters as they are keyed.

2. *Input is allowed only in the positions of an input field*:

   Data Description Specification (DDS) is used to define the areas of the screen where input is allowed as input/output capable. Other fields designated as output only, as labels, or as blank are protected by locking the keyboard from entry.

3. *Input-capable fields are designated by some method of clearly identifying them*:

   The input-capable fields of this benchmark are distinguishable by an underscore character the length of the field and is specified by using the attribute for field underscore in DDS.

4. *It must be possible to key in only significant characters into fields*:

   The fields for the transactions have been specified for translating nonkeyed positions in a field to either blanks or zeroes for alphanumeric, or zeroes for numeric fields through DDS keywords. Therefore, if the Warehouse field is specified as having four positions and the actual warehouse used is "1," then the user only need enter "1" and DDS will fill in the field with zeroes for the nonkeyed positions and right-justify the field so that the actual field input would be "0001."

5. *All fields for which a value is necessary to allow the application to complete are required to contain input prior to the start of the measurement of the transaction RT, or the application must contain a set of error-handling routines to inform the user that required fields have not been entered*:

   The application code for each of the transactions is written to require the minimum input required for completion, if the minimum is not input then the application displays an error message and returns for more input.

6. *Fields can be keyed and rekeyed in any order: Specifically*.

   The emulated user must be able to move the input cursor forward and backward directly to the input capable fields.
   The application cannot rely on fields being entered in any particular order.
   The user can return to a field that has been keyed in and change its value prior to the start of the measurement of the transaction RT.

   The screen handling properties defined in DDS are resident in the AS/400 workstation I/O processor. All fields are first entered and verified by the I/O processor and then sent to the CPU at the start of the transaction. The I/O processor does not require that the fields be entered in any order, and the fields are sent to the CPU when the "ENTER" key is pressed.

7. *Numeric fields must be protected from nonnumeric input:*

   AS/400 DDS allows specification of numeric-only fields and if a nonnumeric character is entered, a message is sent to the display and the keyboard is locked.

Presentation Managers

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

The workstation emulated in the measured configuration is an IBM 5250-type workstation. The 5250 workstations do not use a presentation manager nor is it an intelligent workstation. All of the processing of the input/output screens is handled by the SUT. The workstation is attached to the AS/400 via a twinaxial cable.

Workstations used in the priced configuration are PCs emulating 5250 workstations. The PCs are connected to the AS/400 via 16 Mb token-ring LAN.

Home and Remote Order Lines

The percentage of home and remote order lines in the New-Order transactions must be disclosed.

Table 1 on page 10 shows the percentage of home and remote transactions that occurred during the measurement period for the New-Order transactions.

New-Order Rollback transactions

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

Table 1 on page 10 shows the percentage of New-Order transactions that were rolled back due to an illegal item being entered.

Number of Items per Order

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

Table 1 on page 10 shows the average number of items ordered per New-Order transaction.

Home and Remote Payment Transactions

The percentage of Home and Remote Payment transactions must be disclosed.

Table 1 on page 10 shows the percentage of Home and Remote transactions that occurred during the measurement period for the Payment transactions.

Nonprimary Key Transactions

The percentage of Payment and Order-Status transactions that used nonprimary key (C_LAST) access to the data base must be disclosed.

Table 1 on page 10 shows the percentage of nonprimary key access to the data base by the Payment and Order-Status transactions.

Skipped Delivery Transactions

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.

Table 1 on page 10 shows the percentage of Delivery transactions missed due to a shortage of supply in the NEW-ORDER table.

Mix of Transaction Types

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

Table 1 on page 10 shows the mix percentage for each of the transaction types executed by the SUT.

Queueing Mechanism of Delivery

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

Deferred queuing of the Delivery transaction is handled within standard support from the CICS transaction monitor.

Table 1. Numerical Quantities for Transaction and Terminal Profiles	
New Order	**AS/400e server s40-2261**
Percentage of Home order lines	99.00%
Percentage of Remote order lines	1.00%
Rolled Back Transactions	0.98%
Number of Items per order	10.00
Payment	
Percentage of Home transactions	85.03%
Percentage of Remote transactions	14.97%
Nonprimary Key Access	
Percentage of Payment using C_LAST	59.86%
Percentage of Order-Status using C_LAST	60.15%
Delivery	
Delivery transactions skipped	0
Transaction Mix	
New-Order	44.28%
Payment	43.57%
Order-Status	4.11%
Stock-Level	4.00%
Delivery	4.02%

Clause 3: Transaction and System Properties-Related Items

The results of the ACID test must be disclosed along with a description of how the ACID requirements were met.

Atomicity Requirements

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.

Atomicity of 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 following steps were performed to verify the atomicity of completed transactions:

1. Randomly select a Customer, District, and Warehouse, and query the Customer, District, and Warehouse tables.
2. Execute a Payment transaction for the Customer, District, and Warehouse used in Step 1 above. Commit the transaction.
3. Repeat the query performed in Step 1 to demonstrate that the appropriate changes have been made.

Atomicity of 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 following steps were performed to verify the atomicity of the aborted Payment transaction:

1. Randomly select a Customer, District, and Warehouse, and query the Customer, District, and Warehouse tables.
2. Execute a Payment transaction for the Customer, District, and Warehouse used in Step 1 above. Roll-back the transaction.
3. Repeat the query performed in Step 1 to verify that no changes have been made to the database.

Consistency Requirements

Consistency is the property of the application that requires an 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.

Consistency Condition 1

Entries in the WAREHOUSE and DISTRICT tables must satisfy the relationship:

W_YTD = sum(D_YTD)

for each warehouse defined by (W_ID = D_W_ID)

The following SQL queries were executed before and after transactions were run to show that the data base was always in a consistent state.

```
Select WID, WYTD from WRHS
Select DWID, sum(DYTD) from DSTRCT group by DWID
```

The results of these two queries were then compared to verify consistency.

Consistency Condition 2

Entries in the DISTRICT, ORDER, and NEW-ORDER tables must satisfy the relationship:

D_NEXT_O_ID -1 = max(O_ID) = max(NO_O_ID)

for each district defined by (D_W_ID = O_W_ID) = NO_W_ID) and (D_ID = O_D_ID = NO_D_ID). This condition does not apply to the NEW-ORDER table for any districts which have no outstanding new orders.

The following SQL queries were executed before and after transactions were run to show that the data base was always in a consistent state.

```
Create View QRYTEMP1(OWID, ODID, MAXOID)
  As Select OWID, ODID, MAX(OID) from ORDERS group by OWID, ODID
Create View QRYTEMP2(NOWID, NODID, MAXNOOID)
  As Select NOWID, NODID, MAX(NOOID) from NEWORDS group by NOWID, NODID
Select DWID, DID, (DNXTOR-1), MAXOID, MAXNOOID
  from DSTRCT, QRYTEMP1, QRYTEMP2 where DWID = OWID and DWID=NOWID
  and DID =ODID and DID = NODID and (((DNXTOR-1) <> MAXOID)
  or ((DNXTOR-1) <> MAXNOOID) or (MAXOID <> MAXNOOID))
```

If any records are produced by these queries, the data base would be inconsistent. No records were produced by these queries.

Consistency Condition 3

Entries in NEW-ORDER table must satisfy the relationship:

max(NO_O_ID) - min(NO_O_ID) + 1 = {number of rows in the NEW-ORDER table for this district}

for each district defined by NO_W_ID and NO_D_ID. This condition does not apply to any districts which have no outstanding new orders.

The following SQL queries were executed before and after transactions were run to show that the data base was always in a consistent state.

```
Create View QRYTEMP3(NOWID, NODID, MAXNOOID, MINNOOID, MAXMIN, COUNTO ID)
  As Select NOWID, NODID, MAX(NOOID), MIN(NOOID), (MAX(NOOID) -
  MIN(NOOID) +1), COUNT(*) from NEWORD group by NOWID, NODID
Select * from QRYTEMP3 where MAXMIN <> COUNTOID
```

If any records are produced by these queries, the data base would be inconsistent. No records were produced by these queries.

Consistency Condition 4

Entries in the ORDER and ORDER-LINE tables must satisfy the relationship:

sum(O_OL_CNT) = {number of rows in the ORDER-LINE table for this district}

for each district defined by (O_W_ID = OL_W_ID) and (O_D_ID = OL_D_ID).

The following SQL queries were executed before and after transactions were run to show that the data base was always in a consistent state.

```
Create View QRYTEMP4(OLWID, OLDID, COUNTORD)
  As Select OLWID, OLDID, COUNT(*)
  From ORDERLINE Group by OLWID, OLDID
Create View QRYTEMP5(OWID, ODID, SUMOLINES)
  As Select OWID, ODID, SUM(OLINES)
  From ORDERS Group by OWID, ODID
Select OWID, ODID, SUMOLINES, COUNTORD
  From QRYTEMP4, QRYTEMP5 Where OWID = OLWID and ODID = OLDID
  and SUMOLINES <> COUNTORD Order by OWID, ODID
```

If any records are produced by these queries, the data base would be inconsistent. No records were produced by these queries.

Consistency Condition 5

For any row in the ORDER table, O_CARRIER_ID is set to a null value if and only if there is a corresponding row in the NEW-ORDER table defined by (O_W_ID, O_D_ID, O_ID) = (NO_W_ID, NO_D_ID, NO_O_ID).

This consistency test completed successfully.

Consistency Condition 6

For any row in the ORDER table, O_OL_CNT must equal the number of rows in the ORDER-LINE table for the corresponding order defined by (O_W_ID, O_D_ID, O_ID) = (OL_W_ID, OL_D_ID, OL_O_ID).

This consistency test completed successfully.

Consistency Condition 7

For any row in the ORDER-LINE table, OL_DELIVERY_D is set to a null date/time if and only if the corresponding row in the ORDER table defined by (O_W_ID, O_D_ID, O_ID) = (OL_W_ID, OL_D_ID, OL_O_ID) has (O_CARRIER_ID) set to a null value.

This consistency test completed successfully.

Consistency Condition 8

Entries in the WAREHOUSE and HISTORY tables must satisfy the relationship:

W_YTD = sum(H_AMOUNT)

for each warehouse defined by (W_ID = H_W_ID).

This consistency test completed successfully.

Consistency Condition 9

Entries in the DISTRICT and HISTORY tables must satisfy the relationship:

D_YTD = sum(H_AMOUNT)

for each district defined by (D_W_ID, D_ID = H_W_ID, H_D_ID).

This consistency test completed successfully.

Consistency Condition 10

Entries in the CUSTOMER, HISTORY, ORDER, and ORDER-LINE tables must satisfy the relationship:

C_BALANCE = sum(OL_AMOUNT) - sum(H_AMOUNT)
where:
H_AMOUNT is selected by (C_W_ID, C_D_ID, C_ID) = (H_C_W_ID, H_C_D_ID, H_C_ID)
and:
OL_AMOUNT is selected by:
(OL_W_ID, OL_D_ID, OL_O_ID) = (O_W_ID, O_D_ID, O_ID) and
(O_W_ID, O_D_ID, O_C_ID) = (C_W_ID, C_D_ID, C_ID) and
(OL_DELIVERY_D is not a null value)

This consistency test completed successfully.

Consistency Condition 11

Entries in the CUSTOMER, ORDER, and NEW-ORDER tables must satisfy the relationship:

(count(*) from ORDER) - (count(*)from NEW-ORDER) = sum(C_DELIVERY_CNT)

for each district defined by (O_W_ID, O_D_ID) = (NO_W_ID, NO_D_ID)= (C_W_ID, C_D_ID).

This consistency test completed successfully.

Consistency Condition 12

Entries in the CUSTOMER, and ORDER-LINE table must satisfy the relationship:

C_BALANCE + C_YTD_PAYMENT = sum(OL_AMOUNT)

for any randomly selected customers and where OL_DELIVERY_ID is not set to a null date/time.

This consistency test completed successfully.

All 12 consistency tests were completed successfully.

Consistency Tests

Verify that the data base is initially consistent by verifying that it meets the consistency conditions defined in Clauses 3.3.2.1 to 3.3.2.4. Describe the steps used to do this in sufficient detail so that the steps are independently repeatable.

The queries defined in 4.2.1 through 4.2.4 were run after initial data base build and prior to executing any transactions. All queries showed that the data base was in a consistent state.

After executing transactions at full load for approximately 10 minutes, the queries defined in 4.2.1 through 4.2.4 were run again. All queries showed that the data base was still in a consistent state.

Isolation Requirements

Operations of concurrent data base transactions must yield results which are indistinguishable from the results which would be obtained by forcing each transaction to be serially executed to completion in some order.

Isolation Test 1

This test demonstrates isolation for read-write conflicts of Order-Status and New-Order transactions.

The following steps were performed to satisfy the test of isolation for Order-Status and New-Order transactions:

1. First terminal: Start a New-Order transaction with the necessary inputs. The transaction is delayed to pause the program execution.
2. Second terminal: Start an Order-Status transaction for the same customer as used in the New-Order transaction.
3. Second terminal: The Order-Status transaction attempts to read the CUSTOMER file but is locked out by the New-Order transaction waiting to complete.

4. First terminal: The New-Order transaction is released and the Commit is executed releasing the record. With the CUSTOMER record now released, the Order-Status transaction can now complete.
5. Second terminal: Verify that the Order-Status transaction completes after the New-Order transaction. and that the results displayed for the Order-Status transaction match the input for the New-Order transaction.

Isolation Test 2

This test demonstrates isolation for read-write conflicts of Order-Status and New-Order transactions when the New-Order transaction is rolled back.

The following steps were performed to satisfy the test of isolation for Order-Status and a rolled back New-Order transaction.

1. First terminal: Perform a New-Order transaction for the same customer in the Order-Status transaction in Isolation Test 1; include an invalid item number in the order. The transaction is delayed just prior to the rollback.
2. Second terminal: Start an Order-Status transaction for the same customer used in the the New-Order transaction. The Order-Status transaction attempts to read the CUSTOMER file but is locked by the New-Order transaction.
3. First terminal: Roll back the New-Order transaction. With the CUSTOMER record now released, the Order-Status transaction completes.
4. Verify the results from the Order-Status transaction matches those in Isolation Test 1.

Isolation Test 3

This test demonstrates isolation for write-write conflicts of two New-Order transactions.

The following steps were performed to verify isolation of two New-Order transactions:

1. First terminal: Start a New-Order transaction using the necessary inputs. The transaction is delayed just prior to the Commit.
2. Second terminal: Start a second New-Order transaction for the same customer used by the first terminal. This transaction is forced to wait while the first terminal holds a lock on the DISTRICT record requested by the second terminal.
3. First terminal: The New-Order transaction is allowed to complete and Commit the transaction. With the DISTRICT record released, the second terminal New-Order transaction will complete.
4. Verify the order number from the second terminal New-Order transaction is one greater than the order number from the first terminal.

Isolation Test 4

This test demonstrates isolation for write-write conflicts of two New-Order transactions when one transaction is rolled back.

The following steps were performed to verify isolation of two New-Order transactions after one is rolled back:

1. First terminal: Start a New-Order transaction using the necessary inputs to cause a roll back (invalid item number). The transaction is delayed just prior to the rollback.

2. Second terminal: Start a second New-Order transaction for the same customer used by the first terminal. This transaction is forced to wait while the first terminal holds a lock on the DISTRICT record requested by the second terminal.
3. First terminal: The New-Order transaction is allowed to complete, and the transaction is rolled back due to the invalid item number.
4. Second terminal: With the DISTRICT record released, the second terminal New-Order transaction will complete normally.
5. Verify the order number from the second terminal New-Order transaction is equal to the next order number before either New-Order transaction was started.

Isolation Test 5

This test demonstrates isolation for write-write conflicts of Payment and Delivery transactions.

The following steps were performed to successfully conduct this test:

1. First terminal: A Delivery transaction is started. The transaction is delayed just prior to the Commit.
2. Second terminal: Start a Payment transaction for a customer that will have an order delivered in this transaction started in Step 1. The Payment transaction is forced to wait while the Delivery transaction holds a lock on the CUSTOMER record.
3. The Delivery transaction completes.
4. Second terminal: With the CUSTOMER record released, the Payment transaction is now able to complete.

Isolation Test 6

This test demonstrates isolation for write-write conflicts of Payment and Delivery transactions when the Delivery transaction is rolled back.

The following steps were performed to successfully conduct this test:

1. First terminal: Start a Delivery transaction. The transaction is delayed just prior to the rollback.
2. Second terminal: Start a Payment transaction for a customer that will have an order delivered in this transaction started in Step 1. The Payment transaction is forced to wait while the Delivery transaction holds a lock on the CUSTOMER record.
3. The Delivery transaction rolls back.
4. Second terminal: With the CUSTOMER record released, the Payment transaction is now able to complete.

Isolation Test 7

This test demonstrates repeatable reads for the New-Order transaction while an interactive transaction updates the price of an item.

The following steps were performed to successfully conduct this test:

1. First terminal: Execute a New Order transaction including items x and y.
2. First terminal: A New-Order transaction is started that contains item x twice and item y once. This transaction is stopped after reading the price of item x from the item file the first time.

3. Second terminal: Using interactive SQL, an update transaction is started for items x and y, increasing their price by 10%. Case A, transaction 3 stalls, occurs.
4. First terminal: The New-Order transaction is allowed to complete. It is verified that the prices for items x and y are the same throughout the entire transaction and that they match the results of Step 1.
5. Second terminal: After the New-Order transaction completes, the update transaction completes and is committed.
6. First terminal: Step 1 is repeated, noting that the prices of items x and y now match those set in Step 3.

Isolation Test 8

This test demonstrates isolation for phantom protection between a Delivery and a New-Order transaction.

The following steps were performed to successfully conduct this test:

1. First terminal: All rows for a randomly selected district and warehouse were removed from the NEW-ORDER table.
2. First terminal: A Delivery transaction for the selected warehouse was started.
3. First terminal: The Delivery transaction was stopped immediately after reading the NEW-ORDER table for the selected district. No qualifying row was found.
4. Second terminal: A New-Order transaction was started for the same warehouse and district. Case A, Transaction 2 stalled.
5. First terminal: Repeated the read of the NEW-ORDER table for the selected district.
6. Again no qualifying row was found.
7. First terminal: The Delivery transaction was allowed to complete and was COMMITTED.
8. Second terminal: The NEW-ORDER transaction completed successfully.

Isolation Test 9

This test demonstrates isolation for phantom protection between an Order-Status and a New-Order transaction.

The following steps were performed to successfully conduct this test:

1. First terminal: An Order-Status transaction for a selected customer was started.
2. First terminal: The Order-Status transaction was stopped immediately after reading the ORDER table for the selected customer. The most recent order for that customer was found.
3. Second terminal: A NEW-ORDER transaction was started for the same customer. Case A, Transaction 2 stalled.
4. First terminal: Repeated the read of the ORDER table for the selected customer.
5. Verified the order found was the same as in step 3.
6. First terminal: The Order-Status transaction was allowed to complete and was COMMITTED.
7. Second terminal: The NEW-ORDER transaction completed successfully.

Durability Requirements

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

Permanent Unrecoverable Failure of any Single Durable Medium

Permanent unrecoverable failure of any single durable medium containing TPC-C data base tables or recovery log data.

The AS/400 implementation of the TPC Benchmark C divides the configured disk space into two available auxiliary storage pools (ASP): System ASP and User ASP. The system ASP contains the operating system, integrated relational data base, the application libraries, and the TPC-C tables. The User ASP is protected by device parity protection (RAID-5) and contains the journal receiver (recovery log).

Failure of Durable Medium of Journal Receiver and Instantaneous Interruption and Memory Failure

The following steps were performed to successfully complete the test of the Durability of the journal receiver:

1. The current count of the total number of orders was determined by the sum of D_NEXT_O_ID of all rows in the DISTRICT table giving SUM_1.
2. A full scale test was started on the SUT. The test was allowed to run for 10 minutes before creating the failure.
3. The signal cable from a single disk unit in the User ASP was disconnected. Since the User ASP is protected by device parity protection (RAID-5) the system continued to process transactions. Detection of the device failure caused a diagnostic message to be issued. Processing of transactions continued without performance degradation.
4. Processing was allowed to continue for an additional 10 minutes.
5. An instantaneous power failure was then simulated by issuing an immediate power-off at the service panel.
6. The system was then powered on and IPLed.
7. The number of New-Order transactions executed by the SUT is verified against the number of successful transactions logged by the RTE.
8. Step 1 above was performed again retrieving the new total of orders processed, SUM_2. The difference between SUM_2 and SUM_1 was compared to the number of transactions reported by RTE.

Failure of Durable Medium of Data Base

The following steps were performed to successfully perform the Durability test of failure of a disk unit with data base tables:

1. The current count of the total number of orders was determined by the sum of D_NEXT_O_ID of all rows in the DISTRICT table giving SUM_1.
2. The DSTRCT data base table was saved.
3. A full scale test was started on the SUT. The test was allowed to run for 10 minutes.
4. An unprotected disk in the System ASP was disconnected. This caused the system to halt.
5. The disk was reinstalled and the system restarted.

6. Restore the selected table saved in Step 2. This is equivalent to having lost a disk unit and having to restore the system from a backup tape.
7. Step 1 is performed returning SUM_2. SUM_2 is equal to SUM_1 returned in Step 1.
8. The OS/400 command APYJRNCHG (Apply Journal Changes) is executed applying all of the changes to the restored table for transactions that occurred after the table was saved.
9. Step 1 is performed returning SUM_3.
10. The difference between SUM_3 and SUM_1 is verified to match the total number of successful New-Order transactions completed during the measurement.

Clause 4: Scaling and Data Base Population-Related Items

Cardinality of Tables

The cardinality (ie, the number of rows) of each table, as it existed at the start of the benchmark run, must be disclosed.

Table 2 portrays the TPC Benchmark C defined tables and the number of rows for each table as they were built initially.

Table 2. Initial Data Base Build (# of rows per table)

TPC Benchmark C Tables	AS/400e server s40-2261
WAREHOUSE	2,100
CUSTOMER	63,000,000
NEW-ORDER	18,900,000
DISTRICT	21,000
STOCK	210,000,000
ORDERS	63,000,000
ORDER-LINE	630,025,238
HISTORY	63,000,000
ITEM	100,000

Distribution of Tables and Logs

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

The IBM AS/400 utilizes a **Single-Level Storage** concept where OS/400 views all drives in an **Auxiliary Storage Pool (ASP)** as a single virtual drive. This technique spreads information across all available drives in an ASP, attempting to maintain equivalent percentages of free storage.

Data Base Model Implemented

A statement must be provided that describes the data base model implemented by the DBMS used.

The type of data base implemented in all IBM AS/400 systems is an integrated relational data base. The data base is integrated into the OS/400 operating system.

Partitions/Replications Mapping

The mapping of data base partitions/replications must be explicitly described.

IBM did not implement horizontal or vertical partitioning for these TPC-C tests beyond the normal transparent system partitioning.

Clause 5: Performance Metrics and Response Time-Related Items

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 3 lists the response times and the ninetieth percentiles for each of the transaction types for the AS/400e server s40-2261.

Keying and Think Times

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

Table 3 lists the keying and think times from the measured TPC-C tests for the AS/400e server s40-2261.

Table 3. AS/400e server s40-2261 Response, Keying, and Think Times

Response Times	New-Order	Payment	Order Status	Delivery (int/def)	Stock Level	Menus
90%	1.75	1.14	1.65	0.27/6.48	3.15	0.32
Average	0.92	0.58	0.90	0.16/2.72	1.51	0.23
Maximum	126.82	126.61	97.03	94.73/36.70	62.74	158.77
			Think Times			
Minimum	0.01	0.01	0.01	0.01	0.01	N/A
Average	12.23	12.21	10.19	5.23	5.22	N/A
Maximum	122.07	122.03	102.03	52.01	52.02	N/A
			Keying Times			
Minimum	18.00	3.00	2.00	2.00	2.00	N/A
Average	18.09	3.03	2.03	2.02	2.02	N/A
Maximum	19.24	4.78	2.88	3.05	2.95	N/A

Client Substitution Table

The following table lists the new orders/user by each priced and non-priced clients, and also the average new orders/users for the set of priced clients and for the set of non-priced (substitute) clients.

Client Substitution table

System	CPU	Users	tpmC	Measurement New Orders	New Orders/user
Priced Clients					
A	15 - 194	33	4 5. 5	81 1.	24.55
B	15 - 194	33	4 5.5	811 .	24.58
C	15 - 194	33	4 3.4	8 68.	24.45
D	15 - 194	33	4 3.4	8 68.	24.45
E	15 - 194	33	4 4.45	8 89.	24.51
F	15 - 194	33	4 5.15	81 3.	24.55
G	15 - 194	33	4 5.5	811 .	24.58
H	15 - 194	33	4 2.55	8 51.	24.4
				Average --	24.51
Non-priced Clients					
I	51 -2144	153	18 5.85	36117.	23.61
J	51 -2144	153	1816.1	36322.	23.74
K	51 -2144	153	1838.2	36764.	24. 3
L	51 -2144	153	1829.4	36588.	23.91
M	51 -2144	153	18 3.6	36 72.	23.58
N	51 -2144	153	1841.	3682 .	24. 7
O	51 -2144	153	18 9.85	36197.	23.66
P	51 -2144	153	184 .9	36818.	24. 6
Q	51 -2144	153	1827.1	36542.	23.88
R	51 -2144	153	1845.2	369 4.	24.12
S	51 -2144	153	1834.25	36685.	23.98
T	51 -2144	153	1823.3	36466.	23.83
21				Average --	23.87

Response Time Frequency Distribution

Response time frequency distribution curves must be reported for each transaction type.

Note: Transaction counts are shown at the lower end of the interval ie, a count of 200 at 0 indicates that there were 200 transactions with a response time between 0 and the next interval.

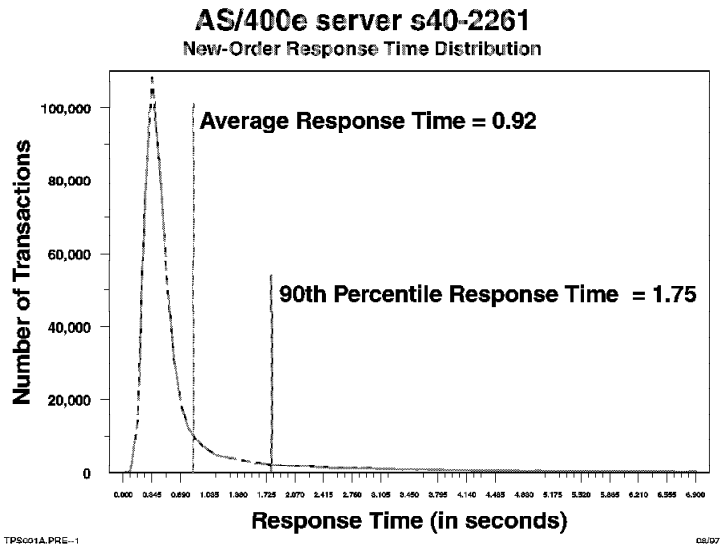


Figure 1. AS/400e server s40-2261 New-Order Response Time Distribution

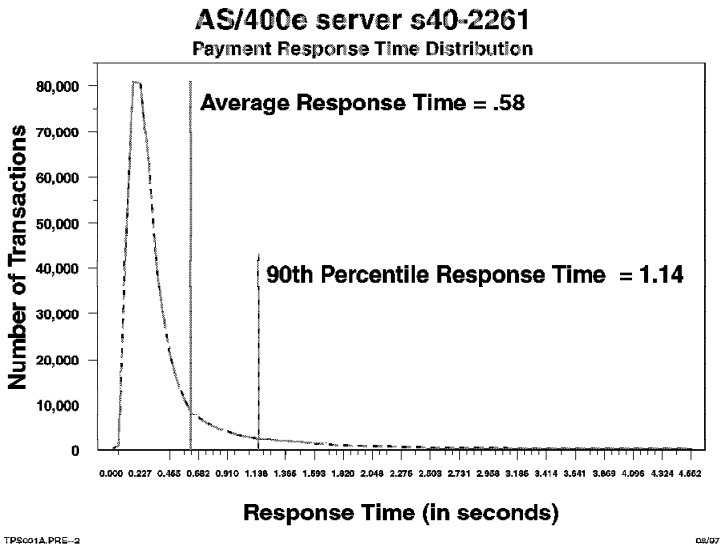


Figure 2. AS/400e server s40-2261 Payment Response Time Distribution

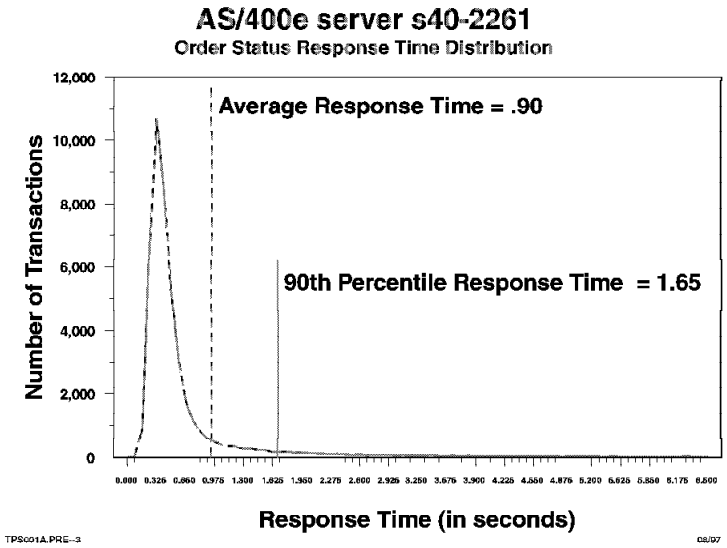


Figure 3. AS/400e server s40-2261 Order-Status Response Time Distribution

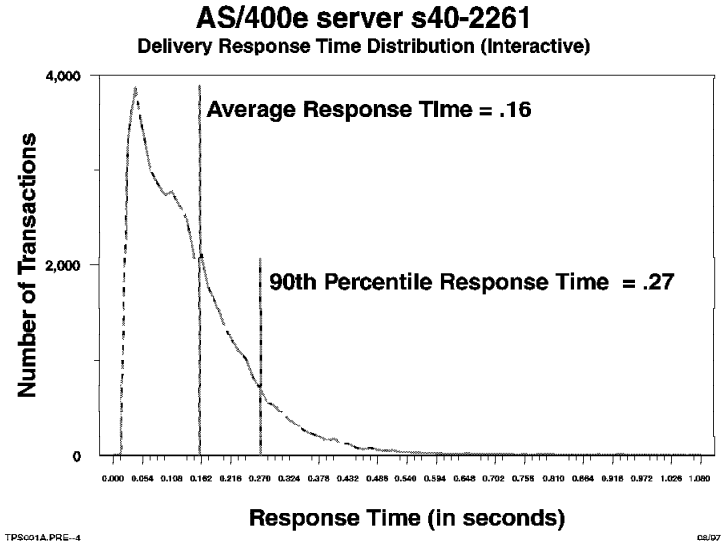


Figure 4. AS/400e server s40-2261 Delivery (Interactive) Response Time Distribution

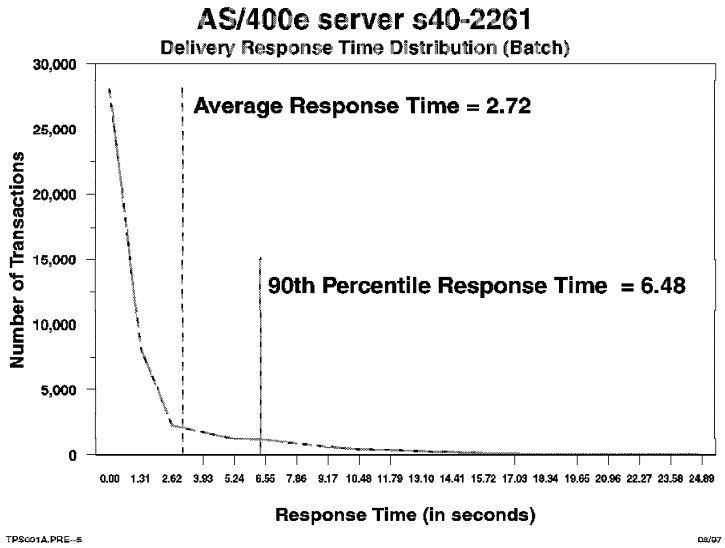


Figure 5. AS/400e server s40-2261 Delivery (Batch) Response Time Distribution

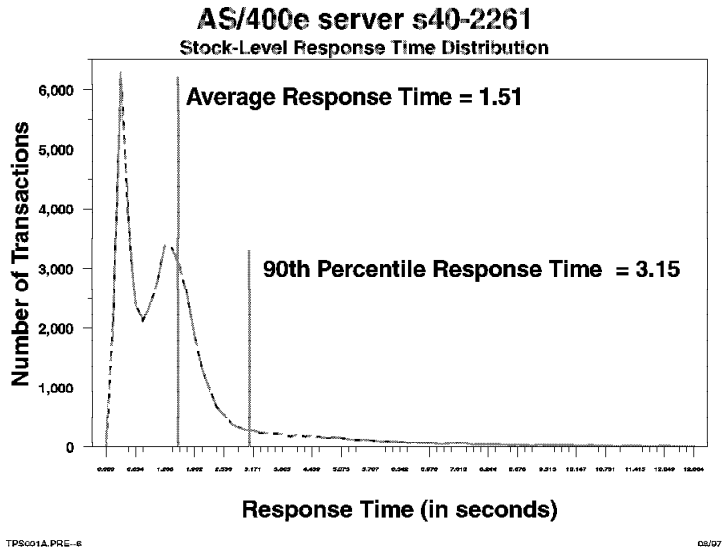


Figure 6. AS/400e server s40-2261 Stock-Level Response Time Distribution

Performance Curve for Response Time versus Throughput

The performance curve for response times versus throughput must be reported for the New-Order transaction.

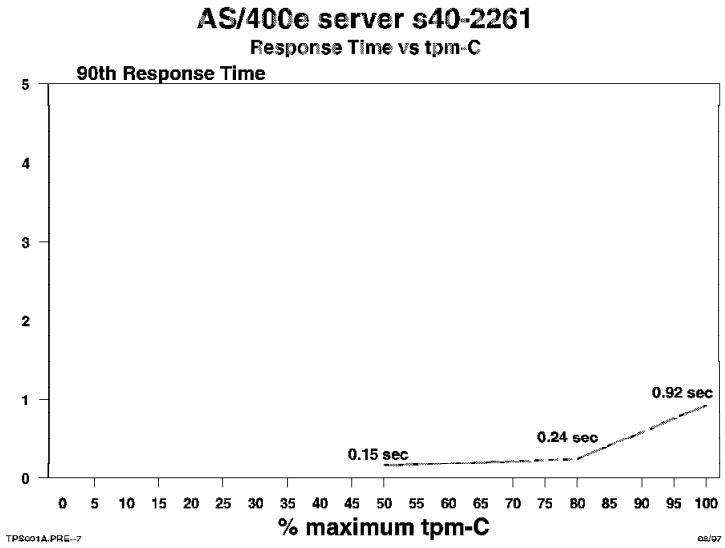


Figure 7. AS/400e server s40-2261 New-Order Response Time Versus Throughput

Think Time Frequency Distribution

Think time frequency distribution curves must be reported for each transaction type.

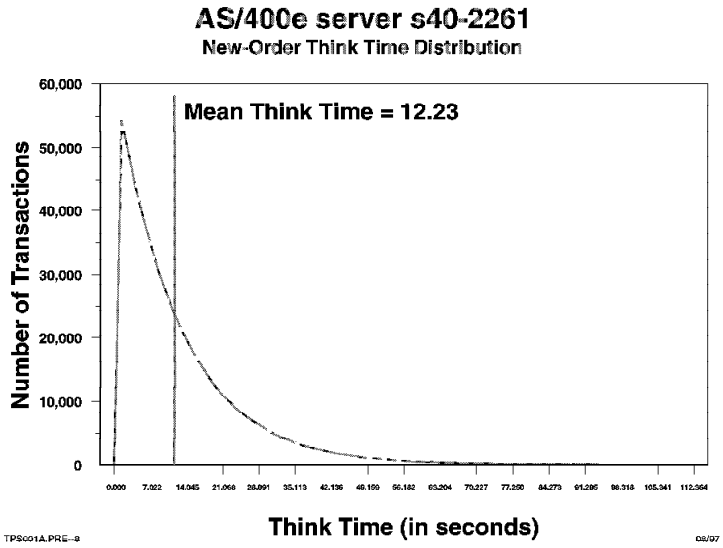


Figure 8. AS/400e server s40-2261 New-Order Think Time Distribution

Throughput Versus Elapsed Time

A graph of throughput versus elapsed time must be reported for each the New-Order transaction.

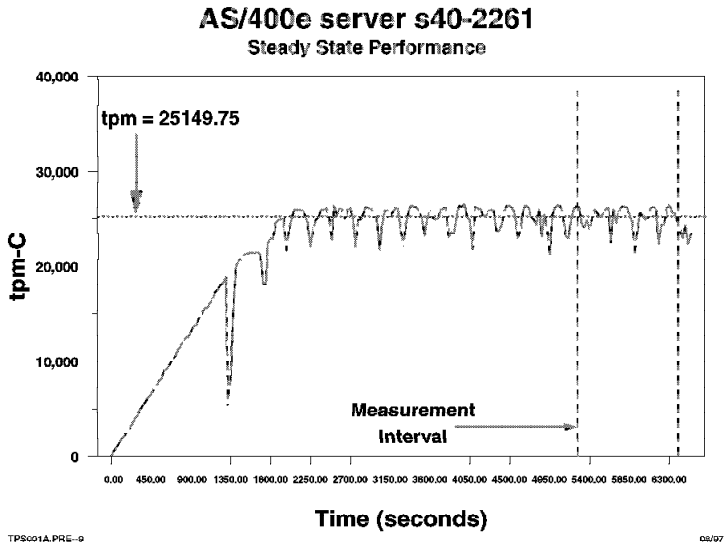


Figure 9. AS/400e server s40-2261 New-Order Throughput Versus Elapsed Time

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.

For each of the TPC Benchmark C transaction types the following steps are executed:

At the data base transaction start, a "start of commit cycle" entry is recorded in the journal.

For each of the files updated by a transaction:

- The data base record being updated is locked by the transaction preventing further updates or reads until the journal records are written.
- A before image of the record is written to the journal receiver.
- An after image of the record is written to the journal receiver.

At the end of the data base transaction, the records are committed in the journal and all locks on the data base records by the transaction are released.

Recording a block of journal entries does not correspond directly to a disk write, since the AS/400 journal management function has the ability to block journal writes from one or more jobs into a single physical I/O.

The AS/400 integrated relational data base does not require an overt checkpointing system to ensure that data is written to disk. AS/400 standard journal management function ensures that data in disk files is synchronized with that in memory in a transparent, nondisruptive fashion.

As data base I/Os are committed, the journal entries associated with the change are written prior to the completion of the commitment function. The data base I/Os are issued as asynchronous I/Os which may be delayed by other

requests to use the same data. To ensure that all data updates are completed in a reasonable period of time, AS/400 journal management ensures that unwritten pages from all tables being journaled are forced to disk at least once for every 50,000 entries to the journal. That is, for the 9 tables in TPC-C one file is forced to disk every 5,555 journal entries, so that all 9 are synchronized within the period of time it takes to log 50,000 journal entries.

The AS/400e server s40-2261 system operating at 25149.75 tpm-C completes 50,000 entries to the journal in approximately 2 seconds. A minimum measurement interval of 20 minutes includes approximately 600 complete cycles.

Reproducibility

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

A repeatability measurement was taken on the AS/400e server s40-2261 for the same length of time as the measured run. The repeatability interval was taken from the same measurement as the reported interval and the intervals were separated by 8 minutes. The repeatability measurement was 25089.65 tpmC.

Measurement Interval

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

The measurement interval for the tpmC reported was for 20 minutes in duration. The reproducibility measurement was also for a 20-minute interval.

Clause 6: SUT, Driver, and Communication Definition-Related Items

RTE Availability

If the RTE is commercially available, then its inputs must be specified. Otherwise, a description must be supplied of what inputs to the RTE had been used.

Appendix E contains the scripts used in the Remote Terminal Emulator testing.

Functionality and Performance of 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.

In the benchmark configuration the Remote Terminal Emulator (RTE) communicates with the client system over token ring. The communications mechanism used in the benchmarked and priced configurations are the same.

Network Bandwidth

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

All networks used 16 Mb/second token ring. The tested configuration of front-end AS/400s and server AS/400 was physically connected on one 16 Mb/second token ring network.

The priced configuration observed the physical limitation of 260 physical devices connected to a single token ring.

Operator Intervention

If the configuration requires operator intervention, the mechanism and the frequency of this intervention must be disclosed.

The AS/400 configurations reported do not require any operator intervention to sustain the reported throughput during the 8-hour period.

Clause 7: Pricing Related Items

Hardware and Programs Used

A detailed list of the hardware and software used in the priced system must be reported. Each 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, contents of the package must be disclosed. Pricing source(s) and effective date(s) must also be reported.

The detailed list of all hardware and programs for the priced configuration is listed in the pricing sheets (please refer to Section "Five Year Cost of System Configuration" for details) for each system reported. The prices for all products and features are provided by IBM and available the same day as product or feature availability. All products are currently orderable for delivery on or before the published availability date.

Five Year Cost of System Configuration

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.

The price sheet for the AS/400e server s40-2261 and associated client systems is contained on the following pages. The discounts used are disclosed below.

Revenue Allowance
: This allowance of 28.5% was based on total hardware and software purchase price of the configuration.

Midrange Service Option (MRSO)
: This discount is available for customers when agreement is reached for the customer to perform specified service duties (consult marketing representative for details). For the priced configuration, the MSAD discount is 17%.

Extended Maintenance Option (EMO)
: This is a discount for prepayment of maintenance costs. A discount of 17% is available for this configuration based on payment for five years maintenance at time of purchase. This discount is applied to the balance after the Midrange Service Option is applied.

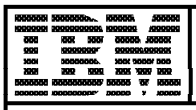
The number and capacity of disk drives in the priced configuration was increased above the measured configuration to meet the 180-day storage requirement. All upgrades were made with units of equivalent or superior performance characteristics.

Statement of tpmC and Price/Performance

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

The IBM AS/400e server s40-2261 was measured at 25149.75 tpmC with a 5-year system price of $3,459,765. The respective price-performance for the AS/400e server s40-2261 is $138.06 per tpmC. The AS/400e server s40-2261 priced configuration is currently orderable for delivery on or after August 29, 1997.

IBM AS/400e server s40-2261 Five-Year System Price Configuration



AS/400e server model s40-2261	TPC-C REV 3.3 EXECUTIVE SUMMARY
	Report Date: Sseptember 1, 1998

TPC Benchmark C							
AS/400 9406-S40 Configuration							
	Feature	Unit	3rd Party		Extended	Extended	5-Year
Item Description	Number	Price	Pricing	Qty.	Price	Maintenance	Price
Server Hardware:							
AS/400 9406 - Model S40 12-way Processor	2261	$300,000		1	$300,000	$69,600	$369,600
Token-Ring Adapter (9249)	Bundled			1	$0		$0
Battery Backup	Bundled			1	$0		$0
Twinax Work Station Controller (5540)	Bundled			1	$0		$0
256 MB Base Memory	Bundled			4	$0		$0
Optical Link	2688	$2,000		2	$4,000		$4,000
1024 MB Main Storage	3192	$22,528		16	$360,448		$360,448
Storage Expansion Unit	5057	$5,000		1	$5,000	$10,560	$15,560
Storage Expansion Unit	5058	$5,000		6	$30,000	$63,360	$93,360
1063 Mbps System Unit Expansion Tower	5073	$14,900		2	$29,800		$29,800
1063 Mbps Storage Expansion Tower	5083	$14,900		7	$104,300	$100,800	$205,100
Token Ring Adapter	6149	$1,200		31	$37,200		$37,200
RAID Disk Unit Controller	6532	$9,900		13	$128,700		$128,700
2.5 GB 1/4-inch Tape Drive	6381	$1,500		1	$1,500		$1,500
RPQ 843804	843804	$900		1	$900		$900
LAN/WAN/Workstation IOP	2629	$2,600		16	$41,600		$41,600
V.24./EIA 232 20 ft Cable	0330	$125		1	$125		$125
8.58 GB Disk Unit	6713	$2,400		216	$518,400		$518,400
Base 8.58 GB Disk Unit	8713	$900		1	$900		900
Server Subtotal					*$1,562,873*	*$244,320*	*$1,807,193*
Client Hardware:							
AS/400 9401-150 Growth Server Pkg V4R1	0194	$12,000		1	$12,000	$4,272	$16,272
4.194 GB Disk Unit	Bundled			1	$0		$0
128 MB Base Memory	Bundled			1	$0		$0
Twinax Work Station Controller	Bundled			1	$0		$0
Base Token Ring Adapter (9724)	Bundled			1	$0		$0
Tape Drive	Bundled			1	$0		$0
64 MB Additional Main Storage Memory	3110	$1,216		1	$1,216		$1,216
Token Ring Adapter	2724	$840		1	$840		$840
4.194 GB Single Disk Unit	6607	$1,500		1	$1,500		$1,500
Single Client Subtotal					*$15,556*	*$4,272*	*$19,828*
Number of Clients				64			
Client Subtotal					*$995,584*	*$273,408*	*$1,268,992*
Server Software:							
IBM Operating System/400 V4R1M0 60-user	Bundled			1	$0		$0
Client Software:							
IBM Operating System/400 V4R1M0	Bundled			64	$0		$0
CICS for OS/400	5716-DFH	$2,450		64	$156,800		$156,800
ILE COBOL	5738-CB1	$900		1	$900		$900
Application Development Toolkit	5716-PW1	$900		1	$900		$900
DB2 Query Manager Dev. Toolkit	Bundled			1	$0		$0
ILE C	5716-CX2	$900		1	$900		$900
Software Subtotal					*$159,500*		*$159,500*
User Connectivity:							
8-port Token Ring connection unit (10% spares)	8226	$545		2976	$1,621,920		$1,621,920
User Connectivity Subtotal					*$1,621,920*		*$1,621,920*
5-year System Subtotal					*$4,339,877*	*$517,728*	*$4,857,605*
Discounts:							
Revenue Allowance					($1,236,865)		*($1,236,865)*
Mid-range System Option						($88,014)	*($88,014)*
Extended Maintenance Option						($73,051)	*($73,051)*
							Total
5-year System Total							**$3,459,675**

Notes:

Revenue Allowance: Applied to hardware and software.

Extended Maintenance Option (EMO): Discount for prepayment of 5 years of maintenance costs for the system unit.

Midrange System Option: This discount is available to customers when agreement is reached for the customer to perform certain service duties.

Five-Year Cost of Ownership: $3,459,675

tpmC Rating: 10625.4

$/tpmC: $138.06

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 assumptions 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 benchmark 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.

Clause 8: Audit-Related Items

If the benchmark has been independently audited, then the auditor's name, address, phone number, and a brief audit summary report indicating compliance must be included in the Full Disclosure Report. A statement should be included, specifying when the complete audit report will become available and who to contact in order to obtain a copy.

These TPC Benchmark C results have been audited by Francis Raab of Information Paradigm. The attestation letter is included at the end of this report.

Appendix A. System Parameters and User Profile

System Parameters

Table 4 shows the system parameters changed for these TPC-C measurements.

Table 4. System Parameters

System Parameters	AS/400e server s40-2261
QMCHPOOL	1,326,120
*BASE	16,499,672
PAGING OPTION	USRDFN
QBASACTLVL	3,000
QPFRADJ	0
EDTRCYAP	*OFF

Transaction Subsystem Description

All transactions and associated user processes ran in the *BASE memory pool.

User Profile

All users executing the TPC Benchmark C transactions signed on using the same User Profile. The User Profile defines the libraries included in the library list, defines which library is the current library, special authorities granted to this user, and which program is called when the user signs on (FIRSTPGM1).

Appendix B. Data Base File Definitions

AREFFIL: Reference File

```
          R REFRCD                TEXT('TPCC Reference File')
A This file contains the field definition for most of the other
A files used in the TPC-C benchmark.  For example to define the
A warehouse ID field, both the warehouse file (WRHS) and the
A district file (DSTRCT) reference WRHSID in this file.  This
A helps when field definitions need to change, the change only
A needs to be made in one place.
A
A Code Identifiers
A          WRHSID        4B       TEXT('Warehouse ID')
A                                 COLHDG('W/H ID')
A          DISTID        2B        TEXT('District ID')
A                                 COLHDG('District')
A                                 EDTCDE(1)
A          CUSTID        6B        TEXT('Customer ID')
A                                 COLHDG('Customer')
A          ITEMID        6B        TEXT('Item ID')
A                                 COLHDG('Item')
A          ITMIMAGE      6B        TEXT('ImageID')
A                                 COLHDG('Image#')
A          ORDID         8B        TEXT('Order ID')
A                                 COLHDG('Order #')
A                                 EDTCDE(4)
A                                 EDTWRD('       ')
A          OLINE         2B        TEXT('Order Line Number')
A                                 COLHDG('Order' 'Line #')
A Name, Address and Descriptor Information
A          LOCNAM        1         TEXT('Name of W/H or District')
A                                 COLHDG('Location' 'Name')
A          FNAME        16         TEXT('First Name')
A                                 COLHDG('First' 'Name')
A          MINIT         2         TEXT('Middle Initial')
A                                 COLHDG('Middle' 'Init')
A          LNAME        16         TEXT('Last Name')
A                                 COLHDG('Last' 'Name')
A          ADDR1         2         TEXT('Address Line 1')
A                                 COLHDG('Address' 'Line 1')
A          ADDR2         2         TEXT('Address Line 2')
A                                 COLHDG('Address' 'Line 2')
A          CITY          2         TEXT('City')
A          STATE         2         TEXT('State')
A          ZIPCD         9A        TEXT('Zip Code')
A                                 COLHDG('Zip' 'Code')
A          PHONE        16         TEXT('Phone Number')
A          ITMNAM       24         TEXT('Item Name')
A                                 COLHDG('Item' 'Name')
A          CARRID        2         TEXT('Carrier ID')
A                                 COLHDG('Carrier' 'Number')
A          LOCAL         1         TEXT('Flag to indicate local')
A Financial and Inventory Numbers
A          TAX           5  4      TEXT('Tax Percentage')
A                                 EDTWRD(' .   ')
A          DSCNT         5  4      TEXT('Discount Percentage')
A                                 COLHDG('Discount')
A                                 EDTWRD(' .   ')
A UPDATED: 3/ 1/96
A          BALANC       13  2      TEXT('Balance Information')
A                                 COLHDG('Balance')
A                                 EDTWRD('       $   .  -')
A          CREDIT        2         TEXT('Credit Status-GC or BC')
A                                 COLHDG('Credit' 'Status')
A UPDATED: 3/ 1/96
A          CRDLMT       13  2      TEXT('Credit Limit')
A                                 COLHDG('Credit' 'Limit')
A                                 EDTWRD('       $   .  -')
A          AMOUNT7       7P 2      TEXT('Amount')
A                                 EDTWRD('  $   .  -'  )
A          YTD          13  2      TEXT('YTD Amount')
A                                 EDTWRD('       $   .  -'  )
A          YTD2          8B        TEXT('YTD Amount')
A                                 EDTCDE(4)
A          QTY2          2B        TEXT('Quantity')
A                                 COLHDG('Quantity')
A                                 EDTCDE(1)
A          QTY4          4B        TEXT('Quantity')
A                                 COLHDG('Quantity')
A                                 EDTCDE(1)
A          QTY3          3         TEXT('Quantity')
A                                 COLHDG('Quantity')
A                                 EDTCDE(1)
A          PRICE         5  2      TEXT('Price')
A                                 EDTWRD('$   .  -')
A Date and Time Information
A          DATE          8S        TEXT('Date')
A                                 EDTWRD('  -  -   ')
A          TIME          6S        TEXT('Time')
A                                 EDTWRD('  :  :  ')
A Pad Information
A          CDATA        5          TEXT('Customer Data')
A                                 COLHDG('Cust' 'Filler')
A          HDATA        24         TEXT('History Information')
A                                 COLHDG('Hist' 'Filler')
A          IDATA         5         TEXT('Item Data')
A                                 COLHDG('Item' 'Filler')
A          DISTINFO     24          TEXT('Dist Info')
A                                 COLHDG('Dist' 'Info')
A TPCC - Plus Information
A          CPHNTC        1          COLHDG('Phonetic Search')
A          DSPDID        2          TEXT('District ID')
A                                 COLHDG('District')
A                                 EDTCDE(4)
A          DSPOID        8          TEXT('Order ID')
A                                 COLHDG('Order #')
A                                 EDTCDE(4)
A          DSPOLN        2          TEXT('Order Line Number')
A                                 COLHDG('Order' 'Line #')
A          AMOUNT6       6  2       TEXT('Amount')
A                                 EDTWRD('$    .  -')
A          DSPQTY        3S         TEXT('Quantity')
A                                 COLHDG('Quantity')
A                                 EDTCDE(1)
```

CSTMRLFCRT: Customer Logical File

```
A          R CSRCD                 PFILE(CSTMRPF)
A          K CWID
A          K CDID
A          K CLAST
A          K CFIRST
```

CSTMRLFNAM: Customer Names Logical File

```
A          R CSRCD                 PFILE(CSTMRPF)
A          K CWID
A          K CDID
```

CSTMR: Customer Logical File

```
A The UNIQUE keyword guarantees that there will be not duplicate
A key values inserted into the file.
A
A                                 UNIQUE
A          R CSRCD                 PFILE(CSTMRPF)
A                                 TEXT('CUSTOMER MASTER FILE - TPCC')
A          K CID
A          K CDID
```

CSTMRPF: Customer Physical File

```
A                                 REF(AREFFIL)
A This is the file definition for the customer data base file.
A All fields that are stored in the customer file are defined
A here, the actual field definitions are in AREFFIL (the
A reference file) and are pulled into this file when it is
A compiled (CRTPF command executed against this source).
A          R CSRCD                 TEXT('CUSTOMER MASTER FILE - TPCC')
A            CID       R           REFFLD(CUSTID)
A            CDID      R           REFFLD(DISTID)
A            CWID      R           REFFLD(WRHSID)
A            CFIRST    R           REFFLD(FNAME)
A            CINIT     R           REFFLD(MINIT)
A            CLAST     R           REFFLD(LNAME)
A            CLDATE    R           REFFLD(DATE)
A                                 COLHDG('Date of' 'Last Order')
A                                 TEXT('Date of DB Build')
A            CADDR1    R           REFFLD(ADDR1)
A            CCREDT    R           REFFLD(CREDIT)
A                                 COLHDG('Credit' 'Status')
A                                 TEXT('Credit Status')
A            CADDR2    R           REFFLD(ADDR2)
A            CDCT      R           REFFLD(DSCNT)
A            CCITY     R           REFFLD(CITY)
A            CSTATE    R           REFFLD(STATE)
A            CZIP      R           REFFLD(ZIPCD)
A            CPHONE    R           REFFLD(PHONE)
A            CBAL      R           REFFLD(BALANC)
A                                 TEXT('Customer Balance')
A            CCRDLM    R           REFFLD(CRDLMT)
A                                 TEXT('Credit Limit')
A            CYTD      R           REFFLD(YTD)
A                                 TEXT('Customer YTD')
A            CPAYCNT   R           REFFLD(QTY4)
A                                 TEXT('Customer Payments')
A            CDELCNT   R           REFFLD(QTY4)
A                                 TEXT('Customer Deliveries')
A            CLTIME    R           REFFLD(TIME)
A                                 COLHDG('Time of' 'Last Order')
A                                 TEXT('Time of DB Build')
```

```
A          CDATA     R
A        K CWID
A        K CLAST
```

DSTRCT: District File

```
                                REF(AREFFIL)
A This is the file definition for the district data base file.
A All fields that are stored in the district file are defined
A here, the actual field definitions are in AREFFIL (the
A reference file) and are pulled into this file when it is
A compiled (CRTPF command executed against this source).
A The UNIQUE keyword guarantees that there will be not duplicate
A key values inserted into the file.
A                               UNIQUE
A        R DSRCD                 TEXT('District Master File - TPCC')
A          DID       R           REFFLD(DISTID)
A          DWID      R           REFFLD(WRHSID)
A          DNAME     R           REFFLD(LOCNAM)
A                               COLHDG('District' 'Name')
A          DADDR1    R           REFFLD(ADDR1)
A          DADDR2    R           REFFLD(ADDR2)
A          DCITY     R           REFFLD(CITY)
A          DSTATE    R           REFFLD(STATE)
A          DZIP      R           REFFLD(ZIPCD)
A          DTAX      R           REFFLD(TAX)
A          DYTD      R           REFFLD(YTD)
A                               COLHDG('YTD' 'Balance')
A                               TEXT('YTD Balance')
A          DNXTOR    R           REFFLD(ORDID)
A                               COLHDG('Next' 'Order #')
A                               TEXT('Next Order Number')
A        K DID
A        K DWID
```

HSTRY: History File

```
                                REF(AREFFIL)
A        R HSRCD                 TEXT('History File for TPCC')
A This is the file definition for the history data base file.
A All fields that are stored in the history file are defined
A here, the actual field definitions are in AREFFIL (the
A reference file) and are pulled into this file when it is
A compiled (CRTPF command executed against this source).
A The UNIQUE keyword is not needed in this file because there
A are no key fields for this file.
A
A          HDID      R           REFFLD(DISTID)
A          HWID      R           REFFLD(WRHSID)
A          HCID      R           REFFLD(CUSTID)
A          HCDID     R           REFFLD(DISTID)
A          HCWID     R           REFFLD(WRHSID)
A          HDATE     R           REFFLD(DATE)
A                               COLHDG('Payment' 'Date')
A          HTIME     R           REFFLD(TIME)
A                               COLHDG('Payment' 'Time')
A          HAMT      R           REFFLD(AMOUNT7)
A                               COLHDG('Payment' 'Amount')
A                               TEXT('Payment Amount')
A          HDATA     R           REFFLD(HDATA)
```

ITEM: Item Physical File

```
A                               REF(AREFFIL)
A This is the file definition for the item data base file.
A All fields that are stored in the item file are defined
A here, the actual field definitions are in AREFFIL (the
A reference file) and are pulled into this file when it is
A compiled (CRTPF command executed against this source).
A The UNIQUE keyword guarantees that there will be not duplicate
A key values inserted into the file.
A
A                               UNIQUE
A        R ITRCD                 TEXT('Item File for TPCC')
A          IID       R           REFFLD(ITEMID)
A          IMAGEID   R           REFFLD(ITMIMAGE)
A          INAME     R           REFFLD(ITMNAM)
A          IPRICE    R           REFFLD(PRICE)
A          IDATA     R
A        K IID
```

ITEMLF: Item Logical File

```
A        R ITRCD                 PFILE(ITEM)
A        K IID
```

NEWORD: New Order Logical File

```
A The UNIQUE keyword guarantees that there will not be duplicate
A key values inserted into the file.
A
A                               UNIQUE
A        R NORCD                 PFILE(NEWORDPF)
                                TEXT('New Orders File - TPCC')
A        K NOWID
A        K NODID
A        K NOOID
```

NEWORDLF: New Order Logical File

```
A        R NORCD                 PFILE(NEWORDPF)
A        K NOWID
A        K NODID
```

NEWORDPF: New Order Physical File

```
                                REF(AREFFIL)
A This is the file definition for the new order data base file.
A All fields that are stored in the new order file are defined
A here, the actual field definitions are in AREFFIL (the
A reference file) and are pulled into this file when it is
A compiled (CRTPF command executed against this source).
A        R NORCD                 TEXT('New Orders File - TPCC')
A          NOOID     R           REFFLD(ORDID)
A          NODID     R           REFFLD(DISTID)
A          NOWID     R           REFFLD(WRHSID)
```

ORDERS: Orders Logical File

```
A         R ORRCD                 PFILE(ORDERSPF)
A           OWID
A           ODID
A           OCID                  EDTWRD('     ')
A           OID
A           OENTDT
A           OENTTM
A           OCARID
A           OLINES
A           OLOCAL
A         K OWID
A         K ODID
A         K OCID
A         K OID
```

ORDERSLF: Orders Logical File

```
A                                 UNIQUE
A         R ORRCD                 PFILE(ORDERSPF)
A         K OWID
A         K ODID
A         K OID
```

ORDERSPF: Orders Physical File

```
                                  REF(AREFFIL)
A This is the file definition for the orders data base file.
A All fields that are stored in the orders file are defined
A here, the actual field definitions are in AREFFIL (the
A reference file) and are pulled into this file when it is
A compiled (CRTPF command executed against this source).
A         R ORRCD                  TEXT('Orders Master File for TPCC')
A           OWID      R            REFFLD(WRHSID)
A           ODID      R            REFFLD(DISTID)
A           OCID      R            REFFLD(CUSTID)
A           OID       R            REFFLD(ORDID)
A           OENTDT    R             REFFLD(DATE)
A                                  COLHDG('Order' 'Date')
A                                  TEXT('Order Entry Date')
A           OENTTM    R             REFFLD(TIME)
A                                  COLHDG('Order' 'Time')
A                                  TEXT('Order Entry Time')
A           OCARID    R             REFFLD(CARRID)
A           OLINES    R             REFFLD(OLINE)
A                                  COLHDG('Number of' 'Order Lines')
A                                  TEXT('Number of Lines in Order')
A           OLOCAL    R             REFFLD(LOCAL)
A                                  TEXT('Flag to indicate local order')
```

ORDLIN: Order Lines Logical File

```
A                                 UNIQUE
A         R OLRCD                  TEXT('Order Line File for TPCC')
A                                  PFILE(ORDLINPF)
A         K OLWID
A         K OLDID
A         K OLOID
A         K OLNBR
```

ORDLINLF: Order Lines Logical File

```
A         R OLRCD                 PFILE(ORDLINPF)
A         K OLWID
A         K OLDID
A         K OLOID
```

ORDLINPF: Order Lines Physical File

```
A                                  REF(AREFFIL)
A         R OLRCD                   TEXT('Order Line File for TPCC')
A           OLOID     R             REFFLD(ORDID)
A           OLDID     R             REFFLD(DISTID)
A                                  TEXT('Customers District')
A           OLWID     R             REFFLD(WRHSID)
A                                  COLHDG('Customers' 'Warehouse')
A                                  TEXT('Customers Warehouse')
A           OLNBR     R             REFFLD(OLINE)
A                                  TEXT('Line Number of Order')
A           OLSPWH    R             REFFLD(WRHSID)
A                                  COLHDG('Supply' 'Warehouse')
A                                  TEXT('Supply Warehouse ID')
A           OLIID     R             REFFLD(ITEMID)
A                                  TEXT('Item Ordered')
A           OLQTY     R             REFFLD(QTY2)
A                                  COLHDG('Qty' 'Ordered')
A                                  TEXT('Quantity Ordered')
A           OLAMNT    R             REFFLD(AMOUNT7)
A                                  TEXT('Order Line Amount')
A           OLDLVD    R             REFFLD(DATE)
A                                  COLHDG('Delivery' 'Date')
A                                  TEXT('Delivery Date')
A           OLDLVT    R             REFFLD(TIME)
A                                  COLHDG('Delivery' 'Time')
A                                  TEXT('Delivery Time')
A           OLDSTI    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Information')
```

STOCK: Stock Logical File

```
A                                 UNIQUE
A         R STRCD                  PFILE(STOCKPF)
A         K STWID
A         K STIID
```

STOCKLF: Stock Logical File

```
A         R STRCD                   TEXT('Stock File for TPCC')
A                                  PFILE(STOCKPF)
A         K STWID
A         K STIID
```

STOCKPF: Stock Physical File

```
A                                  REF(AREFFIL)
A         R STRCD                   TEXT('Stock File for TPCC')
A           STWID     R             REFFLD(WRHSID)
A           STIID     R             REFFLD(ITEMID)
A                                  TEXT('Warhouse Nbr of Stock Item')
A           STQTY     R             REFFLD(QTY4)
A                                  COLHDG('Qty in' 'Stock')
A                                  TEXT('Quantity on hand')
A           STDI 1    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 1')
A           STDI 2    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 2')
A           STDI 3    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 3')
A           STDI 4    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 4')
A           STDI 5    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 5')
A           STDI 6    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 6')
A           STDI 7    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 7')
A           STDI 8    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 8')
A           STDI 9    R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 9')
A           STDI1     R             REFFLD(DISTINFO)
A                                  TEXT('Dist Info 1 ')
A           STYTD     R             REFFLD(YTD2)
A                                  TEXT('Qty ordered YTD')
A           STORDRS   R             REFFLD(QTY4)
A                                  TEXT('# times ordered')
A           STREMORD  R             REFFLD(QTY4)
A                                  TEXT('# times ordered remotely')
A           STDATA    R             REFFLD(IDATA)
```

WRHS: Warehouse Physical File

```
                                REF(AREFFIL)
A                               UNIQUE
A         R WRRCD                TEXT('Warehouse Master File - TPCC')
A           WID       R          REFFLD(WRHSID)
A           WNAME     R          REFFLD(LOCNAM)
A                               COLHDG('W/H' 'Name')
A           WADDR1    R          REFFLD(ADDR1)
A           WADDR2    R          REFFLD(ADDR2)
A           WCITY     R          REFFLD(CITY)
A           WSTATE    R          REFFLD(STATE)
A           WZIP      R          REFFLD(ZIPCD)
A           WTAX      R          REFFLD(TAX)
A           WYTD      R          REFFLD(YTD)
A                               COLHDG('YTD' 'Balance')
A                               TEXT('Warehouse YTD Balance')
A         K WID
```

Appendix C. Data Base Build Programs

Program Flow For Build of Server, Client, and Data Base

This list shows the order of invocation for the data base build programs. Each level of indentation is a call. If a program is indented more than the previous program, it was called by the previous program. If it is at the same margin as the previous program (or as earlier program), it was called by the same program as the previous (or earlier) program. To make determining the level of call easier, the level number will follow the program enclosed in parenthesis.

BLDTPCCPGM (2)
- CRTBLDPGMS (3)
  - NATBLD (4)
  - CRTHASH (4)
    - C_CREATE (5)
    - C_CREATE2 (5)
    - C_CREATE3 (5)
- DLTLOGICLS (3)
- LOADTPCCF (3)
  - LOADW_D (4)
  - LOADITEM (4)
  - LOADCST (4)
  - LOADORD (4)
- SETUP (3)
  - ORDERSVIEW (4)
  - ORDLINVIEW (4)
  - NEWORDVIEW (4)
  - CSTMRVIEW (4)
  - STRJRNTPCC (4)
- CRTENVPGMS (3)

BLDTPCCPGM: Database Build Program

```
            PGM       PARM(&DB &ENV &CRTSAVFILE &DB2)
            /  This program brings in the number of warehouses and   /
            /  the options to compile the build programs and the     /
            /  environment programs.  The data library will get      /
            /  then get built, if it already exists, it is deleted   /
            /  and rebuilt.                                          /

            DCL       VAR(&WRHS) TYPE( DEC) LEN(4  )
            DCL       VAR(&DB) TYPE( CHAR) LEN(1)
            DCL       VAR(&DB2) TYPE( CHAR) LEN(1)
            DCL       VAR(&ENV) TYPE( CHAR) LEN(1)
            DCL       VAR(&APPLIB) TYPE( CHAR) LEN(1 )
            DCL       VAR(&DATLIB) TYPE( CHAR) LEN(1 )
            DCL       VAR(&DB2SETPGM) TYPE( CHAR) LEN(1 )
            DCL       VAR(&LIBRARY) TYPE( CHAR) LEN(1 )
            DCL       VAR(&LIBASP) TYPE( CHAR) LEN(1)
            DCL       VAR(&BLDLIB) TYPE( CHAR) LEN(1 )
            DCL       VAR(&CRTSAVFILE) TYPE( CHAR) LEN(1)
            DCL       VAR(&SAVLIB) TYPE( CHAR) LEN(1 )
            DCL       VAR(&JRNLIB) TYPE( CHAR) LEN(1 )
            DCL       VAR(&WRHSCHAR) TYPE( CHAR) LEN(4)
            DCL       VAR(&STRWHCHAR) TYPE( CHAR) LEN(4)
            DCL       VAR(&ENDWHCHAR) TYPE( CHAR) LEN(4)
            DCL       VAR(&ENDWRHS) TYPE( CHAR) LEN(4)
            DCL       VAR(&STRWRHS) TYPE( CHAR) LEN(4)
            DCL       VAR(&STRWH) TYPE( DEC) LEN(4  ) VALUE(1)
            DCL       VAR(&ENDWH) TYPE( DEC) LEN(4  )
            DCL       VAR(&JRNASP) TYPE( CHAR) LEN(1)
            DCL       VAR(&DATE) TYPE( CHAR) LEN(6)
            DCL       VAR(&PRVLIBVAL) TYPE( CHAR) LEN(1 ) /  +
                        Previous TPC-C Library Names  /

            MONMSG    MSGID(CPF2556)

SETRPY:      ADDRPYLE  SEQNBR(111) MSGID(CPA7 25) RPY(I)
            MONMSG    MSGID(CPF2555) EXEC(DO)
            RMVRPYLE  SEQNBR(111)
            RMVRPYLE  SEQNBR(112)
            RMVRPYLE  SEQNBR(113)
            RMVRPYLE  SEQNBR(114)
            RMVRPYLE  SEQNBR(115)
            ADDRPYLE  SEQNBR(111) MSGID(CPA7 25) RPY(I)
            ENDDO
            ADDRPYLE  SEQNBR(112) MSGID(CPA1332) RPY(I)
            ADDRPYLE  SEQNBR(113) MSGID(CPF211 ) RPY(I)
            ADDRPYLE  SEQNBR(114) MSGID(CPF1 54) RPY(I)
            ADDRPYLE  SEQNBR(115) MSGID(CPF21 5) RPY(I)
            CHGJOB    JOB( ) INQMSGRPY( SYSRPYL)


GETPARMS:  RTVDTAARA  DTAARA(TPCCINFO/DATALIB) RTNVAR(&DATLIB)
           RTVDTAARA  DTAARA(TPCCINFO/LIBASP) RTNVAR(&LIBASP)
           RTVDTAARA  DTAARA(TPCCINFO/APPLIB) RTNVAR(&APPLIB)
           RTVDTAARA  DTAARA(TPCCINFO/MNTLIB) RTNVAR(&BLDLIB)
           RTVDTAARA  DTAARA(TPCCINFO/SAVELIB) RTNVAR(&SAVLIB)
           RTVDTAARA  DTAARA(TPCCINFO/JRNLIB) RTNVAR(&JRNLIB)
           RTVDTAARA  DTAARA(TPCCINFO/JRNASP) RTNVAR(&JRNASP)
           RTVDTAARA  DTAARA(TPCCINFO/ENDWRHS) RTNVAR(&ENDWRHS)
           RTVDTAARA  DTAARA(TPCCINFO/STRWRHS) RTNVAR(&STRWRHS)
           CHGVAR     VAR(&WRHS) VALUE(&ENDWRHS)
           CHGVAR     VAR(&STRWH) VALUE(&STRWRHS)
           RTVSYSVAL  SYSVAL(QDATE) RTNVAR(&DATE)

           CHGVAR     VAR(&WRHSCHAR) VALUE(&WRHS)
           CHGVAR     VAR(&ENDWH) VALUE(&WRHS)
           CHGVAR     VAR(&STRWHCHAR) VALUE(&STRWH)
           CHGVAR     VAR(&ENDWHCHAR) VALUE(&ENDWH)

           MONMSG     MSGID(CPF    )
           ENDSBS     SBS(TPCCBLDSBS) OPTION( IMMED)
           MONMSG     MSGID(CPF1 54)
           DLTSBSD    SBSD(&BLDLIB/TPCCBLDSBS)
           MONMSG     MSGID(CPF21 5)
           DLTJOBD    JOBD(&BLDLIB/TPCBLDJOBD)
           MONMSG     MSGID(CPF21 5)
           CRTSBSD    SBSD(&BLDLIB/TPCCBLDSBS) POOLS((1  BASE)) +
                       TEXT('TPCCBLD Jobs Subsystem')
           DLTCLS     CLS(&BLDLIB/TPCCBLDCLS)
           MONMSG     MSGID(CPF21 5)
           CRTCLS     CLS(&BLDLIB/TPCCBLDCLS) RUNPTY(21) +
                       TIMESLICE(2    ) PURGE( NO)
           DLTJOBQ    JOBQ(&BLDLIB/TPCBLDJOBQ)
           MONMSG     MSGID(CPF21 5)
           CRTJOBQ    JOBQ(&BLDLIB/TPCBLDJOBQ)
           ADDJOBQE   SBSD(&BLDLIB/TPCCBLDSBS) +
                       JOBQ(&BLDLIB/TPCBLDJOBQ) MAXACT( NOMAX)
           CRTJOBD    JOBD(&BLDLIB/TPCBLDJOBD) +
                       JOBQ(&BLDLIB/TPCBLDJOBQ) RTGDTA(TPCCBLD) +
                       INLLIBL(&BLDLIB QTEMP QGPL) LOG(4 +
                          SECLVL) INQMSGRPY( DFT)
           ADDRTGE    SBSD(&BLDLIB/TPCCBLDSBS) SEQNBR(99) +
                       CMPVAL( ANY) PGM(QCMD) +
                       CLS(&BLDLIB/TPCCBLDCLS)
           STRSBS     SBSD(&BLDLIB/TPCCBLDSBS)
CHKDBLIB:   IF (&DB  EQ 'Y') THEN(DO)
           CHKOBJ     OBJ(&DATLIB) OBJTYPE( LIB)
           MONMSG     MSGID(CPF98 1) EXEC(CRTLIB LIB(&DATLIB) +
                       ASP(&LIBASP))
           ENDJRNPF   FILE( ALL) JRN(&DATLIB/TPCCJRN)
           MONMSG     MSGID(CPF    )
           IF (&STRWRHS  EQ '1') THEN(DO)
           CLRLIB     LIB(&DATLIB)
           CHGLIB     LIB(&DATLIB) TEXT('Data library '  CAT &DATE)
           ENDDO
           IF (&STRWRHS  NE '1') THEN(GOTO EXTENDDB)
           ENDDO
CHKOBJLIB:  ADDLIBLE   LIB(&APPLIB)
           MONMSG     MSGID(CPF21 3)
           MONMSG     MSGID(CPF211 ) EXEC(DO)
           CRTLIB     LIB(&APPLIB) TEXT('Application Library ' +
                        CAT &DATE)
             ADDLIBLE   LIB(&APPLIB)
           ENDDO

           SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) +
                       MSGDTA('Starting Build') +
                       TOPGMQ( EXT) MSGTYPE( STATUS)


           /  Check for DB Build  /

 DBCHECK:   IF        COND(&DB  NE 'Y') THEN(GOTO CMDLBL(SKIPDB))
           CRTCLPGM   PGM(&BLDLIB/CRTBLDPGMS) +
                       SRCFILE(&BLDLIB/QCLSRC) +
                       SRCMBR(CRTBLDPGMS) OPTION( NOSOURCE)

           CALL       PGM(&BLDLIB/CRTBLDPGMS) PARM(&STRWH &ENDWH +
                       &BLDLIB &DATLIB)

           CALL       PGM(&BLDLIB/CRTHASHES)

           GOTO       CMDLBL(SBMTPCCF)

EXTENDDB:   ADDLIBLE   LIB(&BLDLIB)
           MONMSG     MSGID(CPF21 3)

/  DELETE THE LOGICALS TO SPEED UP THE BUILD                      /

           CRTCLPGM   PGM(&BLDLIB/DLTLOGICLS) +
                       SRCFILE(&BLDLIB/QCLSRC) OPTION( NOSOURCE)

           CALL       PGM(&BLDLIB/DLTLOGICLS) PARM(&DATLIB)

/               FILL DATA FILES                                 /
 SBMTPCCF:   CALL       PGM(&BLDLIB/LOADTPCCP) PARM(&DATLIB &BLDLIB +
                       &STRWHCHAR &WRHSCHAR)

/    INITIALIZE APPLICATION ENVIRONMENT                          /

           IF        COND(&DB2  EQ 'y') THEN(DO)
           RTVDTAARA  DTAARA(TPCCINFO/DB2SETPGM) RTNVAR(&DB2SETPGM)
           RTVDTAARA  DTAARA(TPCCINFO/LIBRARY) RTNVAR(&LIBRARY)
           SBMJOB     CMD(CALL PGM(&LIBRARY/DB2SETPGM) PARM(&BLDLIB +
                       &BLDLIB &DATLIB &CRTSAVFILE &SAVLIB +
                       &JRNLIB &JRNASP &STRWHCHAR &ENDWHCHAR)) +
                       JOB(SETUP) JOBQ(&BLDLIB/TPCBLDJOBQ)
           ENDDO
           ELSE       CMD(DO)
           SBMJOB     CMD(CALL PGM(&BLDLIB/SETUP) PARM(&BLDLIB +
                       &BLDLIB &DATLIB &CRTSAVFILE &SAVLIB +
                       &JRNLIB &JRNASP &STRWHCHAR &ENDWHCHAR)) +
                       JOB(SETUP) JOBQ(&BLDLIB/TPCBLDJOBQ)
           ENDDO
           /  Check for compiling of Environment programs.  /

 SKIPDB:    IF        COND(&ENV = 'Y') THEN(DO)

           CHGLIB     LIB(&APPLIB) TEXT('Applications Created on ' +
                        CAT (&DATE))
           CRTCLPGM   PGM(&BLDLIB/CRTENVPGMS) +
                       SRCFILE(&BLDLIB/QCLSRC) +
                       SRCMBR(CRTENVPGMS) OPTION( NOSOURCE)
           MONMSG     MSGID(CPF    ) EXEC(SNDPGMMSG MSG('The +
                       application programs could not be created'))
           SBMJOB     CMD(CALL PGM(&BLDLIB/CRTENVPGMS) +
                       PARM(&APPLIB &DATLIB)) JOB(CRTENVPGMS) +
                       JOBQ(QCTL)
           MONMSG     MSGID(CPF    ) EXEC(SNDPGMMSG MSG('The +
                       application programs could not be created'))
           ENDDO

 ENDPGM:    ENDPGM
```

CRTBLDPGMS: Create Database Build Programs

```
           PGM       PARM(&STRWH &ENDWH &BLDLIB &DATLIB)
           DCL       VAR(&STRWH) TYPE( DEC) LEN(4  )
           DCL       VAR(&ENDWH) TYPE( DEC) LEN(4  )
           DCL       VAR(&BLDLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&DATLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&VERSION) TYPE( CHAR) LEN(1)
           DCL       VAR(&VERSIONNUM) TYPE( DEC) LEN(1  )
           DCL       VAR(&MSGID) TYPE( CHAR) LEN(7)
/  This CL program compiles all of the CL, C and CBL programs    /
/  that are needed to do a complete rebuild of the database.    /
/  They are compiled in the order they are needed. None of the  /
/  programs are called from this program, only compiled.       /

           SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) +
                       MSGDTA('Compiling Build Programs.') +
                       TOPGMQ( EXT) MSGTYPE( STATUS)
           CHKOBJ     OBJ(&BLDLIB/TPCCBLDMSG) OBJTYPE( MSGQ)
           MONMSG     MSGID(CPF98 1) EXEC(CRTMSGQ +
                       MSGQ(&BLDLIB/TPCCBLDMSG))
           CLRMSGQ    MSGQ(TPCCBLDMSG)

           CRTCLPGM   PGM(&BLDLIB/NATBLD) SRCFILE(&BLDLIB/QCLSRC) +
                       SRCMBR(NATBLD)

           CRTCLPGM   PGM(&BLDLIB/SETUP) SRCFILE(&BLDLIB/QCLSRC)

           CRTCLPGM   PGM(&BLDLIB/ITEMVIEW) SRCFILE(&BLDLIB/QCLSRC)

           CRTCLPGM   PGM(&BLDLIB/CSTMRVIEW) SRCFILE(&BLDLIB/QCLSRC)

           CRTCLPGM   PGM(&BLDLIB/NEWORDVIEW) SRCFILE(&BLDLIB/QCLSRC)
```

```
CRTCLPGM   PGM(&BLDLIB/ORDERSVIEW) SRCFILE(&BLDLIB/QCLSRC)

CRTCLPGM   PGM(&BLDLIB/ORDLINVIEW) SRCFILE(&BLDLIB/QCLSRC)

CRTCLPGM   PGM(&BLDLIB/STOCKVIEW) SRCFILE(&BLDLIB/QCLSRC)

CRTCLPGM   PGM(&BLDLIB/LOADTPCCF) SRCFILE(&BLDLIB/QCLSRC)

/  Build Physical Files  /
/  Has to be called before CREATE of LOAD pgms  /
IF        COND(&STRWH  EQ 1) THEN(CALL +
            PGM(&BLDLIB/NATBLD) PARM(&ENDWH &BLDLIB +
            &DATLIB))

ADDLIBLE &DATLIB
MONMSG     MSGID(CPF    )

CRTBNDC    PGM(&BLDLIB/LOADW_D) SRCFILE(&BLDLIB/QCSRC)
CRTBNDC    PGM(&BLDLIB/LOADITEM) SRCFILE(&BLDLIB/QCSRC)
CRTBNDC    PGM(&BLDLIB/LOADITONLY) SRCFILE(&BLDLIB/QCSRC)
CRTBNDC    PGM(&BLDLIB/LOADSTONLY) SRCFILE(&BLDLIB/QCSRC)
CRTBNDC    PGM(&BLDLIB/LOADCST) SRCFILE(&BLDLIB/QCSRC)
CRTBNDC    PGM(&BLDLIB/LOADORD) SRCFILE(&BLDLIB/QCSRC)

ENDPGM
```

NATBLD: Create Physical and Logical Files

```
PGM        PARM(&NUMWHSE &SRCLIB &DATLIB)
DCL        VAR(&NUMWHSE) TYPE( DEC) LEN(4  )
DCL        VAR(&SRCLIB) TYPE( CHAR) LEN(1 )
DCL        VAR(&DATLIB) TYPE( CHAR) LEN(1 )
DCL        VAR(&ORDSIZ) TYPE( DEC) LEN(9  )
DCL        VAR(&ORDLINSIZ) TYPE( DEC) LEN(9  )
DCL        VAR(&NEWORDSIZ) TYPE( DEC) LEN(9  )
DCL        VAR(&DLVRYSIZ) TYPE( DEC) LEN(7  )
DCL        VAR(&DATE) TYPE( CHAR) LEN(6)
CHGVAR     VAR(&ORDSIZ) VALUE(&NUMWHSE   36   )
CHGVAR     VAR(&ORDLINSIZ) VALUE(&NUMWHSE   36    )
CHGVAR     VAR(&NEWORDSIZ) VALUE(&NUMWHSE   11   )
CHGVAR     VAR(&DLVRYSIZ) VALUE(&NUMWHSE   1   )
SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) +
             MSGDTA('Creating Data File Library '  CAT +
             &DATLIB) TOPGMQ( EXT) MSGTYPE( STATUS)
RTVSYSVAL  SYSVAL(QDATE) RTNVAR(&DATE)
CRTLIB     LIB(&DATLIB) TEXT('TPC-C Data Files Built ' +
             CAT (&DATE))
MONMSG     MSGID(CPF    )
ADDLIBLE   LIB(&DATLIB)
MONMSG     MSGID(CPF21 3) EXEC(DO)
RMVLIBLE   LIB(&DATLIB)
ADDLIBLE   LIB(&DATLIB)
ENDDO
SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) +
             MSGDTA('Creating the Physical Files.') +
             TOPGMQ( EXT) MSGTYPE( STATUS)

CRTPF      FILE(&DATLIB/AREFFIL) +
             SRCFILE(&SRCLIB/QDDSSRC) WAITRCD( NOMAX) +
             LVLCHK( NO)

CRTPF      FILE(&DATLIB/NEWORDPF) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE(&NEWORDSIZ +
             3     3    ) ALLOCATE( YES) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/WRHS) SRCFILE(&SRCLIB/QDDSSRC) +
             SIZE( NOMAX) WAITRCD( NOMAX) SHARE( YES) +
             LVLCHK( NO)

CRTPF      FILE(&DATLIB/STOCKPF) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE( NOMAX) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/ORDLINPF) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE(&ORDLINSIZ +
             3     3    ) ALLOCATE( YES) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/ITEM) SRCFILE(&SRCLIB/QDDSSRC) +
             SIZE( NOMAX) WAITRCD( NOMAX) SHARE( YES) +
             LVLCHK( NO)

CRTPF      FILE(&DATLIB/HSTRY) SRCFILE(&SRCLIB/QDDSSRC) +
             SIZE(&ORDSIZ 3     3    ) ALLOCATE( YES) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/DSTRCT) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE( NOMAX) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/CSTMRPF) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE( NOMAX) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/ORDERSPF) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE(&ORDSIZ +
             3     3    ) ALLOCATE( YES) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/DLVRYLOG) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE(&DLVRYSIZ +
             1     1    ) ALLOCATE( YES) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPF      FILE(&DATLIB/DLVRYLOGA) +
             SRCFILE(&SRCLIB/QDDSSRC) SIZE( NOMAX) +
             WAITRCD( NOMAX) SHARE( YES) LVLCHK( NO)

CRTPRTF    FILE(&DATLIB/DBUGPRT) +
             SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO)

CRTPRTF    FILE(&DATLIB/DBUGPRT2) +
             SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO)

CRTLF      FILE(&DATLIB/ITEMLF) +
             SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO)

CRTLF      FILE(&DATLIB/STOCK) +
             SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO)

CRTLF      FILE(&DATLIB/CSTMR) +
             SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO)

SNDPGMMSG  MSGID(CPF9898) MSGF(QCPFMSG) +
             MSGDTA('Physical Files created.') +
             TOPGMQ( EXT) MSGTYPE( STATUS)


ENDPGM
```

CRTHASH: Create Hashes

```
PGM        PARM(&DATLIB &BLDLIB)
DCL        VAR(&DATLIB) TYPE( CHAR) LEN(1 )
DCL        VAR(&BLDLIB) TYPE( CHAR) LEN(1 )

MONMSG CPF
ADDLIBLE   LIB(&BLDLIB)
MONMSG     MSGID(CPF21 3)
ADDLIBLE   LIB(&DATLIB)
MONMSG     MSGID(CPF21 3)
DLTF       FILE(QGPL/HASHES)
MONMSG     MSGID(CPF    )
DLTPGM     PGM(QGPL/CSTMR)
DLTPGM     PGM(QGPL/ITEMLF)
DLTPGM     PGM(QGPL/STOCK)
DLTUSRSPC  USRSPC(QGPL/HASH)
CRTSRCPF   FILE(QGPL/HASHES) MBR(HASHES)
CRTCMOD    MODULE(&BLDLIB/C_CREATE) +
             SRCFILE(&BLDLIB/QCSRC) OUTPUT( PRINT) +
             OPTIMIZE( FULL) DBGVIEW( SOURCE)
CRTPGM     PGM(&BLDLIB/C_CREATE) +
             MODULE(&BLDLIB/C_CREATE) +
             BNDSRVPGM(QSYS/QDBCRTHA) ACTGRP( CALLER)
CRTCMOD    MODULE(&BLDLIB/C_CREATE2) +
             SRCFILE(&BLDLIB/QCSRC) OUTPUT( PRINT) +
             OPTIMIZE( FULL) DBGVIEW( SOURCE)
CRTPGM     PGM(&BLDLIB/C_CREATE2) +
             MODULE(&BLDLIB/C_CREATE2) +
             BNDSRVPGM(QSYS/QDBCRTHA) ACTGRP( CALLER)
CRTCMOD    MODULE(&BLDLIB/C_CREATE3) +
             SRCFILE(&BLDLIB/QCSRC) OUTPUT( PRINT) +
             OPTIMIZE( FULL) DBGVIEW( SOURCE)
CRTPGM     PGM(&BLDLIB/C_CREATE3) +
             MODULE(&BLDLIB/C_CREATE3) +
             BNDSRVPGM(QSYS/QDBCRTHA) ACTGRP( CALLER)
SBMJOB     CMD(CALL PGM(&BLDLIB/C_CREATE)) JOBQ(QCTL) +
             MSGQ(&BLDLIB/TPCCBLDMSG)
DLYJOB 5
RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG)
SBMJOB     CMD(CALL PGM(&BLDLIB/C_CREATE2)) JOBQ(QCTL) +
             MSGQ(&BLDLIB/TPCCBLDMSG)
DLYJOB 5
RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG)
SBMJOB     CMD(CALL PGM(&BLDLIB/C_CREATE3)) JOBQ(QCTL) +
             MSGQ(&BLDLIB/TPCCBLDMSG)
DLYJOB 5
RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG)

CLRLIB QRPLOBJ

ENDPGM
```

DLTLOGICLS: Delete Logical Files

```
PGM        PARM(&DATLIB)
DCL        VAR(&DATLIB) TYPE( CHAR) LEN(1 )
MONMSG     MSGID(CPF21 5)

DLTF       FILE(&DATLIB/CSTMR)
DLTF       FILE(&DATLIB/CSTMRLFCRT)
DLTF       FILE(&DATLIB/CSTMRLFNAM)
DLTF       FILE(&DATLIB/NEWORD)
DLTF       FILE(&DATLIB/NEWORDLF)
DLTF       FILE(&DATLIB/ORDERS)
DLTF       FILE(&DATLIB/ORDERSLF)
DLTF       FILE(&DATLIB/ORDLIN)
DLTF       FILE(&DATLIB/ORDLINLF)
DLTF       FILE(&DATLIB/STOCK)
DLTF       FILE(&DATLIB/STOCKLF)
```

LOADTPCCF: Database Population Control Program

```
 INITTPCCF:  PGM       PARM(&DATALIB &OBJLIB &STRWHCHAR &WRHSCHAR)
           DCL       VAR(&DATALIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&OBJLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&WRHSCHAR) TYPE( CHAR) LEN(4)
           DCL       VAR(&STRWHCHAR) TYPE( CHAR) LEN(4)
           DCL       VAR(&STRWRHS5) TYPE( CHAR) LEN(5)
           DCL       VAR(&ENDWRHS5) TYPE( CHAR) LEN(5)
           DCL       VAR(&NULLCH) TYPE( CHAR) LEN(1) VALUE(X'  ')

 /  This program submits jobs to call the C                    /
 /  programs that will fill the data base files.               /
 /  The programs it submits are:                              /
 /    LOADW_D    - A C program that fills WRHS and DSTRCT files.    /
 /    LOADITEM   - A C program that fills the ITEM & STOCK files.   /
 /    LOADCST    - A C program that fills CSTMR and HSTRY files.    /
 /    LOADORD    - A C program that fills ORDERS, ORDLIN & NEWORD.  /
 /  This program does the overrides that determine how many        /
 /  records to write on each physical I/O.  Messages are sent to    /
 /  the display so the user can track the progress of the build.    /

           CRTMSGQ    MSGQ(&DATALIB/TPCCBLDMSG)
           MONMSG     MSGID(CPF2112)

           OVRDBF     FILE(WRHS) TOFILE(&DATALIB/WRHS) SHARE( NO) +
                       SEQONLY( YES 5  ) /  Blocking set to 5   +
                       records  /
           OVRDBF     FILE(DSTRCT) TOFILE(&DATALIB/DSTRCT) +
                       SEQONLY( YES 5  ) /  Blocking set to 5   +
                       records  /
           OVRDBF     FILE(ITEM) TOFILE(&DATALIB/ITEM) +
                       SEQONLY( YES 5   ) /  Blocking set to +
                       5    records  /
           OVRDBF     FILE(STOCKPF) TOFILE(&DATALIB/STOCKPF) +
                       SEQONLY( YES 5   ) /  Blocking set to +
                       5    records  /
           OVRDBF     FILE(CSTMRPF) TOFILE(DUMMY/CSTMRPF) +
                       SEQONLY( YES 1   ) /  Blocking set to +
                       1    records  /
           OVRDBF     FILE(HSTRY) TOFILE(&DATALIB/HSTRY) +
                       SEQONLY( YES 5  ) /  Blocking set to 5   +
                       records  /
           OVRDBF     FILE(ORDERSPF) TOFILE(&DATALIB/ORDERSPF) +
                       SEQONLY( YES 2   ) /  Blocking set to +
                       2    records  /
           OVRDBF     FILE(NEWORDPF) TOFILE(&DATALIB/NEWORDPF) +
                       SEQONLY( YES 2   ) /  Blocking set to +
                       2    records  /
           OVRDBF     FILE(ORDLINPF) TOFILE(&DATALIB/ORDLINPF) +
                       SEQONLY( YES 1    ) /  Blocking set to +
                       1     records  /

           CHGVAR     VAR(&STRWRHS5) VALUE(&STRWHCHAR  CAT &NULLCH)
           CHGVAR     VAR(&ENDWRHS5) VALUE(&WRHSCHAR  CAT &NULLCH)

 /  Submit the job to call LOADW_D to fill WRHS and DSTRCT files    /

           SBMJOB     CMD(CALL PGM(&OBJLIB/LOADW_D) PARM(&STRWRHS5 +
                       &ENDWRHS5)) JOB(WDJOB) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&DATALIB/TPCCBLDMSG)

 /  Submit the job to call LOADITEM to fill ITEM and STOCK files    /

           IF        COND(&STRWHCHAR  EQ '   1') THEN(DO)
           SBMJOB     CMD(CALL PGM(&OBJLIB/LOADITEM) PARM(&STRWRHS5 +
                       &ENDWRHS5)) JOB(ISJOB) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&DATALIB/TPCCBLDMSG)
           ENDDO

 /  Submit the job to call LOADCST to fill CSTMR and HSTRY files    /

           SBMJOB     CMD(CALL PGM(&OBJLIB/LOADCST) PARM(&STRWRHS5 +
                       &ENDWRHS5)) JOB(CHJOB) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&DATALIB/TPCCBLDMSG)

 /  Submit the job to call LOADORD to fill ORDERS, ORDLIN & NEWORD   /

           SBMJOB     CMD(CALL PGM(&OBJLIB/LOADORD) PARM(&STRWRHS5 +
                       &ENDWRHS5)) JOB(OONJOB) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&DATALIB/TPCCBLDMSG)

 /  Wait for the files to be populated                          /


           RCVMSG     MSGQ(&DATALIB/TPCCBLDMSG) WAIT( MAX)
           RCVMSG     MSGQ(&DATALIB/TPCCBLDMSG) WAIT( MAX)
           RCVMSG     MSGQ(&DATALIB/TPCCBLDMSG) WAIT( MAX)
           RCVMSG     MSGQ(&DATALIB/TPCCBLDMSG) WAIT( MAX)

 /  Delete the overrides                                        /

           DLTOVR     FILE(WRHS)
           DLTOVR     FILE(DSTRCT)
           DLTOVR     FILE(ITEM)
           DLTOVR     FILE(STOCKPF)
           DLTOVR     FILE(ORDERSPF)
           DLTOVR     FILE(CSTMRPF)
           DLTOVR     FILE(HSTRY)
           DLTOVR     FILE(ORDLINPF)
           DLTOVR     FILE(NEWORDPF)



           ENDPGM
```

LOADW_D: Fill WRHS and DSTRCT files

```
 /  This is the C program that fills the district file (DSTRCT).     /
  /    /
/  Start include files  /
#include <stdlib.h>
#include <errno.h>
#include <recio.h>
#include <string.h>
#include <xxfdbk.h>
#include <milib.h>
#include <micomput.h>
#include <decimal.h>
#include <time.h>
 /   /
#define RANDOM(a,b) ((rand() % (b-a+1))+a)
 /   /
/  MAPINC generates structures for the database files         /
#pragma mapinc("dstrct"," LIBL/dstrct( all)","both","d _P",,"tpcc")
#include "dstrct"
#pragma mapinc("wrhs"," LIBL/wrhs( all)","both", "d _P",,"tpcc")
#include "wrhs"
 /   /
  /  Prototypes  /
 void LoadWare(int);
 void LoadDstrt(int, int);
 void CreateStr(int, int, char  );
 void CreateZip(char  );
 /   /
  _RFILE
         Dstrct_File,
         Wrhs_File;

 tpcc_DSRCD_both_t DRec;
 tpcc_WRRCD_both_t WRec;
  /   /
 static unsigned long int rand_next = 1; /  used in MaxRand routine  /
 static char chAlpha[62] = "abcdefghijklmnopqrstuvwxyz 123456789";
 static char chUpAlpha[27] = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
 static char tempstr[81];

   /  there are 1   entries each of length 2   /
 char   CITY_ARR [] =
   {  "Saint_Paul         ", "Saint_Louis        ",   "Concord_Grapes     ",
      "Trenton_New_Jersey  ",  "Bismark_Doughnut    ",   "Cheyenne_Wyoming    ",
      "Juneau_Alaska       ",  "Honolulu_Hawaii     ",   "Phoenix_The_Big_Bird",
      "Topeka_Kansas       ",  "Montgomery          ",   "Elmwood_Illinois    ",
      "Madison_Dolly       ",  "Lansing_Michigan    ",   "Frankfurt_Germany   ",
      "Des_Moines_Iowa     ",
      "Lincoln_Abraham     ",
      "Pierre_South_Dakota ",
      "Dover_Cliffs        ",
      "Helena_Montana      ",
      "San_Antonio         ",
      "Saint_Petersburg    ",
      "Caribu_Maine        ",
      "Sault_Saint_Marie   ",
      "Los_Angeles         ",
      "Minneapolis_St_Paul ",
      "Dallas_Fort_Worth   ",
      "Kalamazoo_Michigan  ",
      "The_Land_Of_Oz      ",
      "Lexington_Kentucky  ",
      "Washington          ",
      "District_Of_Columbia",
      "New_Orleans         ",
      "Boise_Idaho         ",
      "Denver_Colorado     ",
      "Kensington_Maryland ",
      "Riverside_Ca        ",
      "Blue_Mountain       ",
      "New_York_City       ",
      "Nashville_Tennessee ",
      "Fayetteville        ",
      "Berkeley_California ",
      "Maryville_Missouri  ",
      "San_Francisco       ",
      "Indianapolis        ",
      "Saint_Joseph_Mo     ",
      "Rochester_Minnesota ",
      "Fort_Worth          ",
      "Holland_Michigan    ",
      "South_Orange_NJ     ",
      "Stillwater          ",
      "Eugene_Oregon       ",
      "Alexandria_Virginia ",
      "Salt_Lake_City      ",
      "Manitowoc_Wisconsin ",
      "Philadelphia        ",
      "Sioux_Falls         ",
      "West_Lafayette      ",
      "New_Brunswick_NJ    ",
      "Rochester_New_York  ",
      "Oakland_Ca          ",
      "Las_Vegas_Nevada    ",
      "Birmingham_Alabama  ",
      "Arkadelphia_Arkansas",
      "San_Juan_Puerto_Rico",
      "Omaha_Nebraska      ",
      "Walla_Walla         ",
      "Baraboo_Wisconsin   ",
      "Atlanta_Georgia     ",
      "Grand_Forks_ND      ",
      "Tempe_Arizona       ",
      "Knoxville_Tn        ",
      "Fort_Leavenworth    ",
      "Boston_Massachusetts",
      "Danville_Virginia   ",
```

```
    "Baltimore_Maryland  ",
    "New_Haven_Ct        ",
    "Claremont_California",
    "Otsego_Michigan     ",
    "Providence          ",
    "Jacksonville        ",
    "Columbia_SC         ",
    "London_England      ",
    "Paris_France        ",
    "Chicago_Illinois    ",
    "Albuquerque         ",
    "Raleigh_NC          ",
    "Kansas_City_Missouri",
    "Tacoma_Washington   ",
    "Oronoco_Mn          ",
    "Charleston_WV       ",
    "Newark_Delaware     ",
    "Burlington_Vermont  ",
    "Damariscotta_Maine  ",
    "Colorado_Springs_Co ",
    "Nacogdoches_Texas   ",
    "Barbourville_Ky     ",
    "North_Carolina      ",
    "Mary_Of_The_Woods   ",
    "Heston_And_Isleworth"   };

  /  There are 1   entries each of length 2.    /
char  state_arr[] =
  {  "AL", "AK", "AR", "AZ", "CA", "CO", "CT", "DE", "FL", "GA",
    "HI", "ID", "IL", "IN", "IA", "KS", "KY", "LA", "ME", "MD",
    "MA", "MI", "MN", "MS", "MO", "MT", "NE", "NV", "NH", "NM",
    "NJ", "NY", "NC", "ND", "OH", "OK", "OR", "PA", "RI", "SC",
    "SD", "TN", "TX", "UT", "VT", "VA", "WA", "WV", "WI", "WY",
    "AC", "AG", "AI", "AM", "AP", "AV", "AW", "CN", "CS", "DI",
    "DM", "DN", "DS", "ED", "EM", "EN", "HN", "HO", "IH", "IM",
    "IR", "IW", "JN", "KA", "KO", "LF", "LI", "NI", "NT", "NZ",
    "OC", "OM", "ON", "PR", "RA", "RO", "SK", "SM", "TC", "TM",
    "TY", "TV", "VI", "VN", "VW", "XT", "YK", "YN", "YW", "ZA"   };
/   /
int main(argc, argv)
register int argc; char   argv;
{
 short int i;
 short int iStrtWrhs = 1;
 short int iEndWrhs = 1;
 short int iCurWrhs = 1;
 short int iDist;
 int iRetCode =  ;
  /  Set up random number generator  /
 time_t ltime;
 time(&ltime);
 srand(ltime);        /  seed the random num generator  /
 rand_next = (unsigned long int)ltime;
    /  set up alpha seed for random chars  /
 strcat(chAlpha, chUpAlpha);
  /  parse the input parms  /
 for (argc--, argv++, i= ; argc> ; ++i, argc--, argv++)
 {
  if (i== ) {
   iStrtWrhs = atoi( argv);
  }
  else {
   iEndWrhs = atoi( argv);
  }
 } /  end of parsing input parms  /

     /    /
 if( (Wrhs_File = _Ropen("wrhs","rr+")) == NULL)
 {
  printf("Open of Wrhs file failed\n");
  exit(99);
 }
 if( (Dstrct_File = _Ropen("dstrct","rr+")) == NULL)
 {
  printf("Open of District file failed\n");
  exit(99);
 }

 for (iCurWrhs=iStrtWrhs; iCurWrhs<=iEndWrhs; iCurWrhs++)
 {
  LoadWare(iCurWrhs);
  for (iDist=1; iDist<=1 ; iDist++)
  {
   LoadDstrt(iCurWrhs, iDist);
  }
 } /  of for (iCurWrhs=iStrtWrhs; iCurWrhs<=iEndWrhs; iCurWrhs++)  /

 _Rclose(Dstrct_File);
 _Rclose(Wrhs_File);
 return(iRetCode);
} /  end of main  /

/                                                                  /
/   L o a d W a r e                                              /
/     Create & write warehouse rec.                              /
/                                                                /
/  PARMS:                                                        /
/    iWid => current warehouse id                                /
/                                                                /
void LoadWare(iWid)
 short iWid;
{
 char curwhs[ 5] = "   1";
 char waddr1[21] = "1";
 char waddr2[21] = "Bldg 1";
 decimal(5,4) d;
 int iX;

 WRec.WID = iWid;
 sprintf(curwhs, "% 4d", iWid);
    /  build wname  /
 CreateStr(1, 5, tempstr);
 strcat(tempstr, curwhs);
 strcat(tempstr, "W");
 memset(WRec.WNAME, ' ', 1 );
 strncpy(WRec.WNAME, tempstr, strlen(tempstr));
    /  build address1  /
 CreateStr(1, 1 , waddr1);
 memset(tempstr, '\ ', strlen(tempstr));
 strcat(tempstr,"1");
 strcat(tempstr, curwhs);
 strcat(tempstr, " Ave.");
 strcat(tempstr, waddr1);
 memset(WRec.WADDR1, ' ', 2 );
 strncpy(WRec.WADDR1, tempstr, strlen(tempstr));
    /  build address2  /
 CreateStr(1, 1 , waddr2);
 memset(tempstr, '\ ', strlen(tempstr));
 strcat(tempstr,"Bldg 1");
 strcat(tempstr, curwhs);
 strcat(tempstr, waddr2);
 memset(WRec.WADDR2, ' ', 2 );
 strncpy(WRec.WADDR2, tempstr, strlen(tempstr));
    /  build city  /
 iX = RANDOM( ,99);
 memset(WRec.WCITY, ' ', 2 );
 strncpy(WRec.WCITY, CITY_ARR[iX], strlen(CITY_ARR[ ]));
    /  build state  /
 strncpy(WRec.WSTATE, state_arr[iX], strlen(state_arr[ ]));
    /  build zip code  /
 CreateZip(tempstr);
 strncpy(WRec.WZIP, tempstr, strlen(tempstr));
    /  build tax  /
 d = (RANDOM( ,2   ))/1    . ;
 WRec.WTAX = d;
    /  build YTD balance  /
 WRec.WYTD = 3     .  ;

 _Rwrite(Wrhs_File,(void  )&WRec, sizeof(WRec));
 return;
} /  end of LoadWare  /



/                                                                  /
/   L o a d D s t r t                                            /
/     Create & write district rec.                               /
/                                                                /
/  PARMS:                                                        /
/    iWid => current warehouse id                                /
/    uchDid => current district id                               /
/                                                                /
void LoadDstrt(iWid, iCurDist)
 short int iWid;
 short int iCurDist;
{
 char curwhs[ 5] = "   1";
 char curdist[ 3] = " 1";
 char daddr[21] = "1";
 char tstr[21];
 decimal(5,4) d;
 int iX;

 DRec.DWID = iWid;
 DRec.DID = iCurDist;
 sprintf(curwhs, "% 4d", iWid);
 sprintf(curdist, "% 2d", iCurDist);

    /  build dname  /
 strcpy(tempstr, "D");
 strcat(tempstr, curwhs);
 strcat(tempstr, curdist);
 CreateStr(1, 4, tstr);
 strcat(tempstr, tstr);
 memset(DRec.DNAME, ' ', 1 );
 strncpy(DRec.DNAME, tempstr, strlen(tempstr));
    /  build address1  /
 strcpy(daddr, curdist);
 iX = RANDOM(1,999);
 sprintf(tstr, "% 3d", iX);
 strcat(daddr, tstr);
 strcat(daddr, " Ave.");
 CreateStr(1, 1 , tempstr);
 strcat(daddr, tempstr);
 memset(DRec.DADDR1, ' ', 2 );
 strncpy(DRec.DADDR1, daddr, strlen(daddr));
    /  build address2  /
 strcpy(daddr, "Bldg ");
 strcat(daddr, curdist);
 strcat(daddr, " ");
 CreateStr(1, 12, tempstr);
 strcat(daddr, tempstr);
 memset(DRec.DADDR2, ' ', 2 );
 strncpy(DRec.DADDR2, daddr, strlen(daddr));
    /  build city  /
 iX = RANDOM( ,99);
 memset(DRec.DCITY, ' ', 2 );
 strncpy(DRec.DCITY, CITY_ARR[iX], strlen(CITY_ARR[ ]));
    /  build state  /
 strncpy(DRec.DSTATE, state_arr[iX], strlen(state_arr[ ]));
    /  build zip code  /
 CreateZip(tstr);
 strncpy(DRec.DZIP, tstr, strlen(tstr));

    /  build tax  /
 d = (RANDOM( ,2   )) /1    . ;
 DRec.DTAX = d;
    /  build YTD balance  /
 DRec.DYTD = 3    .  ;
    /  build next order id  /
 DRec.DNXTOR = 3  1;

 _Rwrite(Dstrct_File,(void  )&DRec,  sizeof(DRec));
 return;
} /  end of LoadDstrt  /


/                                                                  /
/   C r e a t e S t r                                            /
/     Create string of random alphanumeric characters.           /
/                                                                /
/  PARMS:                                                        /
```

```
/     iMin => minimum length of string                          /
/     iMax => maximum length of string                          /
/     szTemp => address to store created string                  /
/   If string is not variable length, then set iMin and iMax to     /
/   the actual fixed length.                                    /
/                                                                 /
void CreateStr(iMin, iMax, szTemp)
  int iMin, iMax;
  char  szTemp;
{
  int iAlphalen,
      i, j;

  iAlphalen = RANDOM(iMin,iMax);   /  determine str len   /
  memset(szTemp, '\ ', strlen(szTemp));
  for (j= ; j<iAlphalen; j++)
  {
    i = RANDOM( ,61);
    szTemp[j]= chAlpha[i];
  }
  return;
} /  end of CreateStr  /

/                                                                 /
/    C r e a t e Z i p                                          /
/      Create zip code string.                                   /
/                                                               /
/   PARMS:                                                     /
/    Returns zip code string.                                   /
/                                                                 /
void CreateZip(zipstr)
char  zipstr;
{
  int iZ;

  iZ = RANDOM( ,99999);
  sprintf(zipstr, "% 5d", iZ);
  strcat(zipstr, "1111");
  return;
} /  end of CreateZip  /


 /  Redefine max generated random num. Default is 32,767.  /
#undef RAND_MAX
#define RAND_MAX 99999
/                                                                 /
/    M a x R a n d                                              /
/      Create random number larger than 32767.                  /
/   NOTE: This is the rand() function used by AS/4   with one      /
/      slight modification.  In the rand() function, rand_next is  /
/      shifted right by 16 rather than the 14 used here.  Shifting  /
/      by 16 produces a max value of 65535.                     /
/                                                               /
/   PARMS:                                                     /
/    Returns zip code string.                                   /
/                                                                 /
int MaxRand(void)
{
  int rand_temp;

  rand_next = rand_next   11 3515245 + 12345;
  rand_temp = (rand_next >> 14)%((unsigned long)(RAND_MAX)+1);
  return(rand_temp);
} /  end of CreateZip  /
```

LOADITEM: Fill ITEM and STOCK Files

```
 /  This is the C program that fills:                          /
 /    item file (ITEM)                                        /
 /    stock file (STOCK)                                      /
  /    /
/  Start include files  /
#include <stdlib.h>
#include <errno.h>
#include <recio.h>
#include <string.h>
#include <xxfdbk.h>
#include <milib.h>
#include <micomput.h>
#include <decimal.h>
#include <time.h>
 /   /
 #define MAXITEMS 1
/  #define MAXITEMS 1     /
#define RANDOM(a,b) ((rand() % (b-a+1))+a)
 /   /
/  MAPINC generates structures for the database files         /
#pragma mapinc("item"," LIBL/item( all)","both","d _P",,"tpcc")
#include "item"
#pragma mapinc("stockpf"," LIBL/stockpf( all)","both", "d _P",,"tpcc")
#include "stockpf"
 /   /
  /  Prototypes  /
 void LoadItem(void);
 void LoadStock(int);
 void CreateStr(int, int, char  );
 /   /
  _RFILE
         Item_File,
         Stock_File;

 tpcc_ITRCD_both_t ItemRec;
 tpcc_STRCD_both_t StkRec;

   short int iStrtWrhs = 1;
   short int iEndWrhs = 1;
   short int iCurWrhs = 1;

char chAlpha[62] = "abcdefghijklmnopqrstuvwxyz 123456789";
char chUpAlpha[27] = "ABCDEFGHIJKLMNOPQRSTUVWXYZ";
char tempstr[81];
char insertr = '5';
long ret_code =  ;

  /  There are 3 sets of characters that are concatenated  /
  /  to make the district information fields for Stock  /
char  DistInf1[] = {
  "abcdefghijk", "nowisthetim", "thisiswhere",
  "whatdoyouno", "notmuchthen", "whydoyouask",
  "Idonotknow_", "sowhereisit", "inthecities",
  "andthetowns"};

char  DistInf2[] = {
  " 1", " 2", " 3", " 4", " 5", " 6", " 7", " 8", " 9", "1 "};

char  DistInf3[] = {
  "mnopqrstuvw", "whydidyoudo", "interactive",
  "batchwork__", "systemview_", "performance",
  "Ineverwork_", "Ialwaysplay", "nexttolast_",
  "nowthefinal"};

  /  There are 1   entries, each of length 24  /
char  ItemNameStr[]= {
  "Ball_Point_Pen         ",   "Sailboat_Fuel_Tank     ",
  "Flowers_(Poppies)      ",   "VCR_Road_Warrior_Game   ",
  "Bird_House_Plans       ",   "Pushbutton_Telephone    ",
  "Surgical_Gloves        ",   "1_Gallon_Distilled_Water",
  "Black_Labrador_Puppies ",   "Plain_Pockets_Pants     ",
  "Electric_Plane         ",   "Childs_Car_Seat         ",
  "Gray_Hooded_Sweatshirts ",   "Lone_Ranger_Costume     ",
  "Jiffy_Pain_Pills       ",   "Devil's_Food_Cake       ",
  "Full_Length_Fox_Fur    ",   "AM_FM_Stereo_Car_Radio  ",
  "Cheddar_Cheese_Ball    ",   "Elephant_Ear_Mushroom   ",
  "White_Traffic_Lane_Paint",   "Plastic_Garbage_Pail    ",
  "Four_Blade_Ceiling_Fans ",   "Doll_House_Furniture    ",
  "Apple_Core_Remover     ",   "Cola_Twelve_Pack        ",
  "Italian_Food_Cook_Book  ",   "Wool_Toe_Socks          ",
  "Feel_Good_Vitamins     ",   "1  '_Rubber_Garden_Hose ",
  "Orange_Golf_Balls      ",   "Snorkle_And_Fins_Set    ",
  "IBM_Facsimile_Machine   ",   "5_lb._Bag_Flour         ",
  "Fleece_Lined_Wool_Gloves",   "Bermuda_Grass_Seed      ",
  "Front_And_Rear_Floor_Mat",   "Waiter_Costume          ",
  "Magical_Mystery_Maze   ",   "Red_Safety_Flares       ",
  "Silver_Push_Pins       ",   "QuartzDigital_Wristwatch",
  "1 _lb_Test_Fishing_Line ",   "Blue_Pile_Carpeting     ",
  "Red_Brick_House        ",   "Bear_Claw_Doughnuts     ",
  "AS/4  _Advanced_Series  ",   "12_Inch_Wooden_Ruler    ",
  "Square_Plastic_Calendar ",   "Twelve_Num_Two_Pencils  ",
  "Pad_Yellow_Legal_Paper  ",   "Change_Machine          ",
  "Street_Hockey_Balls    ",   "Half_Inch_3_Ring_Binders",
  "Sporting_Good_Catalog   ",   "Ten_Gallon_Hats         ",
  "Promotion_Notification  ",   "32_Gal._Keg_Beer        ",
  "Business_Cards         ",   "Pebble_Beach_Poster     ",
  "Texas_Residence_Forms   ",   "COBOL_Programmers_Guide ",
  "25_Inch_Color_TVs      ",   "Black_Magic_Marker      ",
  "Telephone_Books        ",   "Riding_Lawnmower        ",
  "$75  _Gift_Certificate  ",   "Compact_Disc_Player     ",
  "Four_Drawer_Cabinets    ",   "Dry-Erase_Markers       ",
  "Multi-System_Paper     ",   "Message_Waiting_Light   ",
  "Automotive_Care_Manuals ",   "Carton_Ceiling_Tiles    ",
  "12_Ounce_Styrofoam_Cup  ",   "Phone_Calling_Card      ",
  "Inflatable_Globe       ",   "Walnut_Magazine_Rack    ",
  "Over_Under_Shotgun     ",   "While_You_Were_Gone_Memo",
  "Three_Tea_Bags         ",   "Bowling_Pin_Spotter     ",
  "Golf_Club_Cleaner      ",   "Staple_Removers         ",
  "Downtown_Parking_Permit ",   "Sliding_Glass_Door_Locks",
  "Floral_Pattern_Lampshade",   "Junior_College_Books    ",
  "Two_Wheel_Bike         ",   "Zoo_Season_Pass         ",
  "Baseball_Tickets       ",   "Four_Person_Tent        ",
  "Cross_Country_Ski_Set   ",   "Motorcycle_Sidecars     ",
  "Fireplace_Tools        ",   "Radio_Controlled_Plane  ",
  "Oak_Wall_Clock         ",   "Rubber_Baby_Buggy_Wheel ",
  "Anti_Static_Strap      ",   "Old_Wooden_Toothpicks   " };


/   /
int main(argc, argv)
register int argc; char   argv;
{
  short int i;
  int iRetCode =  ;
  int item;

    /  Set up random number generator  /
  time_t ltime;
  time(&ltime);
  srand(ltime);        /  seed the random num generator  /
     /  set up alpha seed for random chars  /
  strcat(chAlpha, chUpAlpha);
    /  parse the input parms  /
  for (argc--, argv++, i= ; argc> ; ++i, argc--, argv++)
  {
    if (i== ) {
      iStrtWrhs = atoi( argv);
    }
    else {
      iEndWrhs = atoi( argv);
   /  strcpy(endwrhs,  argv);            /
   /  printf("endwrhs = %4s \n", endwrhs);  /
    }
  } /  end of parsing input parms  /

       /    /
  if( (Item_File = _Ropen("item","rr+")) == NULL)
  {
    printf("Open of Item file failed\n");
    exit(99);
  }
  if( (Stock_File = _Ropen("stockpf","rr+")) == NULL)
  {
    printf("Open of Stockpf file failed\n");
    exit(99);
  }
    /                          /
```

```
   /   Start of true build   /
    /                        /
  LoadItem();
  for (item=1; item<=MAXITEMS; item++)
  {
    LoadStock(item);
  }

  _Rclose(Item_File);
  _Rclose(Stock_File);

} /  end of main  /


/                                                                  /
/    L o a d I t e m                                             /
/      Create & write item records.                                /
/                                                                /
/   PARMS: none                                                 /
/                                                                  /
void LoadItem()
{
  decimal(5,2) d;
  int i, iX;

  /           hash stuff               /
  long item_keys = 1;

  typedef _Packed struct key_struct {
          char name[1 ];
          long value;
     } key_values_structure[5];

  key_values_structure item_key_values;

  char item_hash_name[1 ];

   memcpy(item_hash_name,"ITEMLF    ",1 );
   memcpy(item_key_values[ ].name,"IID ",1 );

  for (i=1; i<=MAXITEMS; i++)
  {
    ItemRec.IID = i;
    item_key_values[ ].value = i;
      /  build image id 1..1 ,     /
    iX = RANDOM(1,1    );
    ItemRec.IMAGEID = iX;

      /  build iname  /
    iX = RANDOM( ,99);
    memset(ItemRec.INAME, ' ', 24);
    strncpy(ItemRec.INAME, ItemNameStr[iX],
                           strlen(ItemNameStr[ ]));
      /  build IPRICE  /
    d = (RANDOM(1  ,1    )) / 1  .  ;
    ItemRec.IPRICE = d;
      /  Build IDATA random string 26 to 5  chars  /
    CreateStr(26, 5 , tempstr);
    if ((RANDOM( ,9)) ==  )
    {
      iX = (RANDOM( ,(strlen(tempstr)-8)));
      memcpy(&tempstr[iX], "ORIGINAL", 8);
    }
    memset(ItemRec.IDATA, ' ', 5 );
    strncpy(ItemRec.IDATA, tempstr, strlen(tempstr));

    ret_code = qdbrunha(item_hash_name, insertr, item_keys,
            (void  ) &item_key_values, (void  ) &ItemRec, ret_code);
    return;

  } /  end of for  /

  return;
} /  end of LoadItem  /


/                                                                  /
/    L o a d S t o c k                                           /
/      Create & write stock records.                               /
/                                                                /
/   PARMS:                                                       /
/     item => current item id                                      /
/                                                                  /
void LoadStock(item)
 int item;
{
  int i, iX;
  char StockDist[25] ;
  long stock_keys = 3;

   /           hash stuff               /

   typedef _Packed struct key_struct {
           char name[1 ];
           long value;
      } key_values_structure[5];

    key_values_structure stock_key_values;

    char stock_hash_name[1 ];

    memcpy(stock_hash_name,"STOCKLF   ",1 );
    memcpy(stock_key_values[ ].name,"STIID ",1 );
    memcpy(stock_key_values[1].name,"STWID ",1 );

  for (iCurWrhs=iStrtWrhs; iCurWrhs<=iEndWrhs; iCurWrhs++)
  {
     /  create STIID  /
    StkRec.STIID = item;
     /  create STWID  /
    StkRec.STWID = iCurWrhs;

    stock_key_values[ ].value = iCurWrhs;
    stock_key_values[1].value = item;

     /  create STQTY between 1 ..1   /
    StkRec.STQTY = RANDOM(1 ,1  );
     /  CREATES STDInn (district info)  /
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[ ] 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX] 11);
    strncpy(StkRec.STDI 1, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[1], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 2, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[2], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 3, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[3], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 4, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[4], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 5, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[5], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 6, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[6], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 7, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[7], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 8, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[8], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI 9, StockDist, 24);
     iX = RANDOM( , 9);
    memcpy(StockDist, DistInf1[iX], 11);
    memcpy((void  )&StockDist[11], DistInf2[9], 2);
     iX = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[iX], 11);
    strncpy(StkRec.STDI1 , StockDist, 24);
      /  create STDATA random string 26 to 5  chars  /
    CreateStr(26, 5 , tempstr);
    if ((RANDOM( ,9)) ==  )
    {
      iX = (RANDOM( ,(strlen(tempstr)-8)));
      memcpy(&tempstr[iX], "ORIGINAL", 8);
    }
    memset(StkRec.STDATA, ' ', 5 );
    strncpy(StkRec.STDATA, tempstr, strlen(tempstr));

    StkRec.STYTD =  ;
    StkRec.STORDRS =  ;
    StkRec.STREMORD =  ;

    ret_code = qdbrunha(stock_hash_name, insertr, stock_keys,
           (void  ) &stock_key_values, (void  ) &StkRec, ret_code);

  } /  end of for loop  /

  return;
} /  end of LoadStock  /


/                                                                  /
/    C r e a t e S t r                                           /
/      Create string of random alphanumeric characters.            /
/                                                                /
/   PARMS:                                                       /
/     iMin => minimum length of string                             /
/     iMax => maximum length of string                             /
/     szTemp => address to store created string                    /
/   If string is not variable length, then set iMin and iMax to     /
/   the actual fixed length.                                       /
/                                                                  /
void CreateStr(iMin, iMax, szTemp)
  int iMin, iMax;
  char  szTemp;
{
  int iAlphalen,
     i, j;

  iAlphalen = RANDOM(iMin,iMax);    /  determine str len   /
  memset(szTemp, '\ ', strlen(szTemp));
  for (j= ; j<iAlphalen; j++)
  {
   i = RANDOM( ,61);
   szTemp[j]= chAlpha[i];
  }
  return;
} /  end of CreateStr  /
```

LOADCST: Fill CSTMR and HSTRY Files

```
/                                                                      /
/  This program fills the customer and history files.                 /
/  It fills them all simultaneously. It fills a customer              /
/  record, then the history record for that customer.                 /
/                                                                     /
/                                                                     /
/   C H A N G E S   &    U P D A T E S                                 /
/                                                                     /
/                                                                     /
/    PROGRAM-ID. LOADCSTORD.                                          /
/    AUTHOR. PPCOC.                                                  /
/    INSTALLATION. ROCHESTER.                                         /
/    DATE-WRITTEN.  3/ 4/96.                                          /
/    DATE-COMPILED.  3/ 6/96.                                         /
/                                                                      /

/  Start include files  /
#include <stdlib.h>
#include <errno.h>
#include <recio.h>
#include <string.h>
#include <xxfdbk.h>
#include <milib.h>
#include <micomput.h>
#include <decimal.h>
#include <time.h>
 /   /
#define CUSTPERDIST 3
#define RANDOM(a,b) (rand() % (b-a+1))+a
 /   /
/  MAPINC generates structures for the database files          /
#pragma mapinc("cstmrpf"," libl/cstmrpf( all)","both", "d _P",,"tpcc")
#include "cstmrpf"
#pragma mapinc("hstry"," libl/hstry( all)","both", "d _P",,"tpcc")
#include "hstry"
  /    /
  /  Prototypes  /
 void LoadCust(int, int, int);
 void LoadHstry(int, int, int);
 void CreateCLast(int, char  );
 int NURand(int, int, int);
 void CreateStr(int, int, char  );
 void CreateZip(char  );
 void GetDateTime(char  , char  );
 int MaxRand(void);
 /    /
 static int C=7;
 static unsigned long int rand_next = 1; /  used in MaxRand routine  /
    /      /
      /  There are 1   names.       /
  char  szFName[] =
    {"FrankGifford    ",  "FranTarkenton   ",   "GailStormyNight ",
     "JohnWayne       ", "JaneSeeDickRun  ",   "JeannieWithLight",
     "DavesNotHere    ",  "MaryMartin      ",   "JefferyTheWaiter",
     "CarriePromQueen ",  "StephanKing     ",   "KaraKing        ",
     "AnnieOakley     ",  "BillClements    ",   "FannyFarmer     ",
     "AllanLuden      ",  "BerniceLattitude",   "MelindaFisher   ",
     "ElaineBoosler   ",  "FrankieAvalon   ",   "Francine        ",
     "GaleGordon      ",  "JohnBoyWalton   ",   "JeanneCRiley    ",
     "DavidBowie      ",  "KuklaFranOllie  ",   "PhillipOfWales  ",
     "KerryCWilliams  ",  "Stephanie       ",   "AnnaSueBrighton ",
     "BillyBob        ",  "FayDunawayWith  ",   "PamelaSueMartin ",
     "AlanAlda        ",  "BernardPFife    ",   "LindaDayGeorge  ",
     "RobertConrad    ",  "Franklin        ",   "FrancisTheMule  ",
     "GayleMcDonald   ",  "JanMurray       ",   "JoanneCassidy   ",
     "MarkTheSpot     ",  "Geoffrey        ",   "PhyllisDiller   ",
     "DoogieHowser    ",  "Anastasia       ",   "AlvinChipmunk   ",
     "AlexPKeaton     ",  "BelindaMcWilliam",   "EllynBurnstyne  ",
     "JayePMorgan     ",  "JoeFromKokomo   ",   "JoeyHeatherton  ",
     "Gilligan        ",  "TheSkipper2     ",   "CarryBishop     ",
     "BenjaminFranklin",  "AbrahamLincoln  ",   "GeorgeWBush     ",
     "VincentPrice    ",  "PotsieWeber     ",   "RichieCunningham",
     "Alexander       ",  "PeterTheGreater ",   "MickeyMouse     ",
     "DonaldDuck      ",  "BabyHuey        ",   "CrystalGayle    ",
     "SnidelyWhiplash ",  "HastaLaVista    ",   "GeorgeWashington",
     "KareemAbdulJabar",  "WhitneyHouston  ",   "BobSmith        ",
     "PerryMason      ",  "PaulDrake       ",   "DellaMainStreet ",
     "MissPiggy       ",  "TheCookieMonster",   "KermitTheFrog   ",
     "BluesBrothers   ",  "BeaverCleaver   ",   "Anriqueta       ",
     "Crenshaw        ",  "AndyTaylor      ",   "ClaytonWilliams ",
     "BillClinton     ",  "Elizabeth       ",   "MichaelJordan   ",
     "PaulRevere      ",  "JohnGlenn       ",   "WashingtonCarver",
     "DanJohnson      ",  "BubbaTexan      ",   "GGordonLiddy    ",
     "ScottSimpson    ",  "BenKnight       ",
     "NolanRyan       ",  "AlbertEinstein  "   };

   /    /
   /  There are 1   cities.  /
    char   CITY_ARR[] =
   {  "Saint_Paul         ",  "Saint_Louis        ",
      "Concord_Grapes     ",  "Trenton_New_Jersey  ",
      "Bismark_Doughnut   ",  "Cheyenne_Wyoming    ",
      "Juneau_Alaska      ",  "Honolulu_Hawaii     ",
      "Phoenix_The_Big_Bird",  "Topeka_Kansas      ",
      "Montgomery         ",  "Elmwood_Illinois    ",
      "Madison_Dolly      ",  "Lansing_Michigan    ",
      "Frankfurt_Germany  ",  "Des_Moines_Iowa     ",
      "Byron_Minnesota    ",  "Pierre_South_Dakota ",
      "Dover_Cliffs       ",  "Helena_Montana      ",
      "San_Antonio        ",  "Saint_Petersburg    ",
      "Caribu_Maine       ",  "Sault_Saint_Marie   ",
      "Los_Angeles        ",  "Minneapolis_St_Paul ",
      "Dallas_Fort_Worth  ",  "Kalamazoo_Michigan  ",
      "The_Land_Of_Oz     ",  "Lexington_Kentucky  ",
      "Washington         ",  "District_Of_Columbia",
      "New_Orleans        ",  "Boise_Idaho         ",
      "Kensington_Maryland ",  "Denver_Colorado     ",
      "Blue_Mountain      ",  "Riverside_Ca        ",
      "New_York_City      ",  "Nashville_Tennessee ",
      "Mayberry_RFD       ",  "Berkeley_California ",
      "Maryville_Missouri  ",  "San_Francisco       ",
      "Indianapolis       ",  "Saint_Joseph_Mo     ",
      "Rochester_Minnesota ",  "Fort_Worth          ",
      "Holland_Michigan    ",  "South_Orange_NJ     ",
      "Stillwater         ",  "Eugene_Oregon       ",
      "Alexandria_Virginia ",  "Salt_Lake_City      ",
      "Manitowoc_Wisconsin ",  "Philadelphia        ",
      "Sioux_Falls        ",  "West_Lafayette      ",
      "New_Brunswick_NJ    ",  "Rochester_New_York  ",
      "Oakland_Ca         ",  "Las_Vegas_Nevada    ",
      "Birmingham_Alabama  ",  "Arkadelphia_Arkansas",
      "San_Juan_Puerto_Rico",  "Omaha_Nebraska      ",
      "Walla_Walla        ",  "Baraboo_Wisconsin   ",
      "Atlanta_Georgia     ",  "Grand_Forks_ND      ",
      "Tempe_Arizona       ",  "Knoxville_Tn        ",
      "Fort_Leavenworth    ",  "Boston_Massachusetts",
      "Danville_Virginia   ",  "Baltimore_Maryland  ",
      "New_Haven_Ct        ",  "Claremont_California",
      "Otsego_Michigan     ",  "Providence          ",
      "Jacksonville        ",  "Columbia_SC         ",
      "London_England      ",  "Paris_France        ",
      "Chicago_Illinois    ",  "Albuquerque         ",
      "Raleigh_NC          ",  "Kansas_City_Missouri",
      "Tacoma_Washington   ",  "Oronoco_Mn          ",
      "Charleston_WV       ",  "Newark_Delaware     ",
      "Burlington_Vermont  ",  "Damariscotta_Maine  ",
      "Colorado_Springs_Co ",  "Nacogdoches_Texas   ",
      "Barbourville_Ky     ",  "Boca_Raton_Fl       ",
      "Mary_Of_The_Woods   ",  "Heston_And_Isleworth"    };

   /    /
   /   There are 1   states  /
 char  state_arr[] =
   {  "AL", "AK", "AR", "AZ", "CA", "CO", "CT", "DE", "FL", "GA",
      "HI", "ID", "IL", "IN", "IA", "KS", "KY", "LA", "ME", "MD",
      "MA", "MI", "MN", "MS", "MO", "MT", "NE", "NV", "NH", "NM",
      "NJ", "NY", "NC", "ND", "OH", "OK", "OR", "PA", "RI", "SC",
      "SD", "TN", "TX", "UT", "VT", "VA", "WA", "WV", "WI", "WY",
      "AC", "AG", "AI", "AM", "AP", "AV", "AW", "CN", "CS", "DI",
      "DM", "DN", "DS", "ED", "EM", "EN", "HN", "HO", "IH", "IM",
      "IR", "IW", "JN", "KA", "KO", "LF", "LI", "NI", "NT", "NZ",
      "OC", "OM", "ON", "PR", "RA", "RO", "SK", "SM", "TC", "TM",
      "TY", "TV", "VI", "VN", "VW", "XT", "YK", "YN", "YW", "ZA"    };
 /    /
tpcc_CSRCD_both_t CustRec;
tpcc_HSRCD_both_t HstRec;
 /    /
static char chAlpha[62] =
      "abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ";
static char chNumStr[11] = " 123456789";
static char tempstr[81];
static time_t ltime;
static char TimeStr[7];
static char DateStr[9];
 /     /
  _RFILE
         Cstmr_File,
         Hstry_File;
/   /
int main(argc, argv)
register int argc; char   argv;
{
  short int i;
  short int iStrtWrhs = 1;
  short int iEndWrhs = 1;
  short int iCurWrhs = 1;
  short int iDist;
  int iCurCid;
  int iRetCode =  ;
    /  Set up random number generator  /
  time(&ltime);
  srand(ltime);         /  seed the random num generator  /
  rand_next = (unsigned long int)ltime;
     /  set up alpha seed for random chars  /
  strcat(chAlpha, chNumStr);
    /  parse the input parms  /
  for (argc--, argv++, i= ; argc> ; ++i, argc--, argv++)
  {
    if (i== ) {
      iStrtWrhs = atoi( argv);
    }
    else {
      iEndWrhs = atoi( argv);
    }
  } /  end of parsing input parms  /

  if( (Hstry_File = _Ropen("hstry","rr+","blkrcd=Y")) == NULL)
  {
    printf("Open of History file failed\n");
    exit(99);
  }
  if( (Cstmr_File = _Ropen("cstmrpf","rr+","blkrcd=Y")) == NULL)
  {
    printf("Open of Customer file failed\n");
    exit(99);
  }


  for (iCurCid=1; iCurCid<=CUSTPERDIST; iCurCid++)
  {
    for (iCurWrhs=iStrtWrhs; iCurWrhs<=iEndWrhs; iCurWrhs++)
    {
      for (iDist=1; iDist<=1 ; iDist++)
      {
        LoadHstry(iCurCid, iCurWrhs, iDist);
        LoadCust(iCurWrhs, iDist, iCurCid);
      }
    } /  of for (iCurWrhs=iStrtWrhs; iCurWrhs<=iEndWrhs; iCurWrhs++)  /
  }

  _Rclose(Cstmr_File);
  _Rclose(Hstry_File);

  return(iRetCode);
```

```
} /  end of main  /


/                                                                       /
/   L o a d C u s t                                                   /
/     Create & write customer recs.                                     /
/                                                                     /
/   PARMS:                                                            /
/     iWid => current warehouse id                                    /
/     iDid => current district id                                     /
/                                                                       /
void LoadCust(iWid, iDid, iCid)
  short int iWid;
  short int iDid;
  int iCid;
{
  char tstr[21];
  int iX;
  static char cdataStr[5  ];
  char insertr = '5';
  long cust_keys = 3;

  /           hash stuff               /

  typedef _Packed struct key_struct {
          char name[1 ];
          long value;
    } key_values_structure[5];

  key_values_structure cstmr_key_values;

  char cstmr_hash_name[1 ];
  long ret_code =  ;

  memcpy(cstmr_hash_name,"CSTMR    ",1 );
  memcpy(cstmr_key_values[ ].name,"CID ",1 );
  memcpy(cstmr_key_values[1].name,"CDID ",1 );
  memcpy(cstmr_key_values[2].name,"CWID ",1 );
  cstmr_key_values[ ].value = iCid;
  cstmr_key_values[1].value = iDid;
  cstmr_key_values[2].value = iWid;

  CustRec.CWID = iWid;
  CustRec.CDID = iDid;
  CustRec.CID = iCid;

     /  build cfirst. array  ..99  /
  iX = RANDOM( ,99);
  memset(CustRec.CFIRST, ' ', 16);
  if ((iWid==1) && (iDid==1) && (iCid==1))
  {
    sprintf(CustRec.CFIRST,"C_load = %d",C);

  }
  else
  {
  strncpy(CustRec.CFIRST, szFName[iX], strlen(szFName[ ]));
  }
     /  build cinit.  /
  strncpy(CustRec.CINIT, "OE", 2);
     /  build clast  /
  if (iCid < 1  1)
  {
    CreateCLast((iCid-1), tstr);
  }
  else
  {
    iX = NURand(255,  , 999);
    CreateCLast((iX), tstr);
  }
  memset(CustRec.CLAST, ' ', 16);
  strncpy(CustRec.CLAST, tstr, strlen(tstr) );
     /  build address1  /
  CreateStr(1 , 2 , tstr);
  memset(CustRec.CADDR1, ' ', 2 );
  strncpy(CustRec.CADDR1, tstr, strlen(tstr));
     /  build address2  /
  CreateStr(1 , 2 , tstr);
  memset(CustRec.CADDR2, ' ', 2 );
  strncpy(CustRec.CADDR2, tstr, strlen(tstr));
     /  build city  /
  iX = RANDOM( ,99);
  memset(CustRec.CCITY, ' ', 2 );
  strncpy(CustRec.CCITY, CITY_ARR[iX], strlen(CITY_ARR[iX]));
     /  build state  /
  strncpy(CustRec.CSTATE, state_arr[iX], 2);
     /  build zip code  /
  CreateZip(tstr);
  strncpy(CustRec.CZIP, tstr, strlen(tstr));

     /  build phone #  /
  memset(tstr, '\ ', strlen(tstr));
  for (iX =  ; iX < 16; iX++)
  {
    CustRec.CPHONE[iX] = chNumStr[(RANDOM( ,9))];
  }
     /  build credit limit  /
  CustRec.CCRDLM = 5    .  ;
     /  build credit status  /
  if ( (RANDOM( ,9)) >   ) {
    CustRec.CCREDT[ ] = 'G';
  }
  else
    CustRec.CCREDT[ ] = 'B';
  CustRec.CCREDT[1] = 'C';
     /  build Cust balance  /
  CustRec.CBAL = -1 .  ;
     /  build Cust YTD payments  /
  CustRec.CYTD = 1 .  ;
     /  build Cust pay count & delivery count  /
  CustRec.CPAYCNT = 1;
  CustRec.CDELCNT =  ;
     /  build Cust Discount  /
  CustRec.CDCT = ((RANDOM( ,5   )) / 1    .  );
     /  build Cust Data  /
  CreateStr(3  , 5  , cdataStr);
  memset(CustRec.CDATA, ' ', 5  );
  strncpy(CustRec.CDATA, cdataStr, strlen(cdataStr));
     /  build Cust Date & Time  /
  GetDateTime(TimeStr, DateStr);
  strncpy(CustRec.CLDATE, DateStr, strlen(DateStr));
  strncpy(CustRec.CLTIME, TimeStr, strlen(TimeStr));


  ret_code = qdbrunha(cstmr_hash_name, insertr, cust_keys,
        (void  )&cstmr_key_values, (void  ) CustRec, ret_code);
  return;
} /  end of LoadCust  /


/                                                                       /
/   L o a d H s t r y                                                 /
/     Create & write history rec.                                       /
/                                                                     /
/   PARMS:                                                            /
/     iWid => current warehouse id                                    /
/                                                                       /
void LoadHstry(iCid, iWid, iDid)
  int iCid;
  short iWid;
  short iDid;
{


  HstRec.HCWID = iWid;
  HstRec.HWID = iWid;
  HstRec.HDID = iDid;
  HstRec.HCDID = iDid;
  HstRec.HCID = iCid;

  HstRec.HAMT = 1 .  ;
     /  build Hist Data  /
  CreateStr(12, 24, tempstr);
  memset(HstRec.HDATA, ' ', 24);
  strncpy(HstRec.HDATA, tempstr, strlen(tempstr));
     /  build Hist Date & Time  /
  GetDateTime(TimeStr, DateStr);
  strncpy(HstRec.HTIME, TimeStr, strlen(TimeStr));
  strncpy(HstRec.HDATE, DateStr, strlen(DateStr));

  _Rwrite(Hstry_File,(void  )&HstRec,  sizeof(HstRec));
} /  end of LoadHstry  /


/                                                                       /
/   N U R a n d                                                       /
/     Return integer value from nurand function.                        /
/     function is                                                     /
/   NURand(A,x,y) = (((rand( ,A) | rand(x,y))+C) % (y-x+1)) + x     /
/     A is constant chosen according to size of range [x..y]        /
/     exp1 | exp2 stands for bitwise logical OR of exp1 and exp2   /
/     rand(x,y) stands for randomly selected within [x..y]          /
/       C is run-time constant randomly chosen within [ ..A]        /
/                                                                     /
/   PARMS:                                                            /
/     A => integer value                                              /
/     x => minimum value in range                                     /
/     y => maximum value in range                                     /
/                                                                       /
int NURand(A, x, y)
  int A;
  int x;
  int y;
{
  int retval;
  int exp1, exp2;

  exp1 = RANDOM( ,A);
  exp2 = RANDOM(x,y);
  exp1 = (exp1 | exp2) + C;
  exp2 = (y-x+1) + x;
  retval = exp1 % exp2;
  return(retval);
} /  end of NURand  /


/                                                                       /
/   C r e a t e C L a s t                                             /
/     Build cust last name from predefined syllables.                   /
/                                                                     /
/   PARMS:                                                            /
/     iNum => num used to build last name                             /
/     NameStr => address to store last name                           /
/                                                                       /
void CreateCLast(iNum, NameStr)
  int iNum;
  char  NameStr;
{
  static char  sylble[] =
              {"BAR", "OUGHT", "ABLE", "PRE", "PRES",
               "ESE", "ANTI", "CALLY", "ATION", "EING" };
  strcpy(NameStr, sylble[iNum/1  ]);
  strcat(NameStr, sylble[(iNum/1 )%1 ]);
  strcat(NameStr, sylble[(iNum%1 )]);

  return;
} /  end of CreateCLast  /


/                                                                       /
/   C r e a t e S t r                                                 /
/     Create string of random alphanumeric characters.                  /
/                                                                     /
/   PARMS:                                                            /
/     iMin => minimum length of string                                /
/     iMax => maximum length of string                                /
/     szTemp => address to store created string                     /
/   If string is not variable length, then set iMin and iMax to     /
/   the actual fixed length.                                          /
/                                                                       /
void CreateStr(iMin, iMax, szTemp)
  int iMin, iMax;
```

```
  char  szTemp;
{
  int iAlphalen,
      i, j;

  iAlphalen = RANDOM(iMin,iMax); /  determine str len   /
  memset(szTemp, '\ ', strlen(szTemp));
  for (j= ; j<iAlphalen; j++)
  {
    i = RANDOM( ,61);
    szTemp[j]= chAlpha[i];
  }
  return;
} /  end of CreateStr  /


/                                                                    /
/   G e t D a t e T i m e                                        /
/      Get current date/time stamp.                               /
/                                                               /
/   PARMS:                                                      /
/     szTime => pointer to time string                             /
/     szDate => pointer to date string                             /
/                                                                    /
void GetDateTime(szTime, szDate)
  char  szTime;
  char  szDate;
{
  char tstr[5];
  static struct tm  DateTime;
  short iYear;

  time(&ltime);   /  get current date & time  /
  DateTime = gmtime(&ltime);
    /  return time  /
  sprintf(tstr, "% 2d", DateTime->tm_hour);
  strcpy(szTime, tstr);
  sprintf(tstr, "% 2d", DateTime->tm_min);
  strcat(szTime, tstr);
  sprintf(tstr, "% 2d", DateTime->tm_sec);
  strcat(szTime, tstr);
    /  return date  /
  sprintf(tstr, "% 2d", (DateTime->tm_mon + 1));
  strcpy(szDate, tstr);
  sprintf(tstr, "% 2d", DateTime->tm_mday);
  strcat(szDate, tstr);
  iYear = DateTime->tm_year + 19  ;
  sprintf(tstr, "% 4d", iYear);
  strcat(szDate, tstr);
} /  end of GetDateTime  /


/                                                                    /
/   C r e a t e Z i p                                            /
/      Create zip code string.                                    /
/                                                               /
/   PARMS:                                                      /
/    Returns zip code string.                                    /
/                                                                    /
void CreateZip(zipstr)
char  zipstr;
{
/  Redefine max generated random number. Default is 32,767.  /
  int iZ;

  iZ = MaxRand();
  sprintf(zipstr, "% 5d", iZ);
  strcat(zipstr, "1111");
  return;
} /  end of CreateZip  /


/  Redefine max generated random number. Default is 32,767.  /
#undef RAND_MAX
#define RAND_MAX +99999
/                                                                    /
/   M a x R a n d                                                /
/      Create random number larger than 32767.                      /
/   NOTE: This is the rand() function used by AS/4   with one       /
/      slight modification.  In the rand() function, rand_next is   /
/      shifted right by 16 rather than the 14 used here.  Shifting  /
/      by 16 produces a max value of 65535.                        /
/                                                               /
/   PARMS:                                                      /
/    Returns zip code string.                                    /
/                                                                    /
int MaxRand(void)
{
  int rand_temp;

  rand_next = rand_next   11 3515245 + 12345;
  rand_temp = (rand_next >> 14)%((unsigned long)(RAND_MAX)+1);
  return(rand_temp);
} /  end of CreateZip  /
```

LOADORD: Fill ORDERS, ORDLIN, and NEWORD Files

```
/  This program fills the neword, orders, and ordlin  /
/  files.  It fills them all simultaneously. It      /
/  will create an order record, selecting the customer for that   /
/  order at random (each customer will have one and only one order   /
/  but which order that will be is determined with random numbers).  /
/  The next thing done is only done for orders between 2,1 1 and      /
/  3    for each district, this is the creation of a neworder       /
/  record. The orderline records for that order are created last,    /
/  the number of lines for the  order is between 5 and 15, selected  /
/  at random.                                                       /
/   C H A N G E S   &   U P D A T E S           /
/                                                                    /
/                                                                    /
/                                                                    /
/    PROGRAM-ID. LOADORD.                                       /
/    AUTHOR. TPCC.                                             /
/    INSTALLATION. ROCHESTER.                                    /
/    DATE-WRITTEN.  3/ 7/96.                                     /
/    DATE-COMPILED.  3/ 7/96.                                    /
/                                                                    /

/  Start include files  /
#include <stdlib.h>
#include <errno.h>
#include <recio.h>
#include <string.h>
#include <xxfdbk.h>
#include <milib.h>
#include <micomput.h>
#include <decimal.h>
#include <time.h>
#include <xxcvt.h>
 /   /
/  MAPINC generates structures for the database files         /
#pragma mapinc("newordpf"," libl/newordpf( all)","both key","d _P",,"tpcc")
#include "newordpf"
#pragma mapinc("orderspf"," libl/orderspf( all)","both key", "d _P",,"tpcc ")
#include "orderspf"
#pragma mapinc("ordlinpf"," libl/ordlinpf( all)","both key","d _P",,"tpcc" )
#include "ordlinpf"
  /
       /
      /     Orders per district     /
#define ORDERSPERDIST 3
#define MAX_RAND 1
#define RANDOM(a,b) (rand() % (b-a+1))+a
#define MAXNUM1 6

 void LoadOrders(int, int, int);
 void LoadNeword(int, int, int);
 int GetCstmrID(int);
 int GetItemID(void);
 void GetDateTime(char  , char  );
 void GetCarrier(char  );
 void GetAmount(char  );
 int MaxRand(void);
 void BldArray(void);

 int v;

    _RFILE
           NewOrder_File,
           Orders_File,
           OrderLine_File;

tpcc_ORRCD_both_t OrderRec;
tpcc_OLRCD_both_t OrdlnRec;
tpcc_NORCD_both_t NewordRec;

 static time_t ltime;
 static char TimeStr[7];
 static char DateStr[9];
 static char CarrStr[3];
 static char AmntStr[8];
 static int ocid;
 static unsigned long int rand_next = 1;
 int  numarray[ORDERSPERDIST];
  /
       /

      /    There are 1  entries of length 24 each   /
  char   DIST_INFO[] =
     {"Info for District Num   ",
      "Info for District Num  1",
      "Info for District Num  2",
      "Info for District Num  3",
      "Info for District Num  4",
      "Info for District Num  5",
      "Info for District Num  6",
      "Info for District Num  7",
      "Info for District Num  8",
      "Info for District Num  9",
      "Info for District Num 1 " };
   /
         /
  /  There are 3 sets of characters that are concatenated  /
  /  to make the district information fields for Stock  /
char  DistInf1[] = {
  "abcdefghijk", "nowisthetim", "thisiswhere",
  "whatdoyouno", "notmuchthen", "whydoyouask",
  "Idonotknow_", "sowhereisit", "inthecities",
  "andthetowns"};

char  DistInf2[] = {
  " 1", " 2", " 3", " 4", " 5", " 6", " 7", " 8", " 9", "1 "};

char  DistInf3[] = {
  "mnopqrstuvw", "whydidyoudo", "interactive",
  "batchwork__", "systemview_", "performance",
  "Ineverwork_", "Ialwaysplay", "nexttolast_",
  "nowthefinal"};

   /
          /
         char zeroesd[8] = "        ";
         char zeroest[6] = "      ";
   /
          /
         char  CarId[] = { "  "," 1", " 2", " 3", " 4", " 5",
                    " 6", " 7", " 8", " 9", "1 " };
   /
          /

int main(argc, argv)
register int argc; char   argv;
{
  short int i;
```

```
  short int iStrWrhs=1;
  short int iEndWrhs=1;
  short int iCurWrhs=1;
  short int iCurDist;
  int iCurOid;
  int rcode =  ;


 if( (Orders_File = _Ropen("orderspf","rr+","blkrcd=Y")) == NULL)
 {
  printf("Open of orders file failed\n");
  exit(99);
 }
 if( (OrderLine_File = _Ropen("ordlinpf","rr+","blkrcd=Y")) == NULL)
 {
  printf("Open of Orderline file failed\n");
  exit(99);
 }
 if( (NewOrder_File = _Ropen("newordpf","rr+","blkrcd=Y")) == NULL)
 {
  printf("Open of NewOrder file failed\n");
  exit(99);
 }

  /  Set up random number generator  /
 time(&ltime);
 srand(ltime);        /  seed the random num generator  /
 rand_next = (unsigned long int)ltime;

 BldArray();
  /  parse the input parms  /
 for (argc--, argv++, i= ; argc> ; ++i, argc--, argv++)
 {
  if (i== ) {
   iStrWrhs = atoi( argv);
  }
  else  {
   iEndWrhs = atoi( argv);
  }
 } /  end of parsing input parms  /

 for (iCurOid=1; iCurOid<=ORDERSPERDIST; iCurOid++)
 {
  for (iCurWrhs=iStrWrhs; iCurWrhs<=iEndWrhs; iCurWrhs++)
  {

   for (iCurDist=1; iCurDist<=1 ; iCurDist++)
   {

    LoadOrders(iCurWrhs, iCurDist, iCurOid);
    if(iCurOid >= 21 1)
    {
     LoadNeword(iCurWrhs, iCurDist, iCurOid);
    }
   }
  }
 }
_Rclose(Orders_File);
_Rclose(OrderLine_File);
_Rclose(NewOrder_File);

 return(rcode);
} /  end of main  /


/                                                                  /
/   L o a d O r d e r s                                          /
/     Create & write orders and Orderline rec.                 /
/                                                              /
/   PARMS:                                                     /
/     iCurWrhs  => current warehouse id                        /
/     iCurDist  => current district id                         /
/     iCurOid   => current Order id                            /
/                                                                  /
void LoadOrders(iCurWrhs, iCurDist, iCurOid)
  short int iCurWrhs;
  short int iCurDist;
  int iCurOid;
{
  decimal(7,2) d= .  ;
  int i,tmpvar;
  short int oln,curoln;
  char StockDist[25];

  OrderRec.OID  = OrdlnRec.OLOID = iCurOid;
  OrderRec.OWID = OrdlnRec.OLWID = iCurWrhs;
  OrderRec.ODID = OrdlnRec.OLDID = iCurDist;

    OrderRec.OCID = GetCstmrID(iCurOid);
    GetDateTime(TimeStr, DateStr);
    strncpy(OrderRec.OENTDT,DateStr,strlen(DateStr));
    strncpy(OrderRec.OENTTM,TimeStr,strlen(TimeStr));
    if(iCurOid<21 1)
    {
      GetCarrier(CarrStr);
      strncpy(OrderRec.OCARID,CarrStr,strlen(CarrStr));
    }
    else
    {
      memset(OrderRec.OCARID,'\ ', strlen(OrderRec.OCARID));
    }
    OrderRec.OLINES = RANDOM(5, 15);
    curoln = OrderRec.OLINES;
    OrderRec.OLOCAL = 1;
    _Rwrite(Orders_File,(void  )&OrderRec, sizeof(OrderRec));
    for(oln=1;oln<=curoln;oln++)
    {
       OrdlnRec.OLOID = iCurOid;
       OrdlnRec.OLNBR = oln;
       OrdlnRec.OLIID = MaxRand();
       OrdlnRec.OLSPWH = iCurWrhs;
       OrdlnRec.OLQTY = 5;
       if(iCurOid<21 1)
       {
strncpy(OrdlnRec.OLDLVD, OrderRec.OENTDT, sizeof(OrderRec.OENTDT));
strncpy(OrdlnRec.OLDLVT, OrderRec.OENTTM, sizeof(OrderRec.OENTTM));
        OrdlnRec.OLAMNT =  .  ;
       }
       else
       {
        strncpy(OrdlnRec.OLDLVD, zeroesd, 8);
        strncpy(OrdlnRec.OLDLVT, zeroest, 6);
        tmpvar = MaxRand();
        d = tmpvar / 1  ;
        OrdlnRec.OLAMNT = d;
       }
    tmpvar = RANDOM( , 9);
    memcpy(StockDist, DistInf1[tmpvar], 11);
    memcpy((void  )&StockDist[11], DistInf2[iCurDist-1],2);
     tmpvar = RANDOM( , 9);
    memcpy((void  )&StockDist[13], DistInf3[tmpvar],11);
    strncpy(OrdlnRec.OLDSTI, StockDist, 24);
        _Rwrite(OrderLine_File,(void  )&OrdlnRec, sizeof(OrdlnRec));
     } /  End of order line loop  /
 return;
}     / End of LoadOrders  /



/                                                                  /
/   L o a d N e w o r d                                          /
/     Create & write neword rec.                               /
/                                                              /
/   PARMS:                                                     /
/     iCurWrhs  => current warehouse id                        /
/     iCurDist  => current district id                         /
/     iCurOid   => current order id                            /
/                                                                  /
void LoadNeword(iCurWrhs, iCurDist, iCurOid)
  short int iCurWrhs;
  short int iCurDist;
  short int iCurOid;
{

  NewordRec.NOWID = iCurWrhs;
  NewordRec.NODID = iCurDist;
  NewordRec.NOOID = iCurOid;
  _Rwrite(NewOrder_File,(void  )&NewordRec, sizeof(NewordRec));
  return;
}     / End of LoadNeword  /

/                                                                  /
/   G e t C s t m r I D                                          /
/     Generates a random customer id.                          /
/                                                              /
/   PARMS:                                                     /
/     oid => Order ID                                          /
/                                                                  /
int GetCstmrID(oid)
int oid;
{


  if( (OrderRec.OWID == 1) && (OrderRec.ODID == 1) )
  {
      if (oid==1)
        {       v=RANDOM(1, ORDERSPERDIST);
                ocid = numarray[v];
        }
      else
        {       v++;
                if(v > ORDERSPERDIST)
                {
                v = 1;
                }
                ocid= numarray[v];
        }
  }
  else
  {
    ocid++;
    if(ocid > ORDERSPERDIST)
    {
     ocid = 1;
    }
  }
  return(ocid);
} /  End of GetCstmrID  /

/                                                                  /
/   G e t D a t e T i m e                                        /
/     Get current date/time stamp.                             /
/                                                              /
/   PARMS:                                                     /
/     szTime => pointer to time string                         /
/     szDate => pointer to date string                         /
/                                                                  /
void GetDateTime(szTime, szDate)
  char  szTime;
  char  szDate;
{
  char tstr[5];
  static struct tm  DateTime;
  short iYear;

  time(&ltime);   /  get current date & time  /
  DateTime = gmtime(&ltime);
    /  return time  /
  sprintf(tstr, "% 2d", DateTime->tm_hour);
  strcpy(szTime, tstr);
  sprintf(tstr, "% 2d", DateTime->tm_min);
  strcat(szTime, tstr);
  sprintf(tstr, "% 2d", DateTime->tm_sec);
  strcat(szTime, tstr);
    /  return date  /
  sprintf(tstr, "% 2d", (DateTime->tm_mon + 1));
  strcpy(szDate, tstr);
  sprintf(tstr, "% 2d", DateTime->tm_mday);
  strcat(szDate, tstr);
  iYear = DateTime->tm_year + 19  ;
  sprintf(tstr, "% 4d", iYear);
```

```
  strcat(szDate, tstr);
  return;
} /  end of GetDateTime  /


/                                                                    /
/   G e t C a r r i e r                                          /
/      Get carrier id if oid < 21 1.                               /
/                                                                 /
/   PARMS:                                                       /
/     szCarr => pointer to carrier string                          /
/                                                                    /
void GetCarrier(szCarr)
  char  szCarr;
{
  char tstr[2];
  int ri;
  ri = RANDOM(1, 1 );
  strncpy(szCarr, CarId[ri],strlen(CarId[ ]));
  return;
} /  end of GetCarrier  /


/                                                                    /
/   M a x R a n d                                                /
/      Get item id between 1 & 1  ,                                 /
/                                                                 /
/   PARMS:                                                       /
/     None.                                                      /
/                                                                    /
int MaxRand()
{
  int rand_temp;

  rand_next = rand_next   11 3515245 + 12345;
  rand_temp = (rand_next >> 14)%((unsigned long)(MAX_RAND)+1);
  return(rand_temp);
}
/                                                                    /
/    Build the array for OCIDs.                                  /
/      Generates a unique random customer id and builds an array.   /
/                                                                 /
/   PARMS:                                                       /
/     None                                                       /
/                                                                    /
void BldArray()
{
int i,j,k= ,n= ,x,num,same,y1= ,y2= ,y3= ,y4= ,y5= ,count= ;
int numarray1[MAXNUM1],
    numarray2[MAXNUM1],
    numarray3[MAXNUM1],
    numarray4[MAXNUM1],
    numarray5[MAXNUM1];



    for (j= ; j < ORDERSPERDIST; j++)
      {       numarray[j] =  ;
              numarray1[j] =  ;
              numarray2[j] =  ;
              numarray3[j] =  ;
              numarray4[j] =  ;
              numarray5[j] =  ;
      }
         x=MAXNUM1;

     for (i= ; i < ORDERSPERDIST; i++)
       {
          num = RANDOM(1,ORDERSPERDIST);
          same =  ;
       for (j= ; j < x; j++)
         {
         if (num == numarray1[j]) same=1;
         if (num == numarray2[j]) same=1;
         if (num == numarray3[j]) same=1;
         if (num == numarray4[j]) same=1;
         if (num == numarray5[j]) same=1;
         }
        if (same== ) {
        count++;
        numarray[n++(=num;
        if ((count>= ) && (count<6  ))
         numarray1[y1++]=num;
        if ((count>=6  ) && (count<12  ))
          numarray2[y2++]=num;
         if ((count>=12  ) && (count<18  ))
          numarray3[y3++]=num;
         if ((count>=18  ) && (count<24  ))
          numarray4[y4++]=num;
         if ((count>=24  ) && (count<3   ))
          numarray5[y5++]=num;
          }
          else i--;
       }
} /  End of BldArray  /
```

SETUP: System Setup Program

```
           PGM       PARM(&OBJLIB &BLDLIB &DATLIB &CRTSAVFILE +
                       &SAVLIB &JRNLIB &JRNASP &STRWHC &ENDWHC)

/  This program was changed to submit several stages of it to     /
/  batch. 12/19/93                                              /
/  FURTHER CHANGES MADE 1/ 7/94                                  /
/  This program is one of the last called during the creation of  /
/  the TPCC data base.  It creates the data queue from which     /
/  each user will be assigned a warehouse/district when they     /
/  sign on.  It also creates the job description and user       /
/  profile for the interactive users, next it creates the job    /
/  and subsystem descriptions for the batch jobs which will      /
/  execute the deffered portion of the delivery transaction.     /
/  It then creates the journal and journal receiver which are    /
/  used when a transaction is to be rolled-back or when lost     /
/  transactions need to be re-applied.  After creating the       /
/  journal it reorganizes the customer file to be sorted by      /
/  customer last name and first name, then the customer logical   /
/  file is created.  After all of the files are created the      /
/  journaling of the physical files is begun.  The last thing     /
/  this program does is to save the DB so we can use the restore  /
/  function to get the DB back to its initial state.            /

           DCL       VAR(&OBJLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&BLDLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&DATLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&SAVLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&JRNLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&JRNASP) TYPE( CHAR) LEN(1)
           DCL       VAR(&CRTSAVFILE) TYPE( CHAR) LEN(1)
           DCL       VAR(&STRWH) TYPE( DEC) LEN(4  )
           DCL       VAR(&ENDWH) TYPE( DEC) LEN(4  )
           DCL       VAR(&STRWHC) TYPE( CHAR) LEN(4)
           DCL       VAR(&ENDWHC) TYPE( CHAR) LEN(4)
/  Monitor for messages and setup library list                 /

           MONMSG    MSGID(CPF1 64) /  Class already exists  /
           MONMSG    MSGID(CPD1411) /  Subsystem already exists  /
           MONMSG    MSGID(CPD1416) /  Subsystem already active  /
           MONMSG    MSGID(CPD1475) /  Routing Entry already +
                       exists  /
           MONMSG    MSGID(CPD1535) /  Job Queue Entry already +
                       exists  /
           MONMSG    MSGID(CPD1611) /  JOBD already exists  /
           MONMSG    MSGID(CPD1621) /  JOBQ not FOUND      /
           MONMSG    MSGID(CPF1621) /  JOBD not created    /
           MONMSG    MSGID(CPF1696) /  Subsystem not created  /
           MONMSG    MSGID(CPF1697) /  Subsystem not changed  /
           MONMSG    MSGID(CPF21 3) /  Library already in list  /
           MONMSG    MSGID(CPF21 5) /  Object not found       /
           MONMSG    MSGID(CPF211 ) /  Object not found       /
           MONMSG    MSGID(CPF2111) /  Library already exists  /
           MONMSG    MSGID(CPF22 4) /  User Profile Does Not +
                       Exist  /
           MONMSG    MSGID(CPF2555) /  Reply list entry exists  /
           MONMSG    MSGID(CPF3323) /  Job Queue already exists  /
           MONMSG    MSGID(CPF377 ) /  No objects saved or   +
                               restored   /
           MONMSG    MSGID(CPF5813) /  File already exists    /
           MONMSG    MSGID(CPF7 1 ) /  Journal already exists  /
           MONMSG    MSGID(CPF7 32) /  File not journaled     /
           MONMSG    MSGID(CPF73 2) /  File not created       /
           MONMSG    MSGID(CPF7311) /  Errors not allowed in  +
                               DDS                       /
           MONMSG    MSGID(CPF9812) /  File not found        /

           ADDRPYLE  SEQNBR(31 3) MSGID(CPA4 67) RPY(G) /  +
                       Save of Data over existing Save Files  /

           ADDLIBLE  LIB(&BLDLIB)
           ADDLIBLE  LIB(&DATLIB)
           CHGVAR    VAR(&STRWH) VALUE(&STRWHC)
           CHGVAR    VAR(&ENDWH) VALUE(&ENDWHC)



           SNDPGMMSG MSGID(CPF9898) MSGF(QCPFMSG) +
                       MSGDTA('Creating Logical Files') +
                       TOPGMQ( EXT) MSGTYPE( STATUS)
/   BUILD INDEXES                                          /

           SBMJOB    CMD(CALL PGM(&OBJLIB/ORDERSVIEW) +
                       PARM(&DATLIB &BLDLIB &STRWHC &ENDWHC)) +
                       JOB(ORDERSVIEW) JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&BLDLIB/TPCCBLDMSG)

           SBMJOB    CMD(CALL PGM(&OBJLIB/ORDLINVIEW) +
                       PARM(&DATLIB &BLDLIB)) JOB(ORDLINVIEW) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&BLDLIB/TPCCBLDMSG)

           SBMJOB    CMD(CALL PGM(&OBJLIB/NEWORDVIEW) +
                       PARM(&DATLIB &BLDLIB)) JOB(NEWORDVIEW) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&BLDLIB/TPCCBLDMSG)

           SBMJOB    CMD(CALL PGM(&OBJLIB/CSTMRVIEW) PARM(&DATLIB +
                       &BLDLIB)) JOB(CSTMRVIEW) +
                       JOBQ(&OBJLIB/TPCBLDJOBQ) +
                       MSGQ(&BLDLIB/TPCCBLDMSG)



/  Creation of TPCC User Profile                            /

 ENDIT:     CRTJOBD   JOBD(&OBJLIB/TPCCJOBD) JOBQ(QGPL/QBATCH) +
                       TEXT('Job description for TPCCUSER') +
                       LOG( ) INQMSGRPY( DFT)
            DLTUSRPRF USRPRF(TPCCUSER)
            MONMSG    MSGID(CPF2215) EXEC(GOTO CMDLBL(CHGPRF))
            CRTUSRPRF USRPRF(TPCCUSER) CURLIB(&OBJLIB) +
                       INLPGM(QCMD) TEXT('TPCC User created by +
                       BLDTPCC') SPCAUT( SAVSYS  ALLOBJ  JOBCTL) +
                       JOBD(&OBJLIB/TPCCJOBD) DLVRY( HOLD)
            GOTO      CMDLBL(CRTJOBQ)

/  Change the profile if it existed previously              /

 CHGPRF:    CHGUSRPRF USRPRF(TPCCUSER) CURLIB(&OBJLIB) +
                       INLPGM( LIBL/QCMD) TEXT('TPCC User - +
                       Changed by BLDTPCC') SPCAUT( SAVSYS +
                        ALLOBJ  JOBCTL) JOBD(&OBJLIB/TPCCJOBD) +
                       DLVRY( HOLD)
```

```
/  Create job queue, class and subsystem description for the    /
/  batch portion of the delivery transaction                   /

 CRTJOBQ:    CRTJOBQ    JOBQ(&OBJLIB/DLVRYJOBQ) TEXT('Delivery Job +
                        Queue')
             CRTCLS     CLS(&OBJLIB/DLVRYCLS) RUNPTY(4 ) +
                        PURGE( NO) TEXT('Delivery Job Class')
             CRTSBSD    SBSD(&OBJLIB/BATCHSBS) POOLS((1  BASE)) +
                        SGNDSPF(QSYS/QDSIGNON)
             ADDJOBQE   SBSD(&OBJLIB/BATCHSBS) +
                        JOBQ(&OBJLIB/DLVRYJOBQ) MAXACT(5 ) +
                        SEQNBR(1    )
             ADDRTGE    SBSD(&OBJLIB/BATCHSBS) SEQNBR(1    ) +
                        CMPVAL(DLVRYJOB) PGM(QSYS/QCMD) +
                        CLS(&OBJLIB/DLVRYCLS)

/  Create the journal receiver in the mirrored user ASP        /


             IF         COND(&STRWHC  EQ '   1') THEN(DO)

             CRTLIB     LIB(&JRNLIB) ASP(&JRNASP)

             CRTMSGQ    MSGQ(&DATLIB/TPCCJRNMSG) TEXT('TPC-C Journal +
                        Hit Threshold Message')
             MONMSG     MSGID(CPF2112)

             CRTJRNRCV  JRNRCV(&JRNLIB/TPCCJRNRCV)             +
                        THRESHOLD(15     ) TEXT('TPCC Journal +
                        Receiver')
             CRTJRNRCV  JRNRCV(&JRNLIB/TEMPRCV)             +
                        TEXT('TPCC Temporary Receiver (only used +
                        in cleanup pgm)')
             CRTJRN     JRN(&DATLIB/TPCCJRN) +
                        JRNRCV(&JRNLIB/TPCCJRNRCV) +
                        MSGQ(&DATLIB/TPCCJRNMSG) +
                        MNGRCV( SYSTEM) RCVSIZOPT( MINFIXLEN) +
                        TEXT('TPCC Journal')
             ENDDO

             CHGJRN     JRN(&DATLIB/TPCCJRN) JRNRCV( GEN) +
                        MSGQ(&DATLIB/TPCCJRNMSG) MNGRCV( SYSTEM) +
                        RCVSIZOPT( MINFIXLEN)

/  WAIT FOR COMPLETION OF REORGANIZES                          /

             RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG) MSGTYPE( ANY) +
                        WAIT( MAX)
             RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG) MSGTYPE( ANY) +
                        WAIT( MAX)
             RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG) MSGTYPE( ANY) +
                        WAIT( MAX)
             RCVMSG     MSGQ(&BLDLIB/TPCCBLDMSG) MSGTYPE( ANY) +
                        WAIT( MAX)


/  Start journaling                                          /

             CALL       PGM(&BLDLIB/STRJRNTPCC)

/  Save of TPCC Data Files to Save Files.  Used in Cleanup Program  /

             IF         COND(&CRTSAVFILE = 'Y') THEN(DO)
               CRTLIB     LIB(&SAVLIB) TEXT(&DATLIB  CAT ' SAVF')
               CLRLIB     LIB(&SAVLIB)
               CRTSAVF    FILE(&SAVLIB/&DATLIB) TEXT(&DATLIB  CAT ' +
                          SAVF')
               SAVLIB     LIB(&DATLIB) DEV( SAVF) +
                          SAVF(&SAVLIB/&DATLIB) ACCPTH( YES)
               MONMSG CPF37 1 / IGNORE WHEN CANNOT SAVE MSGQ /
             ENDDO

/  Submit this job AFTER save is done or save will be incomplete    /

 ENDPGM:     ENDPGM
```

ORDERSVIEW: Creates Orders View Logical Files

```
             PGM        PARM(&DATALIB &SRCLIB &STRWHC &ENDWHC)
             DCL        VAR(&STRWH) TYPE( DEC) LEN(4  )
             DCL        VAR(&ENDWH) TYPE( DEC) LEN(4  )
             DCL        VAR(&STRWHC) TYPE( CHAR) LEN(4)
             DCL        VAR(&ENDWHC) TYPE( CHAR) LEN(4)
             DCL        VAR(&DATALIB) TYPE( CHAR) LEN(1 )
             DCL        VAR(&PARMSTR) TYPE( CHAR) LEN(18)
             DCL        VAR(&SRCLIB) TYPE( CHAR) LEN(1 )
             /  CREATE THE UNIQUE VIEW OVER ORDERSPF  /
             CHKOBJ     OBJ(&DATALIB/ORDERSLF) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/ORDERSLF) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             /  FOR AUDIT-READY DATA BASES, GENERATE CORRECT +
                CUSTOMER ID'S FOR PRE-DEFINED ORDERS  /
             CHKOBJ     OBJ(&DATALIB/ORDERS) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/ORDERS) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))

             ENDPGM
```

ORDLINVIEW: Creates Orders View Logical Files

```
             PGM        PARM(&DATALIB &SRCLIB)
             DCL        VAR(&DATALIB) TYPE( CHAR) LEN(1 )
             DCL        VAR(&SRCLIB) TYPE( CHAR) LEN(1 )
             /  CREATE THE UNIQUE VIEW OVER ORDLINPF  /
             CHKOBJ     OBJ(&DATALIB/ORDLIN) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/ORDLIN) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             /  CREATE PARTIAL KEY VIEW  /
             CHKOBJ     OBJ(&DATALIB/ORDLINLF) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/ORDLINLF) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             ENDPGM
```

NEWORDVIEW: Creates New Orders View Logical Files

```
             PGM        PARM(&DATALIB &SRCLIB)
             DCL        VAR(&DATALIB) TYPE( CHAR) LEN(1 )
             DCL        VAR(&SRCLIB) TYPE( CHAR) LEN(1 )
             /  CREATE THE UNIQUE VIEW OVER NEWORDPF  /
             CHKOBJ     OBJ(&DATALIB/NEWORD) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/NEWORD) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             /  CREATE PARTIAL KEY VIEW  /
             CHKOBJ     OBJ(&DATALIB/NEWORDLF) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/NEWORDLF) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             ENDPGM
```

CSTMRVIEW: Creates Customer View Logical Files

```
             PGM        PARM(&DATALIB &SRCLIB)
             DCL        VAR(&DATALIB) TYPE( CHAR) LEN(1 )
             DCL        VAR(&SRCLIB) TYPE( CHAR) LEN(1 )
             /  CREATE THE LAST/FIRST NAME VIEW OVER CSTMRPF /
             CHKOBJ     OBJ(&DATALIB/CSTMRLFCRT) OBJTYPE( FILE)
             MONMSG     MSGID(CPF98 1) EXEC(CRTLF +
                         FILE(&DATALIB/CSTMRLFCRT) +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             /  CREATE THE VIEW FOR ACCESS BY LAST NAME  /
             CHKOBJ     OBJ(&DATALIB/CSTMRLFNAM) OBJTYPE( FILE)
             MONMSG CPF98 1 EXEC( +
             CRTLF      FILE(&DATALIB/CSTMRLFNAM)  +
                         SRCFILE(&SRCLIB/QDDSSRC) LVLCHK( NO))
             ENDPGM
```

STRJRNTPCC: Start Journaling for all TPCC Physical Files

```
             PGM

/                                                              /
/                                                 /
/  FUNCTION: THIS PROGRAM STRARTS JOURNALING FOR ALL      /
/           PHYSICAL FILES FOR THE TPCC WORKLOAD.        /
/                                                 /
/  INVOCATION:  THIS PROGRAM IS CALLED VIA:              /
/                                                 /
/           CALL  PGM(STRJRNTPCC)                    /
/           CALLED FROM SETUP AND CLEANUP           /
/                                                 /
/  INPUT:   NONE                                   /
/                                                 /
/  OUTPUT:  JOURNALING START FOR ALL TPCC FILES         /
/                                                 /
/  DEPENDENCIES AND ASSUMPTIONS:   NONE               /
/                                                 /
/                                                          /

/  Monitor for messages                                 /

             MONMSG     MSGID(CPF7 32)
             MONMSG     MSGID(CPF7 3 )

/  Start journaling on the physical files  /
```

```
            STRJRNPF   FILE(CSTMRPF) +
                       JRN(TPCCJRN) IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(DSTRCT) JRN(TPCCJRN) +
                       IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(HSTRY) +
                       JRN(TPCCJRN) IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(ITEM) JRN(TPCCJRN) +
                       IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(NEWORDPF) JRN(TPCCJRN) +
                       IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(ORDERSPF) JRN(TPCCJRN) +
                       IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(STOCKPF) JRN(TPCCJRN) +
                       IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(WRHS) JRN(TPCCJRN) +
                       IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)
            STRJRNPF   FILE(ORDLINPF) +
                       JRN(TPCCJRN) IMAGES( BOTH) +
                       OMTJRNE( OPNCLO)

ENDPGM:     ENDPGM
```

CRTENVPGMS: Create Environment Programs

```
            PGM        PARM(&APPLIB &DATLIB)
            DCL        VAR(&APPLIB) TYPE( CHAR) LEN(1 )
            DCL        VAR(&DATLIB) TYPE( CHAR) LEN(1 )

/  This CL program compiles all of the CL, C and CBL programs    /
/  that are needed to do a complete rebuild of the database.     /
/  They are compiled in the order they are needed. None of the   /
/  programs are called from this program, only compiled.        /


            /  ADD CODE TO BUILD APPP PROGRAMS  /
            MONMSG CPF
            ADDLIBLE   LIB(&DATLIB)
            MONMSG     MSGID(CPF21 3)
            ADDLIBLE   LIB(&APPLIB)
            MONMSG     MSGID(CPF21 3)
            CRTCLPGM   PGM(&APPLIB/ATPCCMTRA) SRCFILE(&APPLIB/QCLSRC)
            CRTCLPGM   PGM(&APPLIB/ATPCCMTRD) SRCFILE(&APPLIB/QCLSRC)
            CRTCLPGM   PGM(&APPLIB/ATPCCMTRS) SRCFILE(&APPLIB/QCLSRC)
            CRTSQLCBLI OBJ(&APPLIB/NOPAYOSMTR) +
                       SRCFILE(&APPLIB/QSQLCBLSRC) COMMIT( ALL) +
                       OPTION( NOGEN)
            CRTCBLMOD  MODULE(&APPLIB/NOPAYOSMTR) +
                       SRCFILE(QTEMP/QSQLTEMP) +
                       OPTION( NOMONOPRC) DBGVIEW( SOURCE) +
                       OPTIMIZE( FULL) LINKLIT( PRC)
            CRTPGM     PGM(&APPLIB/NOPAYOSMTR) +
                       MODULE(&APPLIB/NOPAYOSMTR) +
                       BNDSRVPGM(QSYS/QDBRUNHA) ACTGRP( CALLER)
            CRTCBLMOD  MODULE(&APPLIB/STKLVLMTR) +
                       SRCFILE(&APPLIB/QLBLSRC) +
                       OPTION( NOMONOPRC) DBGVIEW( SOURCE) +
                       OPTIMIZE( FULL) LINKLIT( PRC)
            CRTPGM     PGM(&APPLIB/STKLVLMTR) +
                       MODULE(&APPLIB/STKLVLMTR) +
                       BNDSRVPGM(QSYS/QDBRUNHA) ACTGRP( CALLER)
            CRTCBLMOD  MODULE(&APPLIB/DLVRYMTR) +
                       SRCFILE(&APPLIB/QLBLSRC) +
                       OPTION( NOMONOPRC) DBGVIEW( SOURCE) +
                       OPTIMIZE( FULL) LINKLIT( PRC)
            CRTPGM     PGM(&APPLIB/DLVRYMTR) +
                       MODULE(&APPLIB/DLVRYMTR) +
                       BNDSRVPGM(QSYS/QDBRUNHA) ACTGRP( CALLER)

            CLRLIB QRPLOBJ

            ENDPGM
```

C_CREATE: Create ITEM Hash

```
#include <stdlib.h>
#include <recio.h>
#include <stddef.h>
#include <string.h>
#include <stdio.h>
#include <errno.h>

/ ============================================================ /
/  internal defines                                            /
/ ============================================================ /

void main()
{
  long xx;
  char flag;
  char hash_name[1 ];
  char pf[1 ];
  char pf_lib[1 ];
  char lf[1 ];
  char lf_lib[1 ];
  char expression[255];

  typedef _Packed struct key_struct {
                    char name[1 ];
                    long value;
     } key_ranges_structure[5];

  key_ranges_structure key_ranges;

  flag = '1';
  memcpy(hash_name ,"ITEMLF    ",1 );
  memcpy(pf        ,"ITEM     ",1 );
  memcpy(lf        ,"ITEMLF   ",1 );
  memcpy(pf_lib    ,"TPCCD697  ",1 );
  memcpy(lf_lib    ,"TPCCD697  ",1 );
  memcpy(expression," DFT                          ",33);

  key_ranges[ ].value = 1     ;

  xx=qdbcrtha(flag,hash_name,pf,pf_lib,
              lf,lf_lib,key_ranges,expression);

  xx = ;

}
```

C_CREATE2: Create STOCK Hash

```
#include <stdlib.h>
#include <recio.h>
#include <stddef.h>
#include <string.h>
#include <stdio.h>
#include <errno.h>

/ ============================================================ /
/  internal defines                                            /
/ ============================================================ /

void main()
{
  long xx;
  char flag;
  char hash_name[1 ];
  char pf[1 ];
  char pf_lib[1 ];
  char lf[1 ];
  char lf_lib[1 ];
  char expression[255];

  typedef _Packed struct key_struct {
                    char name[1 ];
                    long value;
     } key_ranges_structure[5];

  key_ranges_structure key_ranges;

  flag = ' ';
  memcpy(hash_name ,"STOCK     ",1 );
  memcpy(pf        ,"STOCKPF   ",1 );
  memcpy(lf        ,"STOCK     ",1 );
  memcpy(pf_lib    ,"TPCCD697  ",1 );
  memcpy(lf_lib    ,"TPCCD697  ",1 );
  memcpy(expression," DFT                          ",33);

  key_ranges[ ].value = 1     ;
  key_ranges[1].value = 51 ;

  xx=qdbcrtha(flag,hash_name,pf,pf_lib,
              lf,lf_lib,key_ranges,expression);

  xx = ;

}
```

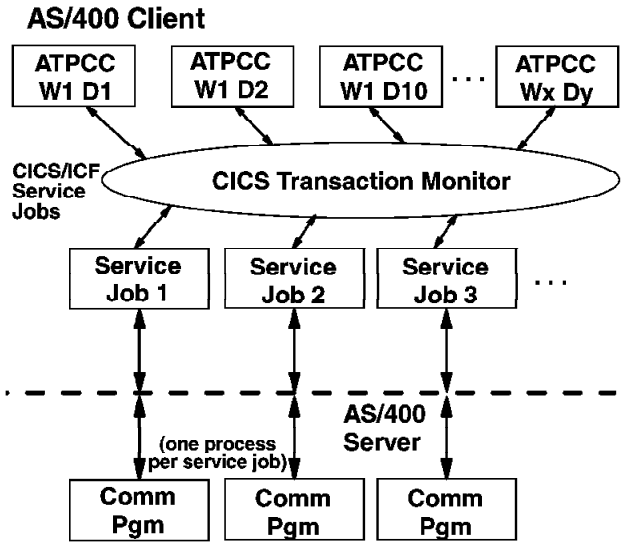
C_CREATE3: Create CSTMR Hash

```
#include <stdlib.h>
#include <recio.h>
#include <stddef.h>
#include <string.h>
#include <stdio.h>
#include <errno.h>

/ ============================================================ /
/  internal defines                                            /
/ ============================================================ /

void main()
{
  long xx;
```

```
  char flag;
  char hash_name[1 ];
  char pf[1 ];
  char pf_lib[1 ];
  char lf[1 ];
  char lf_lib[1 ];
  char expression[255];

  typedef _Packed struct key_struct {
                    char name[1 ];
                    long value;
     } key_ranges_structure[5];

  key_ranges_structure key_ranges;

  flag = ' ';
  memcpy(hash_name ,"CSTMR     ",1 );
  memcpy(pf       ,"CSTMRPF   ",1 );
  memcpy(lf       ,"CSTMR     ",1 );
  memcpy(pf_lib    ,"TPCCD697  ",1 );
  memcpy(lf_lib    ,"TPCCD697  ",1 );
  memcpy(expression," DFT ",5);

  key_ranges[ ].value = 3    ;
  key_ranges[1].value = 1 ;
  key_ranges[2].value = 51 ;

  xx=qdbcrtha(flag,hash_name,pf,pf_lib,
             lf,lf_lib,key_ranges,expression);

  xx = ;

}
```

Appendix D. Application Source Code

Program Flow



The main program on the Client System communicates with a set of CICS service jobs on the client. Each service job has a corresponding job on the server. Communication between the CICS service job on the client and the remote job on the server takes place through an ICF file.

The communication programs on the server handle all five TPCC transactions.

STRICFJOBY: Start CICS Service Jobs

```
#include <stddef.h>
#include <stdlib.h>
#include <stdio.h>
#include <errno.h>
#include <aegtmmtrh.h>

/ ============================================================ /
/  start transaction monitor                                   /
/ ============================================================ /

void main()
{
   error_structure err;
   short xx;
   monitor_type monitor;
   monitor.regions = 1;
   monitor.transactions = 5;

/  Set up parameters for starting the transaction monitor       /

   monitor.tarea[1].ttrans = 66;
   memcpy(monitor.tarea[1].icf_file,"TPCCKVCLNT/STOCICFF ",21);
   memcpy(monitor.tarea[1].remote_loc,"YANKEES ",8);
   memcpy(monitor.tarea[1].mode,"TMODMAR ",8);
   memcpy(monitor.tarea[1].authority[1],"TPCCUSER",8);
   monitor.tarea[1].job_priority =  ;
   monitor.tarea[1].send_length = 23 ;
   monitor.tarea[1].recv_length = 67 ;
   monitor.tarea[1].time_out =  ;

   monitor.tarea[2].ttrans = 55;
   memcpy(monitor.tarea[2].icf_file,"TPCCKVCLNT/DLVRICFF ",21);
   memcpy(monitor.tarea[2].remote_loc,"YANKEES ",8);
   memcpy(monitor.tarea[2].mode,"TMODMAR ",8);
   memcpy(monitor.tarea[2].authority[1],"TPCCUSER",8);
   monitor.tarea[2].job_priority =  ;
   monitor.tarea[2].send_length = 23 ;
   monitor.tarea[2].recv_length = 67 ;
   monitor.tarea[2].time_out =  ;

   monitor.tarea[3].ttrans = 77;
   memcpy(monitor.tarea[3].icf_file,"TPCCKVCLNT/MAINICFF ",21);
   memcpy(monitor.tarea[3].remote_loc,"YANKEES ",8);
   memcpy(monitor.tarea[3].mode,"TMODMAR ",8);
   memcpy(monitor.tarea[3].authority[1],"TPCCUSER",8);
   monitor.tarea[3].job_priority =  ;
   monitor.tarea[3].send_length = 23 ;
   monitor.tarea[3].recv_length = 67 ;
   monitor.tarea[3].time_out =  ;

   monitor.tarea[4].ttrans = 88;
   memcpy(monitor.tarea[4].icf_file,"TPCCKVCLNT/MAINICFF ",21);
   memcpy(monitor.tarea[4].remote_loc,"YANKEES ",8);
   memcpy(monitor.tarea[4].mode,"TMODMAR ",8);
   memcpy(monitor.tarea[4].authority[1],"TPCCUSER",8);
   monitor.tarea[4].job_priority =  ;
   monitor.tarea[4].send_length = 23 ;
   monitor.tarea[4].recv_length = 67 ;
   monitor.tarea[4].time_out =  ;

   monitor.tarea[5].ttrans = 44;
   memcpy(monitor.tarea[5].icf_file,"TPCCKVCLNT/MAINICFF ",21);
   memcpy(monitor.tarea[5].remote_loc,"YANKEES ",8);
   memcpy(monitor.tarea[5].mode,"TMODMAR ",8);
   memcpy(monitor.tarea[5].authority[1],"TPCCUSER",8);
   monitor.tarea[5].job_priority =  ;
   monitor.tarea[5].send_length = 23 ;
   monitor.tarea[5].recv_length = 67 ;
   monitor.tarea[5].time_out =  ;

 /      The transaction types                                  /
 /      66  =  Stock Level                                    /
 /      55  =  Delivery                                       /
 /      77  =  New Order                                      /
 /      88  =  Payment                                        /
 /      44  =  Order Status                                   /

   monitor.rarea[1].ttypes = 5;

   monitor.rarea[1].ttrans[1] = 66;
   monitor.rarea[1].max_jobs[1] = 25;

   monitor.rarea[1].ttrans[2] = 55;
   monitor.rarea[1].max_jobs[2] = 45;

   monitor.rarea[1].ttrans[3] = 77;
   monitor.rarea[1].max_jobs[3] = 5 ;

   monitor.rarea[1].ttrans[4] = 88;
   monitor.rarea[1].max_jobs[4] = 25;

   monitor.rarea[1].ttrans[5] = 44;
   monitor.rarea[1].max_jobs[5] = 2;

/  Invoke the start transaction monitor function with the right parms /

   xx = aegtmstr(monitor,&err);
   xx = xx;
}
```

FIRSTPGM1: Sign-On Program

```
          PGM
          DCL &WRHS  CHAR 4
          DCL &DST  CHAR 2
          DCL       VAR(&QNAME) TYPE( CHAR) LEN(1 ) VALUE(INITDTAQ)
          DCL       VAR(&QLIB) TYPE( CHAR) LEN(1 ) +
                      VALUE(TPCCKVCLNT)
          DCL       VAR(&QNAME1) TYPE( CHAR) LEN(1 ) +
                      VALUE(TEMPDTAQ)
          DCL       VAR(&QLIB1) TYPE( CHAR) LEN(1 ) VALUE(QTEMP)
          DCL       VAR(&FLDLEN) TYPE( DEC) LEN(5  ) VALUE(6)
          DCL       VAR(&WAIT) TYPE( DEC) LEN(5  ) VALUE( )
          DCL       VAR(&VALUE) TYPE( CHAR) LEN(6)
          CALL      PGM(QRCVDTAQ) PARM(&QNAME &QLIB &FLDLEN +
                      &VALUE &WAIT)
          CRTDTAQ   DTAQ(&QLIB1/&QNAME1) MAXLEN(6)
          CALL      PGM(QSNDDTAQ) PARM(&QNAME1 &QLIB1 &FLDLEN +
                      &VALUE)
          CHGVAR     VAR(&WRHS)    VALUE(%SST(&VALUE 1 4))
          CHGVAR     VAR(&DST)  VALUE(%SST(&VALUE 5 2))
          ?         SECONDGM2 WRHSNUM(&WRHS) DSTRCTNUM(&DST)
ENDIT:     ENDPGM
```

FIRSTPGM2: Sign-On Program

```
          PGM PARM(&SSNWHSE &SSNDSTRCT)
          DCL &SSNWHSE  CHAR 4
          DCL &SSNDSTRCT  CHAR 2
          SNDPGMMSG &SSNWHSE
          IF        COND(&SSNWHSE  LE ' 163') THEN(STRCICSUSR +
                      CTLRGN(TPCC) TRANID(TPCC))
          IF        COND((&SSNWHSE  GT ' 163')  AND (&SSNWHSE  LE +
                      ' 193')) THEN(STRCICSUSR CTLRGN(TPC ) +
                      TRANID(TPCC))
          IF        COND((&SSNWHSE  GT ' 193')  AND (&SSNWHSE  LE +
                      ' 223')) THEN(STRCICSUSR CTLRGN(TPC1) +
                      TRANID(TPCC))
          IF        COND((&SSNWHSE  GT ' 223')  AND (&SSNWHSE  LE +
                      ' 253')) THEN(STRCICSUSR CTLRGN(TPC2) +
                      TRANID(TPCC))
          IF        COND((&SSNWHSE  GT ' 253')  AND (&SSNWHSE  LE +
                      ' 266')) THEN(STRCICSUSR CTLRGN(TPC3) +
                      TRANID(TPCC))
          ENDPGM
```

SECONDGM2: Sign-On Program

```
          PGM PARM(&E &C)
          DCL &E     CHAR 1
          DCL &C    CHAR 1
          DCL &WRHS  CHAR 4 VALUE('   1')
          DCL &DST  CHAR 2 VALUE(' 1')
          DCL       VAR(&QNAME) TYPE( CHAR) LEN(1 ) VALUE(TEMPDTAQ)
          DCL       VAR(&QLIB) TYPE( CHAR) LEN(1 ) +
                      VALUE(QTEMP)
          DCL       VAR(&FLDLEN) TYPE( DEC) LEN(5  ) VALUE(6)
          DCL       VAR(&WAIT) TYPE( DEC) LEN(5  ) VALUE( )
          DCL       VAR(&VALUE) TYPE( CHAR) LEN(6)
          CALL      PGM(QRCVDTAQ) PARM(&QNAME &QLIB &FLDLEN +
                      &VALUE &WAIT)
          SNDPGMMSG  MSG(&VALUE)
          CHGVAR     VAR(&WRHS)    VALUE(%SST(&VALUE 1 4))
          CHGVAR     VAR(&DST)  VALUE(%SST(&VALUE 5 2))
          ?         SECONDGM1 WRHSNUM(&WRHS) DSTRCTNUM(&DST)
ENDIT:     ENDPGM
```

SECONDGM1: Sign On Program

```
/                                                               /
/  This program:  Uses warehouse id & district id passed from cmd   /
/                 file prompt.                                  /
/                Calls the COBOL programs to execute the          /
/                  transactions.                                /

          PGM  PARM(&SSNWHSE &SSNDSTRCT)

          DCL       VAR(&SSNWHSE) TYPE( CHAR) LEN(4)
          DCL       VAR(&SSNDSTRCT) TYPE( CHAR) LEN(2)
          DCL       VAR(&E) TYPE( CHAR) LEN(1 )
          DCL       VAR(&C) TYPE( CHAR) LEN(1 )

          DCL       VAR(&JOB) TYPE( CHAR) LEN(1 )
          DCL       VAR(&QNAME) TYPE( CHAR) LEN(1 ) VALUE(INITDTAQ)
          DCL       VAR(&QLIB) TYPE( CHAR) LEN(1 ) +
```

```
                VALUE(TPCCCICS)
          DCL       VAR(&VALUE) TYPE( CHAR) LEN(6)
          DCL       VAR(&VALUE1) TYPE( DEC) LEN(6  )
          DCL       VAR(&FLDLEN) TYPE( DEC) LEN(5  ) VALUE(6)
          DCL       VAR(&WAIT) TYPE( DEC) LEN(5  ) VALUE( )
          DCL       VAR(&DEV) TYPE( CHAR) LEN(1 )
          DCL       VAR(&MODE) TYPE( CHAR) LEN(8)
          DCL       VAR(&OBJLIB) TYPE( CHAR) LEN(1 ) +
                    VALUE(TPCCKVCLNT)

          MONMSG    MSGID(CPF21 3) /  Library already exists in +
                    library list  /

          MONMSG    MSGID(CPF2451) /  The message queue is +
                    allocated to someone else  /

          ADDLIBLE  LIB(&OBJLIB) /  TPC-C data base library  /
          CHGCURLIB CURLIB(&OBJLIB)

          RTVJOBA   JOB(&JOB)
          MONMSG    MSGID(CPF    )

SNDPGMMSG &JOB
SNDPGMMSG &SSNWHSE
SNDPGMMSG &SSNDSTRCT
          CALL    PGM(&OBJLIB/ATPCCCICS) PARM(&E &C &JOB &SSNWHSE +
                    &SSNDSTRCT)
          MONMSG  MSGID(CEE99 1) EXEC(DLYJOB DLY(9999))

          ENDPGM
```

ATPCCCICS: Main TPCC Program

```
      PROCESS NOTRUNC NORANGE.
      IDENTIFICATION DIVISION.

        PROGRAM-ID. ATPCC.
        AUTHOR. P/P COC
        INSTALLATION. IBM-ROCHESTER.
        DATE-WRITTEN.
        DATE-COMPILED.

         C  H  A  N  G  E  S     &     U  P  D  A  T  E  S

         LATEST CHANGES LISTED FIRST

         MM/DD/YY   AUTHOR NAME         LINES CHANGED/ADDED: NNN


           DESCRIPTION OF CHANGE:



      ENVIRONMENT DIVISION.
      CONFIGURATION SECTION.
        SOURCE-COMPUTER. IBM-AS4  .
        OBJECT-COMPUTER. IBM-AS4  .
        INPUT-OUTPUT SECTION.
        FILE-CONTROL.
            SELECT DISPLAY-FILE
               ASSIGN TO WORKSTATION-ATPCCDSPF
               ORGANIZATION IS TRANSACTION
               CONTROL-AREA IS TRANSACTION-CONTROL-AREA
               ACCESS MODE IS SEQUENTIAL.
        DATA DIVISION.
        FILE SECTION.
        FD DISPLAY-FILE
          LABEL RECORDS ARE OMITTED.
         1 DISPLAY-RECORD.

           COPY DDS-ALL-FORMATS OF ATPCCDSPF.

          5 DISPLAY-OUT REDEFINES ATPCCDSPF-RECORD.
              6   OUTPUT-FMT-NUM       PIC XX.
              6   TOTAMT              PIC S9(1 )V9(2).
              6   OENTTM              PIC S9(6).
              6   CLAST               PIC X(16).
              6   CCREDT              PIC X(2).
              6   CDCT                PIC S99V99.
              6   OID                 PIC S9(8).
              6   OLINES              PIC S9(2).
              6   WTAX                PIC S99V99.
              6   DTAX                PIC S99V99.
              6  OUTPUT-TABLE.
                15 OUTPUT-LINE OCCURS  15 TIMES.
                   2  OUTPUT-INAME       PIC X(24).
                   2  OUTPUT-STQTY       PIC s9(3).
                   2  OUTPUT-BORG        PIC  X(1).
                   2  OUTPUT-IPRICE      PIC s9(3)V9(2).
                   2  OUTPUT-OLAMNT      PIC s9(5)V9(2).
            5 NEWORDOUT2 REDEFINES DISPLAY-OUT.
              6  OUTPUT-FMT-NUM-2        PIC XX.
              6  CID2                   PIC X(4).
              6  CLAST                  PIC X(16).
              6  CCREDT                 PIC X(2).
              6  OID                    PIC S9(8).
            5 NEWORDOUT-TEMP REDEFINES DISPLAY-OUT.
              6   FILLER                PIC XX.
              6   TOTAL                 PIC S9(1 )V9(2).
              6   FILLER                PIC S9(6).
              6   FILLER                PIC X(16).
              6   FILLER                PIC X(2).
              6   CDCT-TEMP             PIC SV9999.
              6   FILLER                PIC S9(8).
              6   FILLER                PIC S9(2).
              6   WTAX-TEMP             PIC SV9999.
              6   DTAX-TEMP             PIC SV9999.

            5 PAYMENT-OUTDSP REDEFINES ATPCCDSPF-RECORD.
              6 OUTPUT-FMT-NUM-3      PIC XX.
              6 hdate    PIC s9(8).
              6 htime    pic s9(6).
              6 WADDR1   PIC X(2 ).
              6 DADDR1   PIC X(2 ).
              6 WADDR2   PIC X(2 ).
              6 DADDR2   PIC X(2 ).
              6 WH-DATA.
                8 WCITY    PIC X(2 ).
                8 WSTATE   PIC X( 2).
                8 WZIP     PIC X(1 ).
              6 DST-DATA.
                8 DCITY    PIC X(2 ).
                8 DSTATE   PIC X( 2).
                8 DZIP     PIC X(1 ).
              6 CID        PIC X(4).
              6 CIDN REDEFINES CID  PIC 9(4).
              6 PAYMENT-CUST-INFO.
                8 CFIRST   PIC X(16).
                8 CINIT    PIC X( 2).
                8 CLAST    PIC X(16).
                8 CLDATE   PIC S9(8).
                8 CADDR1   PIC X(2 ).
                8 CCREDT   PIC X( 2).
                8 CADDR2   PIC X(2 ).
              6 CDCT       PIC S99V99.
              6 PAYMENT-CUST-INFO2.
                8 CCITY    PIC X(2 ).
                8 CSTATE   PIC X( 2).
                8 CZIP     PIC X(1 ).
                8 CPHONE   PIC X(19).
              6 CBAL     PIC S9(1 )V9(2).
              6 PAYMNT   PIC S9(4)V9(2).
              6 CCRDLM   PIC S9(1 )V9(2).
              6 MISC-CDATA.
                8  CDAT1    PIC X(5 ).
                8  CDAT2    PIC X(5 ).
                8  CDAT3    PIC X(5 ).
                8  CDAT4    PIC X(5 ).
             5 PAYMENT-OUTDSP2 REDEFINES PAYMENT-OUTDSP.
              6 OUTPUT-FMT-NUM-4      PIC XX.
              6 HDATE    PIC S9(8).
              6 HTIME    PIC S9(6).
              6 WADDR1   PIC X(2 ).
              6 DADDR1   PIC X(2 ).
              6 WADDR2   PIC X(2 ).
              6 DADDR2   PIC X(2 ).
              6 WH-DATA.
                8 WCITY    PIC X(2 ).
                8 WSTATE   PIC X( 2).
                8 WZIP     PIC X(1 ).
              6 DST-DATA.
                8 DCITY    PIC X(2 ).
                8 DSTATE   PIC X( 2).
                8 DZIP     PIC X(1 ).
              6 CID        PIC X(4).
              6 PAYMENT-CUST-INFO.
                8 CFIRST   PIC X(16).
                8 CINIT    PIC X( 2).
                8 CLAST    PIC X(16).
                8 CLDATE   PIC S9(8).
                8 CADDR1   PIC X(2 ).
                8 CCREDT   PIC X( 2).
                8 CADDR2   PIC X(2 ).
              6 CDCT       PIC S99V99.
              6 PAYMENT-CUST-INFO2.
                8 CCITY    PIC X(2 ).
                8 CSTATE   PIC X( 2).
                8 CZIP     PIC X(1 ).
                8 CPHONE   PIC X(19).
              6 CBAL     PIC S99999V99.
              6 CCRDLM   PIC S99999V99.

            5  ORDSTS-OUTDSP2 REDEFINES ATPCCDSPF-RECORD.
               6 ORDSTS-FMT-NUM       PIC XX.
               6 OCID                PIC X(4).
               6 OCIDN REDEFINES OCID  PIC 9(4).
               6 CFIRST               PIC X(16).
               6 CINIT                PIC X(2).
               6 CLAST                PIC X(16).
               6 CBAL                 PIC S9(1 )V9(2).
               6 OID                  PIC S9(8).
               6 OENTDT               PIC S9(8).
               6 OENTTM               PIC S9(6).
               6 OCARID               PIC X(2).
               6 DO-LINE OCCURS 15 TIMES.
                 7 DO-OLSPWH          PIC X(4).
                 7 DO-OLIID           PIC X(6).
                 7 DO-OLQTY           PIC S9(3).
                 7 DO-OLAMNT          PIC S9(5)V9(2).
                 7 DO-OLDLVD          PIC S9(8).

           1 SNDTO-SRVR.
             3 TXNTYPE    PIC X.
             3 SNDJOBNM   PIC X(1 ).
             3 TXNDATA    PIC X(219).


      WORKING-STORAGE SECTION.


      CICS DEFINITIONS
        1 COMMAREAD PIC X(8 1).

         3 TRANS-TYPE.
          6 REGION       PIC S9(4) COMP-4.
          6 TTYPE        PIC S9(4) COMP-4.
          6 PRIORITY     PIC S9(4) COMP-4.
          6 LOAD-BALANCE  PIC S9(9) COMP-4.

         3 DATA-PTR   USAGE POINTER.

         3 DATA-TYPE.
          6 DATA-LEN     PIC S9(4) COMP-4.
          6 RESERVED     PIC X(1 ).
```

```
   6 DATA-DAT     PIC X(75 ).

 3 ERR-PTR USAGE POINTER.

 3 ERR-TYPE.
   6 BYTES-PROV    PIC S9(4) COMP-4.
   6 BYTES-AVAIL   PIC S9(4) COMP-4.
   6 EXCEPT-ID     PIC X(7).
   6 RESERVED      PIC X(1).


 1 DUMMYB    PIC X(4 ).

 1 PAYMNTT              PIC S9(4)V9(2).

 1 SPACES-STRUCT        PIC X(23 ) VALUE SPACES.
 1 SPACE-LINE.
      5 FILLER           PIC X(4) VALUE SPACES.
      5 FILLER           PIC X(6) VALUE SPACES.
      5 FILLER           PIC S9(3) VALUE ZEROS.
 1 FLAG PIC X.

 1  TWO-SPACES.
    3 FILLER       PIC XX VALUE SPACES.
 1  TWO-BIN-SPACES REDEFINES TWO-SPACES.
    3 BIN-SPACES    PIC 9(4) BINARY.
 1  TEMP-AMT  PIC 9V9999 COMP-3.
 1  DISPLAY-IN             PIC X(222) VALUE SPACES.
 1  DISPLAY-NEWORDIN REDEFINES DISPLAY-IN.
    6 CDID               PIC S9(2).
    6  DIST-NUM REDEFINES CDID   PIC 99.
    6 CID                PIC X(4).
    6 INPUT-TABLE.
      8 INPUT-LINE OCCURS 16 TIMES.
        1  INPUT-OLSPWH      PIC X(4).
        1  INPUT-OLIID       PIC X(6).
        1  INPUT-OLQTY       PIC 9(3).
    6 NEWORDER-DISTRICT      PIC X(2).
    6 NEWORDER-WID           PIC X(4).


 1  DISPLAY-ORDSTSIN REDEFINES DISPLAY-IN.
    6  HIDEIT               PIC XX.
    6  ODID                 PIC S9(2).
    6  OCID                 PIC X(4).
    6  CLAST                PIC X(16).
    6  ORDSTS-DISTRICT       PIC X(2).
    6  ORDSTS-WAREHOUSE      PIC X(4).

 1  DISPLAY-PAYMNTIN2.
       6  HIST-DATA.
          7  DID                 PIC S9(2).
          7  CID                 PIC X(4).
          7  CWID                PIC X(4).
          7  CDID                PIC S9(2).
       6  HDATA               PIC X(24).
       6  MISC-HDATA REDEFINES HDATA.
          8  CLAST               PIC X(16).
          8  PAYMNT              PIC S9(4)V9(2).
          8  FILLER              PIC X(2).
       6  HWID2               PIC X(4).
       6  HDATE               PIC S9(8).
       6  HTIME               PIC S9(6).
       6  TEMP-PAYMENT         PIC S9(7)V9(2).
       6  PAYMENT-DISTRICT      PIC X(2).
       6  PAYMENT-WAREHOUSE     PIC X(4).

 1 SLDATA.
    5 SLDATA-TERMINAL.
       6 FILLER             PIC XX.
       6 SLDATA-WID         PIC XXXX.
       6 FILLER             PIC XX.
       6 FILLER             PIC XX.
    5 SLDATA-THRSH          PIC S9(2).
    5 SLDATA-DIST           PIC X(2).

 1 SLRXDATA.
    5 SLRX-TERMINAL         PIC X(1 ).
    5 SLRX-BLWSTK           PIC S9(3).
    5 FILLER               PIC X(1).




 1  FORMAT-ID.
    5  FILLER         PIC X(6) VALUE "DSPREC".
    5  FMT-NUM        PIC X(2) VALUE SPACES.
    5  NUMBER-OF-ITEMS REDEFINES FMT-NUM
                      PIC 99.
 1 I                            PIC S999 BINARY.
 1 J                            PIC S999 BINARY.
 1 NUMBER-OF-ORDERLINES             PIC S999 BINARY.


 1 DATEINT.
    6 YY         PIC 9(2).
    6 MMDD       PIC 9(4).

 1 DATETIME.
    5 TPCDATE.
       6  TPCMD            PIC 9(4).
       6  TPCCEN           PIC 9(2) VALUE 19.
       6  TPCYEAR          PIC 9(2).
    5 CURTIME.
       6 CURTIME6          PIC 9(6).
       6 FILLER            PIC 9(2).

 1  TRANSACTION-CONTROL-AREA.
     5  FUNCTION-KEY         PIC XX.
     5  TERMINAL-ID          PIC X(1 ).
     5  FORMAT-NAME          PIC X(1 ).

 1 PRM-WH               PIC XXXX.
 1 PRM-DIST             PIC XX.
 1 PRM-WH-INT                   PIC 9999.
 1 TTEMP-PRM-WH                 PIC 9999.
 1 TEMP-PRM-WH REDEFINES TTEMP-PRM-WH PIC XXXX.


 1 SNDJOBNM    PIC X(1 ).


THE DATA STRUCTURES USED BY THE SERVER


 1  TRANSACTION-INPUT.
      6   TRANSACTION-TYPE    PIC X.
      6   CLIENT-INPUT       PIC X(195).
      6 NEWORD-I REDEFINES CLIENT-INPUT.
        8 CWID             PIC S9(4) COMP-4.
        8 CDID             PIC S9(2) COMP-4.
        8 CID              PIC S9(6) COMP-4.
        8 NUMBER-OF-ITEMS     PIC 9(2) BINARY.
        8 INPUT-LINE1 OCCURS 16 TIMES.
         1  OLSPWHI          PIC S9(4) COMP-4.
         1  OLIIDI           PIC S9(6) COMP-4.
         1  OLQTYI           PIC S9(2) COMP-4.
      6 PAYMENT-I REDEFINES CLIENT-INPUT.
        8 PAYMENT-TYPE       PIC X.
                            Payment type = C if by CID
                            Payment type = L if by CLAST
        8 HISTORY-DATA.
         9 PAY-DIST-KEY.
         1  DID             PIC S9(2) COMP-4.
         1  WID             PIC S9(4) COMP-4.
         9 PAY-CUST-KEY.
         1  CID             PIC S9(6) COMP-4.
         1  CDID            PIC S9(2) COMP-4.
         1  CWID            PIC S9(4) COMP-4.
         9 AMOUNT           PIC S9(5)V99 COMP-3.
        8 CLAST             PIC X(16).
        8 FILLER            PIC X(157).
      6 ORDSTS-I REDEFINES CLIENT-INPUT.
        8 ORDSTS-TYPE        PIC X.
        8 ORD-CUST-KEY.
         9 CID              PIC S9(6) COMP-4.
         9 DID              PIC S9(2) COMP-4.
         9 WID              PIC S9(4) COMP-4.
        8 CLAST             PIC X(16).
        8 FILLER            PIC X(165).
      6 STKLVL-I REDEFINES CLIENT-INPUT.
        8 WID               PIC S9(4) COMP-4.
        8 DID               PIC S9(2) COMP-4.
        8 THRESHOLD          PIC S9(2) COMP-4.
        8 BLWSTK            PIC S9(4) COMP-4.
      6 DLVRY-I REDEFINES CLIENT-INPUT.
        8 WID               PIC S9(4) COMP-4.
        8 CARRIER           PIC XX.
        8 D-TIME            PIC S9(8).
        8 D-DATE            PIC S9(6).

 1 PRM-DTAQLIB            PIC X(1 ).


ARRAY DECLARATION FOR HANDLING ORDER LINE RECORDS


 1 OLINEINF.
       7 DO-OLSPWH1          PIC S9(4) COMP-4.
       7 DO-OLIID1           PIC S9(6) COMP-4.
       7 DO-OLQTY1           PIC S9(2) COMP-4.
       7 DO-OLAMNT1          PIC S9(5)V9(2) COMP-3.
       7 DO-OLDLVD1          PIC S9(8).

 1 DOLINE.
       7 DO-OLSPWH2         PIC X(4).
       7 DO-OLIID2          PIC X(6).
       7 DO-OLQTY2          PIC S9(3).
       7 DO-OLAMNT2         PIC S9(5)V9(2).
       7 DO-OLDLVD2         PIC S9(8).


 1 DOLINE-NULL.
       7 DO-OLSPWH3         PIC X(4) VALUE SPACES.
       7 DO-OLIID3          PIC X(6) VALUE SPACES.
       7 DO-OLQTY3          PIC S9(3) VALUE  .
       7 DO-OLAMNT3         PIC S9(5)V9(2) VALUE  .
       7 DO-OLDLVD3         PIC S9(8) VALUE  .

  1 DQDATA.
    5 DQDATA-WHS  PIC X(4).
    5 DQDATA-CARR PIC X(2).
    5 DQDATA-BTIM PIC X(8).
    5 DQDATA-fill PIC X(6).


 1 RETURN-DATA.

 5 NEWORD-O.
      6   NEWORD-RESULT        PIC X.
      6   OENTTM              PIC S9(6).
      6   CLAST               PIC X(16).
      6   CCREDT              PIC X(2).
      6   CDCT                PIC S999V99 COMP-3.
      6   OID                 PIC S9(8) COMP-4.
      6   WTAX                PIC S9V9999 COMP-3.
      6   DTAX                PIC S9V9999 COMP-3.
      6   TOTAMT              PIC S9(9)V9(2) COMP-3.
      6  OUTPUT-TABLE.
       1  OUTPUT-LINE1 OCCURS  15 TIMES.
         15 OUTPUT-STQTY1       PIC S9(4) COMP-4.
         15 OUTPUT-BORG1        PIC  X(1).
         15 OUTPUT-ITEM-INFO.
           2  OUTPUT-INAME1      PIC X(24).
           2  OUTPUT-IPRICE1     PIC S9(3)V9(2) COMP-3.
        15 OUTPUT-OLAMNT1     PIC S9(5)V9(2) COMP-3.
      6 FILLER PIC X(116).
```

```
 1  PAYFROM-SRVR  REDEFINES RETURN-DATA.
     5 PAYDATABACK PIC X(527).
     5 PAYMNT-O REDEFINES PAYDATABACK.
       6 OUTPUT-FMT-NUM1-3     PIC XX.
                               17 = bad credit
                               18 = no cid or clast
                               19 = good credit
                               88 = bad last name
       6 HDATE    PIC S9(8).
       6 HTIME    pic S9(6).
       6 WH-DATA.
         8 WADDR1   PIC X(2 ).
         8 WADDR2   PIC X(2 ).
         8 WCITY    PIC X(2 ).
         8 WSTATE   PIC X( 2).
         8 WZIP    PIC X(9).
       6 DST-DATA.
         8 DADDR1   PIC X(2 ).
         8 DADDR2   PIC X(2 ).
         8 DCITY    PIC X(2 ).
         8 DSTATE   PIC X( 2).
         8 DZIP    PIC X(9).
       6 CID       PIC S9(6) COMP-4.
       6 PAYMENT-CUST-INFO.
          8 CFIRST   PIC X(16).
          8 CINIT    PIC X( 2).
          8 CLAST    PIC X(16).
          8 CLDATE   PIC S9(8).
          8 CADDR1   PIC X(2 ).
          8 CCREDT   PIC X( 2).
          8 CADDR2   PIC X(2 ).
          8 CDCT     PIC S9V9999 COMP-3.
          8 CCITY    PIC X(2 ).
          8 CSTATE   PIC X( 2).
          8 CZIP     PIC X(9).
          8 CPHONE   PIC X(16).
          8 CBAL     PIC S9(11)V9(2) COMP-3.
          8 CCRDLM   PIC S9(11)V9(2) COMP-3.
       6 MISC-CDATA.
          8  CDAT1    PIC X(5 ).
          8  CDAT2    PIC X(5 ).
          8  CDAT3    PIC X(5 ).
          8  CDAT4    PIC X(5 ).


 1  OS-FROM-SRVR  REDEFINES RETURN-DATA.
     5 OSDATABACK PIC X(512).
     5  ORDSTS-O REDEFINES OSDATABACK.
      6 ORDSTS-FMT-NUM1      PIC XX.
      6 OCID                PIC S9(6) COMP-4.
      6 CUSTINFO.
         8 CFIRST              PIC X(16).
         8 CINIT               PIC X(2).
         8 CLAST               PIC X(16).
      6 CBAL                PIC S9(11)V9(2) COMP-3.
      6 ORDERINFO.
         8 OID                 PIC S9(8) COMP-4.
         8 OENTDT              PIC S9(8).
         8 OENTTM              PIC S9(6).
         8 OCARID              PIC X(2).
         8 OLINENBR            PIC S9(2) COMP-4.
      6 OLINEINFO OCCURS 15 TIMES.
        7 DO-OLSPWH          PIC S9(4) COMP-4.
        7 DO-OLIID           PIC S9(6) COMP-4.
        7 DO-OLQTY           PIC S9(2) COMP-4.
        7 DO-OLAMNT          PIC S9(5)V9(2) COMP-3.
        7 DO-OLDLVD          PIC S9(8).
 1  SL-FROM-SRVR  REDEFINES RETURN-DATA.
     5 SLDATABACK PIC X(14).
     5 STKLVL-O REDEFINES SLDATABACK.
        6 FILLER               PIC X(2).
        6 BLWSTK               PIC S9(2) COMP-4.

 1 DL-FROM-SRVR REDEFINES RETURN-DATA.
      5 DLVRY-O.
         6 FILLER               PIC X(2).
         6 DELIVERY-STATUS       PIC X.


  1 DUMMYA   PIC X(4 ).
  1 FIRSTTIME      PIC X(1) VALUE "Y".


 THE DATA STRUCTURES USED BY THE SERVER



  LINKAGE SECTION FOR DATA PASSED TO THE PROGRAM

LINKAGE SECTION.

  1 PRM-JOBNAM             PIC X(1 ).
  1 PRM-WH1               PIC XXXX.
  1 PRM-DIST1             PIC XX.


PROCEDURE DIVISION USING PRM-JOBNAM, PRM-WH1, PRM-DIST1.



  MAIN-LINE-ROUTINE.

     PERFORM SET-UP-ROUTINE.
     PERFORM CMD-KEY-ROUTINE THRU
           CMD-KEY-ROUTINE-EXIT
       UNTIL FUNCTION-KEY = " 3".

     CLOSE DISPLAY-FILE.
     STOP RUN.



  CMD-KEY ROUTINE PERFORMS ALL DISPLAY FILE I/O AND
  DETERMINES WHAT TRANSACTION TYPE TO PROCESS.
```

```
CMD-KEY-ROUTINE.
      IF FUNCTION-KEY = " 3"
         GO TO CMD-KEY-ROUTINE-EXIT
      END-IF.

 WRITE SCREEN I/O RECORD WITH THE FOLLOWING WRITE STATEMENT

   WRITE DISPLAY-RECORD FORMAT IS FORMAT-ID.

 READ SCREEN I/O, PAYMENT RECORD IS DONE DIFFERETLY

   IF FORMAT-ID = "DSPREC88"
       READ DISPLAY-FILE INTO DISPLAY-PAYMNTIN2
           FORMAT IS FORMAT-ID
     ELSE
       READ DISPLAY-FILE INTO DISPLAY-IN
           FORMAT IS FORMAT-ID.


Check for transfer job request
 --TESTS FEEDBACK AREA FOR CA-KEY--



     IF FUNCTION-KEY = "  "
       IF  FORMAT-NAME = "DSPREC  "
         PERFORM HANDLE-NEWORD THRU HANDLE-NEWORD-EXIT

       ELSE
       IF FORMAT-NAME = "DSPREC88"
          PERFORM HANDLE-PAYMNT THRU HANDLE-PAYMNT-EXIT
          MOVE OUTPUT-FMT-NUM-3 TO FMT-NUM

       ELSE
       IF FORMAT-NAME = "DSPREC22"
         PERFORM HANDLE-DLVRY THRU HANDLE-DLVRY-EXIT
          MOVE "23" TO FMT-NUM

       ELSE
       IF FORMAT-NAME = "DSPREC3 "
        PERFORM HANDLE-ORDSTS THROUGH HANDLE-ORDSTS-EXIT
           MOVE ORDSTS-FMT-NUM  TO FMT-NUM


       ELSE
       IF FORMAT-NAME = "DSPREC5 "
         PERFORM HANDLE-STKLVL THRU HANDLE-STKLVL-EXIT
            MOVE "51" TO FMT-NUM

       ELSE
       IF  FORMAT-NAME = "DSPREC99"

            MOVE "  " TO FMT-NUM
            PERFORM HANDLE-NEWORD THRU HANDLE-NEWORD-EXIT

       END-IF.

     IF FUNCTION-KEY = " 1"
       MOVE "  " TO FMT-NUM
       MOVE PRM-WH TO CWID OF DSPREC  -O
       MOVE TPCDATE TO OENTDT OF DSPREC  -O
     ELSE

     IF FUNCTION-KEY = " 2"
       MOVE "88" TO FMT-NUM
       MOVE PRM-WH TO WID OF DSPREC88-O
     ELSE
     IF FUNCTION-KEY = " 4"
       MOVE "22" TO FMT-NUM
       MOVE PRM-WH TO WID OF DSPREC22-O
     ELSE
     IF FUNCTION-KEY = " 5"
       MOVE "3 " TO FMT-NUM
       MOVE PRM-WH TO OWID OF DSPREC3 -O
     ELSE
     IF FUNCTION-KEY = " 6"
       MOVE "5 "     TO FMT-NUM
       MOVE PRM-WH    TO DWID OF DSPREC5 -O
       MOVE PRM-DIST1 TO DID  OF DSPREC5 -O.
CMD-KEY-ROUTINE-EXIT.
    EXIT.

HANDLE-NEWORD.
   MOVE PRM-WH TO NEWORDER-WID OF DISPLAY-NEWORDIN.
       MOVE PRM-WH TO CWID OF NEWORD-I.
       MOVE CDID OF DISPLAY-NEWORDIN TO CDID OF NEWORD-I.
       MOVE CID OF DISPLAY-NEWORDIN TO CID OF NEWORD-I.
       MOVE SPACE-LINE TO INPUT-LINE(16).
       PERFORM VARYING I FROM
           1 BY 1 UNTIL INPUT-LINE(I) = SPACE-LINE
        IF INPUT-OLSPWH(I) = SPACES MOVE "62" TO HIDEME OF
         DSPREC62
         MOVE "62" TO FMT-NUM OF FORMAT-ID
         GO TO HANDLE-NEWORD-EXIT
        END-IF
             MOVE INPUT-OLSPWH(I) TO
           OLSPWHI(I)

        IF INPUT-OLIID(I) = SPACES MOVE "62" TO HIDEME OF
         DSPREC62
         MOVE "62" TO FMT-NUM OF FORMAT-ID
         GO TO HANDLE-NEWORD-EXIT
        END-IF
             MOVE INPUT-OLIID(I) TO
           OLIIDI(I)
        IF INPUT-OLQTY(I) =   MOVE "62" TO HIDEME OF
         DSPREC62
         MOVE "62" TO FMT-NUM OF FORMAT-ID
         GO TO HANDLE-NEWORD-EXIT
        END-IF
        MOVE INPUT-OLQTY(I) TO
           OLQTYI(I)
       END-PERFORM.
       SUBTRACT 1 FROM I GIVING NUMBER-OF-ORDERLINES.
       MOVE NUMBER-OF-ORDERLINES TO
```

```
                NUMBER-OF-ITEMS OF NEWORD-I.
                SUBTRACT I FROM 16 GIVING J.
          PERFORM J TIMES
            ADD 1 TO I GIVING I
            IF INPUT-LINE(I) NOT EQUAL SPACE-LINE
   MOVE "ID" TO FMT-NUM OF FORMAT-ID, OUTPUT-FMT-NUM-2
             GO TO HANDLE-NEWORD-EXIT
            END-IF
            END-PERFORM.

   MOVE "N" TO TXNTYPE OF SNDTO-SRVR.
   MOVE PRM-JOBNAM TO SNDJOBNM OF SNDTO-SRVR.
   MOVE NEWORD-I TO TXNDATA OF SNDTO-SRVR.

   SET DATA-PTR TO ADDRESS OF DATA-TYPE.
   SET ERR-PTR  TO ADDRESS OF ERR-TYPE.

   MOVE  1 TO REGION.
   MOVE 77 TO TTYPE.
   MOVE    TO PRIORITY.
   MOVE    TO LOAD-BALANCE.

   MOVE 23              TO DATA-LEN OF DATA-TYPE.
   MOVE SNDTO-SRVR(1:23 ) TO DATA-DAT OF DATA-TYPE.

   EXEC CICS LINK PROGRAM('AEGTMRUN') COMMAREA(COMMAREAD)
          LENGTH(8 1) END-EXEC.


   MOVE DATA-DAT(1:67 ) TO NEWORD-O.

   MOVE NUMBER-OF-ORDERLINES TO OLINES OF DISPLAY-OUT
        IF NEWORD-RESULT = "G"
        MOVE CLAST  OF NEWORD-O TO CLAST  OF DISPLAY-OUT
        MOVE CCREDT OF NEWORD-O TO CCREDT OF DISPLAY-OUT
        MOVE OID    OF NEWORD-O TO OID    OF DISPLAY-OUT
        MOVE OENTTM OF NEWORD-O TO OENTTM OF DISPLAY-OUT
        MOVE CDCT   OF NEWORD-O TO CDCT   OF DISPLAY-OUT
        MOVE WTAX   OF NEWORD-O TO WTAX   OF DISPLAY-OUT
        MOVE DTAX   OF NEWORD-O TO DTAX   OF DISPLAY-OUT
        MOVE TOTAMT OF NEWORD-O TO TOTAMT OF DISPLAY-OUT
        PERFORM VARYING I FROM
            1 BY 1 UNTIL I > NUMBER-OF-ORDERLINES
           MOVE OUTPUT-STQTY1(I) TO
                OUTPUT-STQTY(I)
           MOVE OUTPUT-BORG1(I)  TO
                OUTPUT-BORG(I)
           MOVE OUTPUT-INAME1(I) TO
                OUTPUT-INAME(I)
           MOVE OUTPUT-IPRICE1(I) TO
                OUTPUT-IPRICE(I)
           MOVE OUTPUT-OLAMNT1(I) TO
                OUTPUT-OLAMNT(I)
        END-PERFORM
   MOVE I TO NUMBER-OF-ITEMS OF FORMAT-ID
   MOVE FMT-NUM TO OUTPUT-FMT-NUM
   SUBTRACT CDCT-TEMP FROM 1 GIVING TEMP-AMT
   MULTIPLY TOTAL BY TEMP-AMT GIVING TOTAL ROUNDED
   ADD WTAX-TEMP TO 1 GIVING TEMP-AMT
   ADD DTAX-TEMP TO TEMP-AMT GIVING TEMP-AMT
   MULTIPLY TOTAL BY TEMP-AMT GIVING TOTAL ROUNDED
   ELSE IF NEWORD-RESULT = "R"
        MOVE CLAST  OF NEWORD-O TO CLAST  OF NEWORDOUT2
        MOVE CCREDT OF NEWORD-O TO CCREDT OF NEWORDOUT2
   MOVE CID OF DISPLAY-NEWORDIN TO CID2
   MOVE OID OF NEWORD-O TO OID OF NEWORDOUT2
   MOVE "RB" TO FMT-NUM OF FORMAT-ID, OUTPUT-FMT-NUM-2
   IF NEWORD-RESULT = "I"
   MOVE "ID" TO FMT-NUM OF FORMAT-ID, OUTPUT-FMT-NUM-2
   END-IF
   ELSE
       CALL "DLYFOREVER"
   END-IF.
HANDLE-NEWORD-EXIT.
   ADD   TO I GIVING I.
     EXIT.

HANDLE-PAYMNT.
   MOVE PRM-WH1  TO PAYMENT-WAREHOUSE
                    OF DISPLAY-PAYMNTIN2
        MOVE PRM-WH1 TO WID OF PAYMENT-I
        MOVE DID OF DISPLAY-PAYMNTIN2 TO DID OF PAYMENT-I
        MOVE CDID OF DISPLAY-PAYMNTIN2 TO CDID OF PAYMENT-I
   IF CID OF DISPLAY-PAYMNTIN2 EQUAL "    " MOVE "    " TO
     CID OF DISPLAY-PAYMNTIN2
   END-IF
   IF CID OF DISPLAY-PAYMNTIN2 NOT EQUAL "    "
     MOVE "C" TO PAYMENT-TYPE
   ELSE
     IF CLAST OF DISPLAY-PAYMNTIN2 NOT = SPACES
       MOVE "L" TO PAYMENT-TYPE
     ELSE
       MOVE "18" TO OUTPUT-FMT-NUM-3
       MOVE "18" TO HIDEME OF DSPREC18
       GO TO HANDLE-PAYMNT-EXIT
     END-IF
   END-IF
        MOVE CID OF DISPLAY-PAYMNTIN2 TO CID OF PAYMENT-I
        MOVE CWID OF DISPLAY-PAYMNTIN2 TO CWID OF PAYMENT-I
        MOVE PAYMNT OF DISPLAY-PAYMNTIN2 TO
            AMOUNT OF PAYMENT-I
        MOVE CLAST OF DISPLAY-PAYMNTIN2 TO
            CLAST OF PAYMENT-I

   MOVE "P"       TO TXNTYPE  OF SNDTO-SRVR.
   MOVE PRM-JOBNAM TO SNDJOBNM OF SNDTO-SRVR.
   MOVE PAYMENT-I  TO TXNDATA  OF SNDTO-SRVR.

   SET DATA-PTR TO ADDRESS OF DATA-TYPE.
   SET ERR-PTR  TO ADDRESS OF ERR-TYPE.

   MOVE  1 TO REGION.
   MOVE 88 TO TTYPE.
   MOVE    TO PRIORITY.
   MOVE    TO LOAD-BALANCE.

   MOVE 23              TO DATA-LEN OF DATA-TYPE.
   MOVE SNDTO-SRVR(1:23 ) TO DATA-DAT OF DATA-TYPE.

   EXEC CICS LINK PROGRAM('AEGTMRUN') COMMAREA(COMMAREAD)
          LENGTH(8 1) END-EXEC.

   MOVE DATA-DAT(1:67 ) TO PAYMNT-O.

        MOVE OUTPUT-FMT-NUM1-3 OF PAYMNT-O TO
            OUTPUT-FMT-NUM-3 OF PAYMENT-OUTDSP
        IF OUTPUT-FMT-NUM-3 OF PAYMENT-OUTDSP = "77"
        MOVE "77" TO HIDEME OF DSPREC77
        GO TO HANDLE-PAYMNT-EXIT.
        MOVE HDATE  OF PAYMNT-O TO HDATE OF PAYMENT-OUTDSP
        MOVE HTIME  OF PAYMNT-O TO HTIME OF PAYMENT-OUTDSP
        MOVE WADDR1 OF PAYMNT-O TO WADDR1 OF PAYMENT-OUTDSP
        MOVE WADDR2 OF PAYMNT-O TO WADDR2 OF PAYMENT-OUTDSP
        MOVE DADDR1 OF PAYMNT-O TO DADDR1 OF PAYMENT-OUTDSP
        MOVE DADDR2 OF PAYMNT-O TO DADDR2 OF PAYMENT-OUTDSP
        MOVE WCITY  OF PAYMNT-O TO WCITY  OF PAYMENT-OUTDSP
        MOVE WSTATE OF PAYMNT-O TO WSTATE OF PAYMENT-OUTDSP
        MOVE WZIP   OF PAYMNT-O TO WZIP   OF PAYMENT-OUTDSP
        MOVE DCITY  OF PAYMNT-O TO DCITY  OF PAYMENT-OUTDSP
        MOVE DSTATE OF PAYMNT-O TO DSTATE OF PAYMENT-OUTDSP
        MOVE DZIP   OF PAYMNT-O TO DZIP   OF PAYMENT-OUTDSP
        MOVE CID    OF PAYMNT-O TO CIDN   OF PAYMENT-OUTDSP
        MOVE CFIRST OF PAYMNT-O TO CFIRST OF PAYMENT-OUTDSP
        MOVE CINIT  OF PAYMNT-O TO CINIT  OF PAYMENT-OUTDSP
        MOVE CLAST  OF PAYMNT-O TO CLAST  OF PAYMENT-OUTDSP
        MOVE CLDATE OF PAYMNT-O TO CLDATE OF PAYMENT-OUTDSP
        MOVE CADDR1 OF PAYMNT-O TO CADDR1 OF PAYMENT-OUTDSP
        MOVE CADDR2 OF PAYMNT-O TO CADDR2 OF PAYMENT-OUTDSP
        MOVE CDCT   OF PAYMNT-O TO CDCT   OF PAYMENT-OUTDSP
        MOVE CCREDT OF PAYMNT-O TO CCREDT OF PAYMENT-OUTDSP
        MOVE CCITY  OF PAYMNT-O TO CCITY  OF PAYMENT-OUTDSP
        MOVE CSTATE OF PAYMNT-O TO CSTATE OF PAYMENT-OUTDSP
        MOVE CZIP   OF PAYMNT-O TO CZIP   OF PAYMENT-OUTDSP
        MOVE CPHONE OF PAYMNT-O TO CPHONE OF PAYMENT-OUTDSP
        MOVE CBAL   OF PAYMNT-O TO CBAL   OF PAYMENT-OUTDSP
        MOVE AMOUNT OF PAYMENT-I TO PAYMNT OF PAYMENT-OUTDSP
        MOVE CCRDLM OF PAYMNT-O TO CCRDLM OF PAYMENT-OUTDSP
        MOVE MISC-CDATA OF PAYMNT-O TO
            MISC-CDATA OF PAYMENT-OUTDSP.
HANDLE-PAYMNT-EXIT.
     EXIT.

HANDLE-DLVRY.
   MOVE OCARID OF DSPREC22-I TO CARRIER OF DLVRY-I.
   MOVE PRM-WH TO WID OF DLVRY-I.
   ACCEPT D-TIME OF DLVRY-I FROM TIME.

   MOVE "D"       TO TXNTYPE  OF SNDTO-SRVR.
   MOVE PRM-JOBNAM TO SNDJOBNM OF SNDTO-SRVR.
   MOVE DLVRY-I    TO TXNDATA  OF SNDTO-SRVR.

   SET DATA-PTR TO ADDRESS OF DATA-TYPE.
   SET ERR-PTR  TO ADDRESS OF ERR-TYPE.

   MOVE  1 TO REGION.
   MOVE 55 TO TTYPE.
   MOVE    TO PRIORITY.
   MOVE    TO LOAD-BALANCE.

   MOVE 23              TO DATA-LEN OF DATA-TYPE.
   MOVE SNDTO-SRVR(1:23 ) TO DATA-DAT OF DATA-TYPE.

   EXEC CICS LINK PROGRAM('AEGTMRUN') COMMAREA(COMMAREAD)
          LENGTH(8 1) END-EXEC.

HANDLE-DLVRY-EXIT.
     EXIT.

HANDLE-STKLVL.
   ACCEPT CURTIME FROM TIME.
   MOVE THRSH OF DSPREC5 -I TO SLDATA-THRSH OF SLDATA.
   MOVE PRM-DIST1 TO SLDATA-DIST OF SLDATA.
   MOVE PRM-WH1   TO SLDATA-WID  OF SLDATA.
        MOVE SLDATA-WID   TO WID      OF STKLVL-I
        MOVE SLDATA-DIST  TO DID      OF STKLVL-I
        MOVE SLDATA-THRSH TO THRESHOLD OF STKLVL-I

   MOVE "S"       TO TXNTYPE  OF SNDTO-SRVR.
   MOVE PRM-JOBNAM TO SNDJOBNM OF SNDTO-SRVR.
   MOVE STKLVL-I   TO TXNDATA  OF SNDTO-SRVR.

   SET DATA-PTR TO ADDRESS OF DATA-TYPE.
   SET ERR-PTR  TO ADDRESS OF ERR-TYPE.

   MOVE  1 TO REGION.
   MOVE 66 TO TTYPE.
   MOVE    TO PRIORITY.
   MOVE    TO LOAD-BALANCE.

   MOVE 23              TO DATA-LEN OF DATA-TYPE.
   MOVE SNDTO-SRVR(1:23 ) TO DATA-DAT OF DATA-TYPE.

   EXEC CICS LINK PROGRAM('AEGTMRUN') COMMAREA(COMMAREAD)
          LENGTH(8 1) END-EXEC.

   MOVE DATA-DAT(1:67 ) TO STKLVL-O.
   MOVE BLWSTK OF STKLVL-O TO SLRX-BLWSTK.
   IF BLWSTK OF STKLVL-O =   MOVE "  " TO SLRX-BLWSTK.
   MOVE SLRX-BLWSTK TO BLWSTK OF DSPREC51-O.
HANDLE-STKLVL-EXIT.
     EXIT.

HANDLE-ORDSTS.
   MOVE PRM-WH1 TO ORDSTS-WAREHOUSE OF DISPLAY-ORDSTSIN.
        MOVE ODID  OF DISPLAY-ORDSTSIN TO DID     OF ORDSTS-I
   IF OCID OF DISPLAY-ORDSTSIN EQUAL "    " MOVE "    " TO
     OCID OF DISPLAY-ORDSTSIN
   END-IF
   IF OCID OF DISPLAY-ORDSTSIN NOT EQUAL "    "
     MOVE "C" TO ORDSTS-TYPE
   ELSE
     IF CLAST OF DISPLAY-ORDSTSIN NOT = SPACES
```

```
          MOVE "L" TO ORDSTS-TYPE
        ELSE
          MOVE "31" TO ORDSTS-FMT-NUM
          MOVE "31" TO HIDEME OF DSPREC31
          GO TO HANDLE-ORDSTS-EXIT
        END-IF
      END-IF
          MOVE OCID  OF DISPLAY-ORDSTSIN TO CID     OF ORDSTS-I
          MOVE CLAST OF DISPLAY-ORDSTSIN TO CLAST    OF ORDSTS-I
          MOVE ORDSTS-WAREHOUSE         TO WID     OF ORDSTS-I


     MOVE "O"       TO TXNTYPE  OF SNDTO-SRVR.
     MOVE PRM-JOBNAM TO SNDJOBNM OF SNDTO-SRVR.
     MOVE ORDSTS-I   TO TXNDATA  OF SNDTO-SRVR.

     SET DATA-PTR TO ADDRESS OF DATA-TYPE.
     SET ERR-PTR  TO ADDRESS OF ERR-TYPE.

     MOVE  1 TO REGION.
     MOVE 44 TO TTYPE.
     MOVE    TO PRIORITY.
     MOVE    TO LOAD-BALANCE.

     MOVE 23              TO DATA-LEN OF DATA-TYPE.
     MOVE SNDTO-SRVR(1:23 ) TO DATA-DAT OF DATA-TYPE.

     EXEC CICS LINK PROGRAM('AEGTMRUN') COMMAREA(COMMAREAD)
          LENGTH(8 1) END-EXEC.

     MOVE DATA-DAT(1:67 ) TO ORDSTS-O.

          MOVE ORDSTS-FMT-NUM1 OF ORDSTS-O TO
              ORDSTS-FMT-NUM OF ORDSTS-OUTDSP2
          IF ORDSTS-FMT-NUM1 OF ORDSTS-O = "62"
             GO TO HANDLE-ORDSTS-EXIT
          END-IF.
          MOVE OENTTM OF ORDSTS-O TO OENTTM OF ORDSTS-OUTDSP2
          MOVE OENTDT OF ORDSTS-O TO OENTDT OF ORDSTS-OUTDSP2
          MOVE CLAST  OF ORDSTS-O TO CLAST  OF ORDSTS-OUTDSP2
          MOVE CFIRST OF ORDSTS-O TO CFIRST OF ORDSTS-OUTDSP2
          MOVE CINIT  OF ORDSTS-O TO CINIT  OF ORDSTS-OUTDSP2
          MOVE OID    OF ORDSTS-O TO OID    OF ORDSTS-OUTDSP2
          MOVE OCID   OF ORDSTS-O TO OCIDN  OF ORDSTS-OUTDSP2
          MOVE CBAL   OF ORDSTS-O TO CBAL   OF ORDSTS-OUTDSP2
          MOVE OCARID OF ORDSTS-O TO OCARID OF ORDSTS-OUTDSP2
          ADD 3  TO OLINENBR GIVING OLINENBR
        IF OLINENBR < 35 MOVE 35 TO NUMBER-OF-ITEMS OF FORMAT-ID
        ELSE MOVE OLINENBR TO NUMBER-OF-ITEMS OF FORMAT-ID
        END-IF
          MOVE FMT-NUM TO ORDSTS-FMT-NUM OF ORDSTS-OUTDSP2
          SUBTRACT 3  FROM OLINENBR GIVING OLINENBR
          PERFORM VARYING I FROM
              1 BY 1 UNTIL I > OLINENBR
          MOVE OLINEINFO(I) TO OLINEINF
              MOVE DO-OLSPWH1 TO DO-OLSPWH2
              MOVE DO-OLIID1 TO DO-OLIID2
              MOVE DO-OLQTY1 TO DO-OLQTY2
              MOVE DO-OLAMNT1 TO DO-OLAMNT2
              MOVE DO-OLDLVD1 TO DO-OLDLVD2
          MOVE DOLINE TO DO-LINE(I)
          END-PERFORM.
          PERFORM VARYING J FROM
              I BY 1 UNTIL J > 5
          MOVE DOLINE-NULL TO DO-LINE(J)
          END-PERFORM.
  HANDLE-ORDSTS-EXIT.

  SET-UP-ROUTINE.
     MOVE PRM-WH1 TO PRM-WH.
     MOVE PRM-DIST1 TO PRM-DIST.
  OPEN FILES
     OPEN I-O    DISPLAY-FILE.
   Following lines MUST wait for display-file to be opened.
     MOVE "99" TO FMT-NUM.
     ACCEPT DATEINT     FROM DATE.
     ACCEPT CURTIME FROM TIME.
     MOVE YY TO TPCYEAR.
     MOVE MMDD TO TPCMD.
     IF YY < 7  THEN
          MOVE 2  TO TPCCEN.
     MOVE  TPCDATE TO OENTDT OF DSPREC  -O.
     MOVE SPACE-LINE TO INPUT-LINE(16).
     MOVE  PRM-WH  TO CWID OF DSPREC  -O.

  END-OF-JOB.
     STOP RUN.
```

DLYFOREVER: Delay Forever

```
#include <stdlib.h>
#include <string.h>
#include <stdio.h>


void DLYFOREVER()
{
  char   cmd[16];


  memcpy(cmd,"DLYJOB DLY(9999)",16);
  cmd[16] = '\ ';

  if ( system(cmd) )
  {
  }

}
```

ATPCCDSPF: Screen Definition File

```
A %%TS  SD  1992 929  22 345  PPCOC      REL-V2R2M   5738-PW1
A  This is the screen definition file for ALL screens used
A    during execution of the TPC-C V2.  Specification.
A
A %%EC
A                               DSPSIZ(24 8   DS3)
A                               REF( LIBL/AREFFIL)
A                               CHGINPDFT(UL FE)
A                               CA 1
A                               CA 2
A                               CA 3
A                               CA 4
A                               CA 5
A                               CA 6
A DSPREC99 IS INITIAL SIGNON SCREEN - SETUP FOR NEWORD
A INPUT OR MENU SELECTION -ONLY TIME MENU IS WRITTEN-
A        R DSPREC99
A %%TS  SD  1992 83    82531  PPCOC      REL-V2R2M   5738-PW1
A                             1 36'New Order'
A                                DSPATR(HI)
A                             2  1'Warehouse:'
A          CWID     R       O  2 12REFFLD(CSRCD/CWID CSTMR)
A                             2 19'District:'
A          CDID     R       I  2 29REFFLD(DSPDID)
A                                CHECK(ME RZ)
A                             2 4 'Date:'
A          OENTDT   R       O  2 46REFFLD(ORRCD/OENTDT ORDERS)
A                                EDTWRD('  -  -    ')
A                             2 6 'Time:'
A                             2 66TIME
A                             3  1'Customer:'
A          CID           4D  I  3 12
A                                CHECK(RZ ME)
A                             3 19'Name:'
A                             3 44'Credit:'
A                             3 57'%Disc:'
A                             4  1'Order Number:'
A                             4 25'Number of Lines:'
A                             4 52'W_tax:'
A                             4 67'D_tax:'
A                             6  2'Supp-W'
A                             6 1 'Item Id'
A                             6 21'Qty'
A                             6 31'Item'
A                             6 36'Name'
A                             6 5 'Stock'
A                             6 57'B/G'
A                             6 63'Price'
A                             6 73'Amount'
A          OLSPWH1       4D  I  7  3
A                                CHECK(RZ ME)
A          OLIID1        6D  I  7 11
A                                CHECK(RZ ME)
A          OLQTY1   R        I  7 21REFFLD(DSPQTY)
A                                CHECK(RZ ME)
A          OLSPWH2       4D  I  8  3
A                                CHECK(RZ)
A          OLIID2        6D  I  8 11
A                                CHECK(RZ)
A          OLQTY2   R        I  8 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH3       4D  I  9  3
A                                CHECK(RZ)
A          OLIID3        6D  I  9 11
A                                CHECK(RZ)
A          OLQTY3   R        I  9 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH4       4D  I 1  3
A                                CHECK(RZ)
A          OLIID4        6D  I 1  11
A                                CHECK(RZ)
A          OLQTY4   R        I 1  21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH5       4D  I 11  3
A                                CHECK(RZ)
A          OLIID5        6D  I 11 11
A                                CHECK(RZ)
A          OLQTY5   R        I 11 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH6       4D  I 12  3
A                                CHECK(RZ)
A          OLIID6        6D  I 12 11
A                                CHECK(RZ)
A          OLQTY6   R        I 12 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH7       4D  I 13  3
A                                CHECK(RZ)
A          OLIID7        6D  I 13 11
A                                CHECK(RZ)
A          OLQTY7   R        I 13 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH8       4D  I 14  3
A                                CHECK(RZ)
A          OLIID8        6D  I 14 11
A                                CHECK(RZ)
A          OLQTY8   R        I 14 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH9       4D  I 15  3
A                                CHECK(RZ)
A          OLIID9        6D  I 15 11
A                                CHECK(RZ)
A          OLQTY9   R        I 15 21REFFLD(DSPQTY)
A                                CHECK(RZ)
A          OLSPWH1       4D  I 16  3
```

```
A                                     CHECK(RZ)
A          OLIID1        6D  I 16 11
A                                     CHECK(RZ)
A          OLQTY1    R       I 16 21REFFLD(DSPQTY)
A                                     CHECK(RZ)
A          OLSPWH11      4D  I 17  3
A                                     CHECK(RZ)
A          OLIID11       6D  I 17 11
A                                     CHECK(RZ)
A          OLQTY11   R       I 17 21REFFLD(DSPQTY)
A                                     CHECK(RZ)
A          OLSPWH12      4D  I 18  3
A                                     CHECK(RZ)
A          OLIID12       6D  I 18 11
A                                     CHECK(RZ)
A          OLQTY12   R       I 18 21REFFLD(DSPQTY)
A                                     CHECK(RZ)
A          OLSPWH13      4D  I 19  3
A                                     CHECK(RZ)
A          OLIID13       6D  I 19 11
A                                     CHECK(RZ)
A          OLQTY13   R       I 19 21REFFLD(DSPQTY)
A                                     CHECK(RZ)
A          OLSPWH14      4D  I 2   3
A                                     CHECK(RZ)
A          OLIID14       6D  I 2  11
A                                     CHECK(RZ)
A          OLQTY14   R       I 2  21REFFLD(DSPQTY)
A                                     CHECK(RZ)
A          OLSPWH15      4D  I 21  3
A                                     CHECK(RZ)
A          OLIID15       6D  I 21 11
A                                     CHECK(RZ)
A          OLQTY15   R       I 21 21REFFLD(DSPQTY)
A                                     CHECK(RZ)
A                               22  2'EXECUTION STATUS:'
A                               22 54'Total:'
A                               23  2'PF1-         PF2-        PF3-    -
A                                      PF4-        PF5-        PF6-'
A                               24  2'New Order    Payment     EXIT    -
A                                      Delivery    Order Status Stoc-
A                                  k Level'
A        R DSPREC
A %%TS  SD  1992 83    82531  PPCOC      REL-V2R2M   5738-PW1
A                                     CLRL(22)
A                               1 36'New Order'
A                                  DSPATR(HI)
A                               2  1'Warehouse:'
A          CWID      R       O  2 12REFFLD(CSRCD/CWID CSTMR)
A                               2 19'District:'
A          CDID      R       I  2 29REFFLD(DSPDID)
A                                  CHECK(ME RZ)
A                               2 4 'Date:'
A          OENTDT    R       O  2 46REFFLD(ORRCD/OENTDT ORDERS)
A                                  EDTWRD('  -  -    ')
A                               2 6 'Time:'
A                               2 66TIME
A                               3  1'Customer:'
A          CID            4D  I  3 12
A                                  CHECK(RZ ME)
A                               3 19'Name:'
A                               3 44'Credit:'
A                               3 57'%Disc:'
A                               4  1'Order Number:'
A                               4 25'Number of Lines:'
A                               4 52'W_tax:'
A                               4 67'D_tax:'
A                               6  2'Supp-W'
A                               6 1 'Item Id'
A                               6 21'Qty'
A                               6 31'Item'
A                               6 36'Name'
A                               6 5 'Stock'
A                               6 57'B/G'
A                               6 63'Price'
A                               6 73'Amount'
A          OLSPWH1       4D  I  7  3
A                                  CHECK(RZ ME)
A          OLIID1        6D  I  7 11
A                                  CHECK(RZ ME)
A          OLQTY1    R       I  7 21REFFLD(DSPQTY)
A                                  CHECK(RZ ME)
A          OLSPWH2       4D  I  8  3
A                                  CHECK(RZ)
A          OLIID2        6D  I  8 11
A                                  CHECK(RZ)
A          OLQTY2    R       I  8 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH3       4D  I  9  3
A                                  CHECK(RZ)
A          OLIID3        6D  I  9 11
A                                  CHECK(RZ)
A          OLQTY3    R       I  9 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH4       4D  I 1   3
A                                  CHECK(RZ)
A          OLIID4        6D  I 1  11
A                                  CHECK(RZ)
A          OLQTY4    R       I 1  21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH5       4D  I 11  3
A                                  CHECK(RZ)
A          OLIID5        6D  I 11 11
A                                  CHECK(RZ)
A          OLQTY5    R       I 11 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH6       4D  I 12  3
A                                  CHECK(RZ)
A          OLIID6        6D  I 12 11
A                                  CHECK(RZ)
A          OLQTY6    R       I 12 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH7       4D  I 13  3
A                                  CHECK(RZ)
A          OLIID7        6D  I 13 11
A                                  CHECK(RZ)
A          OLQTY7    R       I 13 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH8       4D  I 14  3
A                                  CHECK(RZ)
A          OLIID8        6D  I 14 11
A                                  CHECK(RZ)
A          OLQTY8    R       I 14 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH9       4D  I 15  3
A                                  CHECK(RZ)
A          OLIID9        6D  I 15 11
A                                  CHECK(RZ)
A          OLQTY9    R       I 15 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH1       4D  I 16  3
A                                  CHECK(RZ)
A          OLIID1        6D  I 16 11
A                                  CHECK(RZ)
A          OLQTY1    R       I 16 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH11      4D  I 17  3
A                                  CHECK(RZ)
A          OLIID11       6D  I 17 11
A                                  CHECK(RZ)
A          OLQTY11   R       I 17 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH12      4D  I 18  3
A                                  CHECK(RZ)
A          OLIID12       6D  I 18 11
A                                  CHECK(RZ)
A          OLQTY12   R       I 18 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH13      4D  I 19  3
A                                  CHECK(RZ)
A          OLIID13       6D  I 19 11
A                                  CHECK(RZ)
A          OLQTY13   R       I 19 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH14      4D  I 2   3
A                                  CHECK(RZ)
A          OLIID14       6D  I 2  11
A                                  CHECK(RZ)
A          OLQTY14   R       I 2  21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A          OLSPWH15      4D  I 21  3
A                                  CHECK(RZ)
A          OLIID15       6D  I 21 11
A                                  CHECK(RZ)
A          OLQTY15   R       I 21 21REFFLD(DSPQTY)
A                                  CHECK(RZ)
A                               22  2'EXECUTION STATUS:'
A                               22 54'Total:'
A        R DSPRECRB
A %%TS  SD  1992 819  111811  PPCOC      REL-V2R2M   5738-PW1
A                                  CLRL( NO)
A          HIDEME        2  H
A          CID       R       O  3 12REFFLD(CSRCD/CID   CSTMR)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          OID       R       O  4 15REFFLD(DSPOID)
A                               22 2 'ITEM NUMBER IS NOT VALID'
A                                  DSPATR(HI)
A        R DSPRECRC
A %%TS  SD  1992 819  111811  PPCOC      REL-V2R2M   5738-PW1
A                                  CLRL( NO)
A          HIDEME        2  H
A          CID       R       O  3 12REFFLD(CSRCD/CID   CSTMR)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          OID       R       O  4 15REFFLD(DSPOID)
A                               22 2 'SUPPLY WRHS IS NOT VALID'
A                                  DSPATR(HI)
A        R DSPRECRD
A %%TS  SD  1992 819  111811  PPCOC      REL-V2R2M   5738-PW1
A                                  CLRL( NO)
A          HIDEME        2  H
A          CID       R       O  3 12REFFLD(CSRCD/CID   CSTMR)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          OID       R       O  4 15REFFLD(DSPOID)
A                               22 2 'ITEM QTY IS NOT VALID'
A                                  DSPATR(HI)
A        R DSPREC 2
A %%TS  SD  1992 929  22 345  PPCOC      REL-V2R2M   5738-PW1
A                                  CLRL( NO)
A          HIDEME        2  H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL  CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT          4Y 2O  3 64EDTCDE(1)
A          OID       R       O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX          4Y 2O  4 59EDTCDE(1)
A          DTAX          4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1         1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 3
A %%TS  SD  1992 929  22 345  PPCOC      REL-V2R2M   5738-PW1
A                                  CLRL( NO)
A          HIDEME        2  H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT          4Y 2O  3 64EDTCDE(1)
A          OID       R       O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX          4Y 2O  4 59EDTCDE(1)
A          DTAX          4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1         1A  O  7 58
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A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 4
A %%TS  SD  1992 929  22 345  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME        2  H
A          TOTAMT   R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM   R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST    R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT   R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT         4Y 2O  3 64EDTCDE(1)
A          OID      R       O  4 15REFFLD(DSPOID)
A          OLINES   R       O  4 42REFFLD(DSPOLN)
A          WTAX         4Y 2O  4 59EDTCDE(1)
A          DTAX         4Y 2O  4 74EDTCDE(1)
A          INAME1   R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1   R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3   R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3   R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3  R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3  R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 5
A %%TS  SD  1992 929  22 345  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME        2  H
A          TOTAMT   R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM   R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST    R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT   R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT         4Y 2O  3 64EDTCDE(1)
A          OID      R       O  4 15REFFLD(DSPOID)
A          OLINES   R       O  4 42REFFLD(DSPOLN)
A          WTAX         4Y 2O  4 59EDTCDE(1)
A          DTAX         4Y 2O  4 74EDTCDE(1)
A          INAME1   R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1   R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3   R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3   R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3  R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3  R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4   R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4   R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4  R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4  R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 6
A %%TS  SD  1992 929  22 345  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME        2  H
A          TOTAMT   R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM   R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST    R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT   R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT         4Y 2O  3 64EDTCDE(1)
A          OID      R       O  4 15REFFLD(DSPOID)
A          OLINES   R       O  4 42REFFLD(DSPOLN)
A          WTAX         4Y 2O  4 59EDTCDE(1)
A          DTAX         4Y 2O  4 74EDTCDE(1)
A          INAME1   R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1   R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3   R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3   R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3  R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3  R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4   R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4   R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4  R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4  R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5   R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5   R       O 11 51REFFLD(QTY3)
A          BORG5        1A  O 11 58
A          IPRICE5  R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5  R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 7
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME        2  H
A          TOTAMT   R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM   R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST    R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT   R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT         4Y 2O  3 64EDTCDE(1)
A          OID      R       O  4 15REFFLD(DSPOID)
A          OLINES   R       O  4 42REFFLD(DSPOLN)
A          WTAX         4Y 2O  4 59EDTCDE(1)
A          DTAX         4Y 2O  4 74EDTCDE(1)
A          INAME1   R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1   R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3   R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3   R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3  R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3  R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4   R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4   R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4  R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4  R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5   R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5   R       O 11 51REFFLD(QTY3)
A          BORG5        1A  O 11 58
A          IPRICE5  R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5  R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6   R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6   R       O 12 51REFFLD(QTY3)
A          BORG6        1A  O 12 58
A          IPRICE6  R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6  R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 8
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME        2  H
A          TOTAMT   R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM   R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST    R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT   R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT         4Y 2O  3 64EDTCDE(1)
A          OID      R       O  4 15REFFLD(DSPOID)
A          OLINES   R       O  4 42REFFLD(DSPOLN)
A          WTAX         4Y 2O  4 59EDTCDE(1)
A          DTAX         4Y 2O  4 74EDTCDE(1)
A          INAME1   R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1   R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3   R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3   R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3  R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3  R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4   R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4   R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4  R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4  R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5   R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5   R       O 11 51REFFLD(QTY3)
A          BORG5        1A  O 11 58
A          IPRICE5  R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5  R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6   R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6   R       O 12 51REFFLD(QTY3)
A          BORG6        1A  O 12 58
A          IPRICE6  R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6  R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7   R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7   R       O 13 51REFFLD(QTY3)
A          BORG7        1A  O 13 58
A          IPRICE7  R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7  R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC 9
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME        2  H
A          TOTAMT   R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM   R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST    R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT   R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT         4Y 2O  3 64EDTCDE(1)
A          OID      R       O  4 15REFFLD(DSPOID)
A          OLINES   R       O  4 42REFFLD(DSPOLN)
A          WTAX         4Y 2O  4 59EDTCDE(1)
A          DTAX         4Y 2O  4 74EDTCDE(1)
A          INAME1   R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1   R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1  R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1  R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2   R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2   R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2  R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2  R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3   R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3   R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3  R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3  R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4   R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4   R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4  R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4  R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5   R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5   R       O 11 51REFFLD(QTY3)
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A          BORG5         1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6         1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7         1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8         1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC1
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                 CLRL( NO)
A          HIDEME        2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT          4Y 2O  3 64EDTCDE(1)
A          OID       R     O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX          4Y 2O  4 59EDTCDE(1)
A          DTAX          4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1         1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2         1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
A          BORG3         1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4         1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5         1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6         1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7         1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8         1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9         1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC11
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                 CLRL( NO)
A          HIDEME        2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT          4Y 2O  3 64EDTCDE(1)
A          OID       R     O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX          4Y 2O  4 59EDTCDE(1)
A          DTAX          4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1         1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2         1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
A          BORG3         1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4         1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5         1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6         1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7         1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8         1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9         1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME1    R       O 16 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O 16 51REFFLD(QTY3)
A          BORG1         1A  O 16 58
A          IPRICE1   R       O 16 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT91  R       O 16 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC12
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                 CLRL( NO)
A          HIDEME        2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT          4Y 2O  3 64EDTCDE(1)
A          OID       R     O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX          4Y 2O  4 59EDTCDE(1)
A          DTAX          4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1         1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2         1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
A          BORG3         1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4         1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5         1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6         1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7         1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8         1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9         1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME1    R       O 16 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O 16 51REFFLD(QTY3)
A          BORG1         1A  O 16 58
A          IPRICE1   R       O 16 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT11  R       O 17 25REFFLD(ITRCD/INAME ITEM)
A          STQTY11   R       O 17 51REFFLD(QTY3)
A          BORG11        1A  O 17 58
A          IPRICE11  R       O 17 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT11  R       O 17 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC13
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                 CLRL( NO)
A          HIDEME        2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT          4Y 2O  3 64EDTCDE(1)
A          OID       R     O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX          4Y 2O  4 59EDTCDE(1)
A          DTAX          4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1         1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2         1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
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A          BORG3        1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5        1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6        1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7        1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8        1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9        1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME1    R       O 16 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O 16 51REFFLD(QTY3)
A          BORG1        1A  O 16 58
A          IPRICE1   R       O 16 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O 16 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME11   R       O 17 25REFFLD(ITRCD/INAME ITEM)
A          STQTY11   R       O 17 51REFFLD(QTY3)
A          BORG11       1A  O 17 58
A          IPRICE11  R       O 17 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT11  R       O 17 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME12   R       O 18 25REFFLD(ITRCD/INAME ITEM)
A          STQTY12   R       O 18 51REFFLD(QTY3)
A          BORG12       1A  O 18 58
A          IPRICE12  R       O 18 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT12  R       O 18 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC14
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME         2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT           4Y 2O  3 64EDTCDE(1)
A          OID       R       O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX           4Y 2O  4 59EDTCDE(1)
A          DTAX           4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5        1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6        1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7        1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8        1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9        1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME1    R       O 16 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O 16 51REFFLD(QTY3)
A          BORG1        1A  O 16 58
A          IPRICE1   R       O 16 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O 16 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME11   R       O 17 25REFFLD(ITRCD/INAME ITEM)
A          STQTY11   R       O 17 51REFFLD(QTY3)
A          BORG11       1A  O 17 58
A          IPRICE11  R       O 17 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT11  R       O 17 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME12   R       O 18 25REFFLD(ITRCD/INAME ITEM)
A          STQTY12   R       O 18 51REFFLD(QTY3)
A          BORG12       1A  O 18 58
A          IPRICE12  R       O 18 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT12  R       O 18 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME13   R       O 19 25REFFLD(ITRCD/INAME ITEM)
A          STQTY13   R       O 19 51REFFLD(QTY3)
A          BORG13       1A  O 19 58
A          IPRICE13  R       O 19 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT13  R       O 19 71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC15
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME         2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT           4Y 2O  3 64EDTCDE(1)
A          OID       R       O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX           4Y 2O  4 59EDTCDE(1)
A          DTAX           4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
A          BORG3        1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4        1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5        1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6        1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7        1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8        1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9        1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME1    R       O 16 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O 16 51REFFLD(QTY3)
A          BORG1        1A  O 16 58
A          IPRICE1   R       O 16 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O 16 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME11   R       O 17 25REFFLD(ITRCD/INAME ITEM)
A          STQTY11   R       O 17 51REFFLD(QTY3)
A          BORG11       1A  O 17 58
A          IPRICE11  R       O 17 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT11  R       O 17 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME12   R       O 18 25REFFLD(ITRCD/INAME ITEM)
A          STQTY12   R       O 18 51REFFLD(QTY3)
A          BORG12       1A  O 18 58
A          IPRICE12  R       O 18 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT12  R       O 18 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME13   R       O 19 25REFFLD(ITRCD/INAME ITEM)
A          STQTY13   R       O 19 51REFFLD(QTY3)
A          BORG13       1A  O 19 58
A          IPRICE13  R       O 19 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT13  R       O 19 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME14   R       O 2  25REFFLD(ITRCD/INAME ITEM)
A          STQTY14   R       O 2  51REFFLD(QTY3)
A          BORG14       1A  O 2  58
A          IPRICE14  R       O 2  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT14  R       O 2  71REFFLD(OLRCD/OLAMNT ORDLIN)
A        R DSPREC16
A %%TS  SD  1992 819   81833  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME         2   H
A          TOTAMT    R       O 22 61REFFLD(CSRCD/CBAL CSTMR)
A          OENTTM    R       O  2 66REFFLD(ORRCD/OENTTM ORDERS)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          CDCT           4Y 2O  3 64EDTCDE(1)
A          OID       R       O  4 15REFFLD(DSPOID)
A          OLINES    R       O  4 42REFFLD(DSPOLN)
A          WTAX           4Y 2O  4 59EDTCDE(1)
A          DTAX           4Y 2O  4 74EDTCDE(1)
A          INAME1    R       O  7 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O  7 51REFFLD(QTY3)
A          BORG1        1A  O  7 58
A          IPRICE1   R       O  7 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O  7 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME2    R       O  8 25REFFLD(ITRCD/INAME ITEM)
A          STQTY2    R       O  8 51REFFLD(QTY3)
A          BORG2        1A  O  8 58
A          IPRICE2   R       O  8 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT2   R       O  8 71REFFLD(OLRCD/OLAMNT ORDLIN)
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A          INAME3    R       O  9 25REFFLD(ITRCD/INAME ITEM)
A          STQTY3    R       O  9 51REFFLD(QTY3)
A          BORG3         1A  O  9 58
A          IPRICE3   R       O  9 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT3   R       O  9 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME4    R       O 1  25REFFLD(ITRCD/INAME ITEM)
A          STQTY4    R       O 1  51REFFLD(QTY3)
A          BORG4         1A  O 1  58
A          IPRICE4   R       O 1  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT4   R       O 1  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME5    R       O 11 25REFFLD(ITRCD/INAME ITEM)
A          STQTY5    R       O 11 51REFFLD(QTY3)
A          BORG5         1A  O 11 58
A          IPRICE5   R       O 11 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT5   R       O 11 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME6    R       O 12 25REFFLD(ITRCD/INAME ITEM)
A          STQTY6    R       O 12 51REFFLD(QTY3)
A          BORG6         1A  O 12 58
A          IPRICE6   R       O 12 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT6   R       O 12 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME7    R       O 13 25REFFLD(ITRCD/INAME ITEM)
A          STQTY7    R       O 13 51REFFLD(QTY3)
A          BORG7         1A  O 13 58
A          IPRICE7   R       O 13 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT7   R       O 13 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME8    R       O 14 25REFFLD(ITRCD/INAME ITEM)
A          STQTY8    R       O 14 51REFFLD(QTY3)
A          BORG8         1A  O 14 58
A          IPRICE8   R       O 14 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT8   R       O 14 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME9    R       O 15 25REFFLD(ITRCD/INAME ITEM)
A          STQTY9    R       O 15 51REFFLD(QTY3)
A          BORG9         1A  O 15 58
A          IPRICE9   R       O 15 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT9   R       O 15 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME1    R       O 16 25REFFLD(ITRCD/INAME ITEM)
A          STQTY1    R       O 16 51REFFLD(QTY3)
A          BORG1         1A  O 16 58
A          IPRICE1   R       O 16 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT1   R       O 16 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME11   R       O 17 25REFFLD(ITRCD/INAME ITEM)
A          STQTY11   R       O 17 51REFFLD(QTY3)
A          BORG11        1A  O 17 58
A          IPRICE11  R       O 17 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT11  R       O 17 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME12   R       O 18 25REFFLD(ITRCD/INAME ITEM)
A          STQTY12   R       O 18 51REFFLD(QTY3)
A          BORG12        1A  O 18 58
A          IPRICE12  R       O 18 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT12  R       O 18 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME13   R       O 19 25REFFLD(ITRCD/INAME ITEM)
A          STQTY13   R       O 19 51REFFLD(QTY3)
A          BORG13        1A  O 19 58
A          IPRICE13  R       O 19 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT13  R       O 19 71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME14   R       O 2  25REFFLD(ITRCD/INAME ITEM)
A          STQTY14   R       O 2  51REFFLD(QTY3)
A          BORG14        1A  O 2  58
A          IPRICE14  R       O 2  62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT14  R       O 2  71REFFLD(OLRCD/OLAMNT ORDLIN)
A          INAME15   R       O 21 25REFFLD(ITRCD/INAME ITEM)
A          STQTY15   R       O 21 51REFFLD(QTY3)
A          BORG15        1A  O 21 58
A          IPRICE15  R       O 21 62REFFLD(ITRCD/IPRICE ITEM)
A          OLAMNT15  R       O 21 71REFFLD(OLRCD/OLAMNT ORDLIN)
A   Payment Screen
A   INITIAL INPUT SCREEN
A         R DSPREC88
A                                   CLRL(22)
A                                 1 38'Payment'
A                                 2  1'Date:'
A                                 4  1'Warehouse:'
A          WID       R       O  4 12REFFLD(WRRCD/WID WRHS)
A                                 4 42'District:'
A          DID       R       I  4 52REFFLD(DSPDID)
A                                   CHECK(ME RZ)
A                                 9  1'Customer:'
A          CID           4D  I  9 11
A                                   DSPATR(MDT)
A                                   CHECK(RZ)
A                                 9 17'Cust-Warehouse:'
A          CWID          4D  I  9 33
A                                   CHECK(RZ ME)
A                                 9 39'Cust-District:'
A          CDID      R       I  9 54REFFLD(DSPDID)
A                                   CHECK(ME RZ)
A                                 1  1'Name:'
A          CLAST     R       I 1   9REFFLD(CSRCD/CLAST CSTMR)
A                                 1  5 'Since:'
A                                 11 5 'Credit:'
A                                 12 5 '%Disc:'
A                                 13 5 'Phone:'
A                                 15  1'Amount Paid:'
A          PAYMNT        6Y 2I 15 15TEXT('Amount')
A                                   CHECK(RZ ME)
A                                 15 37'New Cust Balance:'
A                                 16  1'Credit Limit:'
A                                 18  1'Cust-Data:'
A   PAYMENT OUTPUT DISPLAY
A         R DSPREC17
A                                   CLRL( NO)
A          HIDEME         2  H
A          HDATE     R       O  2  7REFFLD(HSRCD/HDATE HSTRY)
A          HTIME     R       O  2 18REFFLD(HSRCD/HTIME HSTRY)
A          WADDR1    R       O  5  1REFFLD(WRRCD/WADDR1 WRHS)
A          DADDR1    R       O  5 42REFFLD(DSRCD/DADDR1 DSTRCT)
A          WADDR2    R       O  6  1REFFLD(WRRCD/WADDR2 WRHS)
A          DADDR2    R       O  6 42REFFLD(DSRCD/DADDR2 DSTRCT)
A          WCITY     R       O  7  1REFFLD(WRRCD/WCITY WRHS)
A          WSTATE    R       O  7 22REFFLD(WRRCD/WSTATE WRHS)
A          WZIP      R       O  7 25REFFLD(WRRCD/WZIP   WRHS)
A          DCITY     R       O  7 42REFFLD(DSRCD/DCITY  DSTRCT)
A          DSTATE    R       O  7 62REFFLD(DSRCD/DSTATE DSTRCT)
A          DZIP      R       O  7 66REFFLD(DSRCD/DZIP   DSTRCT)
A          CID       R       O  9 11REFFLD(CSRCD/CID   CSTMR)
A          CFIRST    R       O 1   9REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O 1  26REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O 1  29REFFLD(CSRCD/CLAST CSTMR)
A          CLDATE    R       O 1  58REFFLD(CSRCD/CLDATE CSTMR)
A          CADDR1    R       O 11  9REFFLD(CSRCD/CADDR1 CSTMR)
A          CCREDT    R       O 11 58REFFLD(CSRCD/CCREDT CSTMR)
A          CADDR2    R       O 12  9REFFLD(CSRCD/CADDR2 CSTMR)
A          CDCT          4  2O 12 58EDTCDE(1)
A          CCITY     R       O 13  9REFFLD(CSRCD/CCITY CSTMR)
A          CSTATE    R       O 13 3 REFFLD(CSRCD/CSTATE CSTMR)
A          CZIP      R       O 13 33REFFLD(CSRCD/CZIP CSTMR)
A          CPHONE        19A  O 13 58
A          CBAL      R       O 15 55REFFLD(CSRCD/CBAL CSTMR)
A          PAYMNT        6Y 2O 15 15EDTCDE(J $)
A          CCRDLM    R       O 16 15REFFLD(CSRCD/CCRDLM CSTMR)
A   The next 4 fields are Logical Version of CDATA via COBOL renames.
A          CDAT1         5    O 18 12
A          CDAT2         5    O 19 12
A          CDAT3         5    O 2  12
A          CDAT4         5    O 21 12
A         R DSPREC18
A                                   CLRL( NO)
A          HIDEME         2  H
A                                 22 2 'ENTER CID OR CLAST'
A                                   DSPATR(HI)
A   PAYMENT OUTPUT DISPLAY WITHOUT BAD CREDIT STUFF
A         R DSPREC19
A                                   CLRL( NO)
A          HIDEME         2  H
A          HDATE     R       O  2  7REFFLD(HSRCD/HDATE HSTRY)
A          HTIME     R       O  2 18REFFLD(HSRCD/HTIME HSTRY)
A          WADDR1    R       O  5  1REFFLD(WRRCD/WADDR1 WRHS)
A          DADDR1    R       O  5 42REFFLD(DSRCD/DADDR1   DSTRCT)
A          WADDR2    R       O  6  1REFFLD(WRRCD/WADDR2 WRHS)
A          DADDR2    R       O  6 42REFFLD(DSRCD/DADDR2   DSTRCT)
A          WCITY     R       O  7  1REFFLD(WRRCD/WCITY   WRHS)
A          WSTATE    R       O  7 22REFFLD(WRRCD/WSTATE WRHS)
A          WZIP      R       O  7 25REFFLD(WRRCD/WZIP   WRHS)
A          DCITY     R       O  7 42REFFLD(DSRCD/DCITY  DSTRCT)
A          DSTATE    R       O  7 62REFFLD(DSRCD/DSTATE DSTRCT)
A          DZIP      R       O  7 66REFFLD(DSRCD/DZIP   DSTRCT)
A          CID       R       O  9 11REFFLD(CSRCD/CID   CSTMR)
A          CFIRST    R       O 1   9REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O 1  26REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O 1  29REFFLD(CSRCD/CLAST CSTMR)
A          CLDATE    R       O 1  58REFFLD(CSRCD/CLDATE CSTMR)
A          CADDR1    R       O 11  9REFFLD(CSRCD/CADDR1 CSTMR)
A          CCREDT    R       O 11 58REFFLD(CSRCD/CCREDT CSTMR)
A          CADDR2    R       O 12  9REFFLD(CSRCD/CADDR2 CSTMR)
A          CDCT          4  2O 12 58EDTCDE(1)
A          CCITY     R       O 13  9REFFLD(CSRCD/CCITY CSTMR)
A          CSTATE    R       O 13 3 REFFLD(CSRCD/CSTATE CSTMR)
A          CZIP      R       O 13 33REFFLD(CSRCD/CZIP CSTMR)
A          CPHONE        19A  O 13 58
A          CBAL      R       O 15 55REFFLD(CSRCD/CBAL CSTMR)
A          PAYMNT        6Y 2O 15 15EDTCDE(J $)
A          CCRDLM    R       O 16 15REFFLD(CSRCD/CCRDLM CSTMR)

     ORDER STATUS DISPLAYS DSPREC3 (INPUT) DSPREC35-45(OUTPUT)

A   Order Status INPUT Screen
A         R DSPREC3
A                                   CLRL(22)
A          HIDEME         2  H
A                                   1 35'Order-Status'
A                                   DSPATR(HI)
A                                 2  1'Warehouse:'
A          OWID      R       O  2 12REFFLD(ORRCD/OWID   ORDERS)
A                                 2 19'District:'
A          ODID      R       I  2 29REFFLD(DSPDID)
A                                   CHECK(ME RZ)
A                                 3  1'Customer:'
A          OCID          4D  I  3 11
A                                   CHECK(RZ)
A                                 3 18'Name:'
A          CLAST     R       I  3 44REFFLD(CSRCD/CLAST CSTMR)
A                                 4  1'Cust-Balance:'
A                                 6  1'Order Number:'
A                                 6 26'Entry Date:'
A                                 6 6 'Carrier Number:'
A                                 7  1'Supply W'
A                                 7 14'Item Id'
A                                 7 25'Qty'
A                                 7 33'Amount'
A                                 7 45'Delivery Date'
A         R DSPREC31
A                                   CLRL( NO)
A          HIDEME         2  H
A                                 22 2 'ENTER CID OR CLAST'
A                                   DSPATR(HI)
A   ORDER STATUS OUTPUT SCREEN
A         R DSPREC35                CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1  15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1  25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1  31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1  47REFFLD(OLRCD/OLDLVD ORDLIN)
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A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC36                CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC37                CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC38                CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC39                CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC4                 CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
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A          OLQTY3    R       O 1  25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1  31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1  47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
A          OLAMNT9   R       O 16 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD9   R       O 16 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH1   R       O 17  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O 17 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O 17 25REFFLD(DSPQTY)
A          OLAMNT1   R       O 17 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O 17 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC41                 CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
A          OLAMNT9   R       O 16 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD9   R       O 16 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH1   R       O 17  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O 17 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O 17 25REFFLD(DSPQTY)
A          OLAMNT1   R       O 17 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O 17 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH11  R       O 18  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID11   R       O 18 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY11   R       O 18 25REFFLD(DSPQTY)
A          OLAMNT11  R       O 18 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD11  R       O 18 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC42                 CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
A          OLAMNT9   R       O 16 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD9   R       O 16 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH1   R       O 17  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O 17 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O 17 25REFFLD(DSPQTY)
A          OLAMNT1   R       O 17 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O 17 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH11  R       O 18  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID11   R       O 18 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY11   R       O 18 25REFFLD(DSPQTY)
A          OLAMNT11  R       O 18 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD11  R       O 18 47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A          R DSPREC43                 CLRL( NO)
A          HIDEME         2  H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL  CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
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A          OLAMNT9   R       O 16 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD9   R       O 16 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH1   R       O 17  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O 17 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O 17 25REFFLD(DSPQTY)
A          OLAMNT1   R       O 17 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O 17 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH11  R       O 18  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID11   R       O 18 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY11   R       O 18 25REFFLD(DSPQTY)
A          OLAMNT11  R       O 18 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD11  R       O 18 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH12  R       O 19  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID12   R       O 19 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY12   R       O 19 25REFFLD(DSPQTY)
A          OLAMNT12  R       O 19 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD12  R       O 19 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH13  R       O 2   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID13   R       O 2  15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY13   R       O 2  25REFFLD(DSPQTY)
A          OLAMNT13  R       O 2  31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD13  R       O 2  47REFFLD(OLRCD/OLDLVD ORDLIN)
A    ORDER STATUS OUTPUT SCREEN
A        R DSPREC44                CLRL( NO)
A          HIDEME         2   H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
A          OLAMNT9   R       O 16 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD9   R       O 16 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH1   R       O 17  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O 17 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O 17 25REFFLD(DSPQTY)
A          OLAMNT1   R       O 17 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O 17 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH11  R       O 18  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID11   R       O 18 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY11   R       O 18 25REFFLD(DSPQTY)
A          OLAMNT11  R       O 18 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD11  R       O 18 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH12  R       O 19  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID12   R       O 19 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY12   R       O 19 25REFFLD(DSPQTY)
A          OLAMNT12  R       O 19 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD12  R       O 19 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH13  R       O 2   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID13   R       O 2  15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY13   R       O 2  25REFFLD(DSPQTY)
A          OLAMNT13  R       O 2  31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD13  R       O 2  47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH14  R       O 21  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID14   R       O 21 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY14   R       O 21 25REFFLD(DSPQTY)
A          OLAMNT14  R       O 21 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD14  R       O 21 47REFFLD(OLRCD/OLDLVD ORDLIN)
A
A    ORDER STATUS OUTPUT SCREEN
A        R DSPREC45                CLRL( NO)
A          HIDEME         2   H
A          OCID      R       O  3 11REFFLD(ORRCD/OCID   ORDERS)
A          CFIRST    R       O  3 24REFFLD(CSRCD/CFIRST CSTMR)
A          CINIT     R       O  3 41REFFLD(CSRCD/CINIT CSTMR)
A          CLAST     R       O  3 44REFFLD(CSRCD/CLAST CSTMR)
A          CBAL      R       O  4 15REFFLD(CSRCD/CBAL CSTMR)
A          OID       R       O  6 15REFFLD(DSPOID)
A          OENTDT    R       O  6 38REFFLD(ORRCD/OENTDT ORDERS)
A          OENTTM    R       O  6 49REFFLD(ORRCD/OENTTM ORDERS)
A          OCARID    R       O  6 76REFFLD(ORRCD/OCARID ORDERS)
A          OLSPWH1   R       O  8  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O  8 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O  8 25REFFLD(DSPQTY)
A          OLAMNT1   R       O  8 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O  8 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH2   R       O  9  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID2    R       O  9 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY2    R       O  9 25REFFLD(DSPQTY)
A          OLAMNT2   R       O  9 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD2   R       O  9 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH3   R       O 1   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID3    R       O 1   15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY3    R       O 1   25REFFLD(DSPQTY)
A          OLAMNT3   R       O 1   31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD3   R       O 1   47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH4   R       O 11  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID4    R       O 11 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY4    R       O 11 25REFFLD(DSPQTY)
A          OLAMNT4   R       O 11 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD4   R       O 11 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH5   R       O 12  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID5    R       O 12 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY5    R       O 12 25REFFLD(DSPQTY)
A          OLAMNT5   R       O 12 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD5   R       O 12 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH6   R       O 13  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID6    R       O 13 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY6    R       O 13 25REFFLD(DSPQTY)
A          OLAMNT6   R       O 13 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD6   R       O 13 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH7   R       O 14  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID7    R       O 14 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY7    R       O 14 25REFFLD(DSPQTY)
A          OLAMNT7   R       O 14 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD7   R       O 14 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH8   R       O 15  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID8    R       O 15 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY8    R       O 15 25REFFLD(DSPQTY)
A          OLAMNT8   R       O 15 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD8   R       O 15 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH9   R       O 16  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID9    R       O 16 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY9    R       O 16 25REFFLD(DSPQTY)
A          OLAMNT9   R       O 16 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD9   R       O 16 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH1   R       O 17  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID1    R       O 17 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY1    R       O 17 25REFFLD(DSPQTY)
A          OLAMNT1   R       O 17 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD1   R       O 17 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH11  R       O 18  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID11   R       O 18 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY11   R       O 18 25REFFLD(DSPQTY)
A          OLAMNT11  R       O 18 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD11  R       O 18 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH12  R       O 19  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID12   R       O 19 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY12   R       O 19 25REFFLD(DSPQTY)
A          OLAMNT12  R       O 19 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD12  R       O 19 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH13  R       O 2   3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID13   R       O 2  15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY13   R       O 2  25REFFLD(DSPQTY)
A          OLAMNT13  R       O 2  31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD13  R       O 2  47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH14  R       O 21  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID14   R       O 21 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY14   R       O 21 25REFFLD(DSPQTY)
A          OLAMNT14  R       O 21 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD14  R       O 21 47REFFLD(OLRCD/OLDLVD ORDLIN)
A          OLSPWH15  R       O 22  3REFFLD(OLRCD/OLSPWH ORDLIN)
A          OLIID15   R       O 22 15REFFLD(OLRCD/OLIID ORDLIN)
A          OLQTY15   R       O 22 25REFFLD(DSPQTY)
A          OLAMNT15  R       O 22 31REFFLD(OLRCD/OLAMNT ORDLIN)
A          OLDLVD15  R       O 22 47REFFLD(OLRCD/OLDLVD ORDLIN)
A
A  DELIVERY INPUT SCREEN
A
A        R DSPREC22
A                                CLRL(22)
A                              1 38'Delivery'
A                                DSPATR(HI)
A                              2  1'Warehouse:'
A          WID       R       O  2 12REFFLD(ORRCD/OWID   ORDERS)
A                              4  1'Carrier Number:'
A                                DSPATR(HI)
A          OCARID         2D  I  4 17
A                                CHECK(RZ ME)
A
A   DELIVERY RESPONSE SCREEN
A
A        R DSPREC23                CLRL( NO)
A                              6  1'Execution Status:'
A                              6 19'Delivery has been queued'
A   Stock Level INPUT SCREEN
A        R DSPREC5
A %%TS  SD  19921  2  17213   PPCOC      REL-V2R2M   5738-PW1
A                                CLRL(22)
A                              1 35'Stock-Level'
A                              2  1'Warehouse:'
A          DWID      R       O  2 12REFFLD(DSRCD/DWID   DSTRCT)
A                              2 19'District:'
A          DID       R       O  2 29REFFLD(DSPDID)
A                              4  1'Stock Level Threshold:'
A          THRSH          2Y  I  4 24CHECK(ME RZ)
A                              6  1'low stock found:'
A   Stock Level Screen
A        R DSPREC51                CLRL( NO)
A          BLWSTK         3Y  O  6 18EDTWRD('   ')
A        R DSPRECID
A %%TS  SD  1992 819  111811  PPCOC      REL-V2R2M   5738-PW1
A                                CLRL( NO)
A          HIDEME         2   H
A          CID       R       O  3 12REFFLD(CSRCD/CID   CSTMR)
A          CLAST     R       O  3 25REFFLD(CSRCD/CLAST CSTMR)
```

```
A          CCREDT    R       O  3 52REFFLD(CSRCD/CCREDT CSTMR)
A          OID       R       O  4 15REFFLD(DSPOID)
A                              22 2 'INPUT DATA  IS NOT VALID'
A                                   DSPATR(HI)
A        R DSPREC77
A                                   CLRL( NO)
A          HIDEME        2   H
A                              22 2 'INPUT DATA  IS NOT VALID'
A                                   DSPATR(HI)
A        R DSPREC62
A                                   CLRL( NO)
A          HIDEME        2   H
A                              22 2 'INPUT DATA  IS NOT VALID'
A                                   DSPATR(HI)
```

DLVRICFF: Delivery ICF File on Client

```
A
A
A           ICF file for DELIVERY transaction
A
A
A   File level indicators:
A
A                                INDARA
A
A
A           ICF RECORD FORMATS
A
A        R RCVDATA                TEXT('DATA RECEIVED FROM -
A                                REMOTE SYSTEM.')
A          RCVFLD      67 A       TEXT('NEW ORD RCV FIELD')
A        R SNDDATA                TEXT('DATA SENT TO THE   -
A                                REMOTE SYSTEM.')
A  1                             FRCDTA
A          SNDFLD      23 A       TEXT('TRANSACTION DATA')
A        R EVOKPGM                TEXT('EVOKE THE TARGET   -
A                                PROGRAM.')
A                                SECURITY(3  USER)
A                                EVOKE(TPCCNCSRVR/ATPCCMTRD)
A        R ENDREC
```

MAINICFF: Neworder/Payment/Order Status ICF Files on Client

```
A
A
A           ICF FILE FOR MAIN TRANSACTIONS
A
A
A   File level indicators:
A
A                                INDARA
A
A                               RCVTRNRND(15 'END OF DATA')
A
A  3                             DETACH
A
A                               INDTXT(3  '3 ->DETACH TARG-
A                               ET PROGRAM.')
A
A                               RCVDETACH(35 'RECEIVED    -
A                               DETACHED.')
A
A
A
A           ICF RECORD FORMATS
A
A        R RCVDATA                TEXT('DATA RECEIVED FROM -
A                                REMOTE SYSTEM.')
A          RCVFLD      67 A       TEXT('NEW ORD RCV FIELD')
A        R SNDDATA                TEXT('DATA SENT TO THE   -
A                                REMOTE SYSTEM.')
A                                INVITE
A          SNDFLD      23 A       TEXT('TRANSACTION DATA')
A        R EVOKPGM                TEXT('EVOKE THE TARGET   -
A                                PROGRAM.')
A                                EVOKE(TPCCNCSRVR/ATPCCMTRA)
A                                SECURITY(3  USER)
A        R ENDREC
```

STOCICFF: Stock Level ICF File on Client

```
A
A
A           ICF file for DELIVERY transaction
A
A
```

```
A   File level indicators:
A
A                                INDARA
A
A                               RCVTRNRND(15 'END OF DATA')
A
A  3                             DETACH
A
A                               INDTXT(3  '3 ->DETACH TARG-
A                               ET PROGRAM.')
A
A                               RCVDETACH(35 'RECEIVED    -
A                               DETACHED.')
A
A
A
A           ICF RECORD FORMATS
A
A        R RCVDATA                TEXT('DATA RECEIVED FROM -
A                                REMOTE SYSTEM.')
A          RCVFLD      67 A       TEXT('NEW ORD RCV FIELD')
A        R SNDDATA                TEXT('DATA SENT TO THE   -
A                                REMOTE SYSTEM.')
A                                INVITE
A          SNDFLD      23 A       TEXT('TRANSACTION DATA')
A        R EVOKPGM                TEXT('EVOKE THE TARGET   -
A                                PROGRAM.')
A                                SECURITY(3  USER)
A                                EVOKE(TPCCNCSRVR/ATPCCMTRS)
A        R ENDREC
```

ATPCCMTRD: Delivery Start Program

```
     PGM

     DCL       VAR(&DATALIB) TYPE( CHAR) LEN(1 ) +
                VALUE(TPCCD697)

     ADDLIBLE   LIB(&DATALIB)
     MONMSG CPF21 3
     CHGJOB     RUNPTY(34)
     STRCMTCTL  LCKLVL( ALL)

     OVRDBF     FILE(ORDERSLF) TOFILE(ORDERSLF) +
                LVLCHK( NO) SHARE( NO)

     OVRDBF     FILE(NEWORDLF) TOFILE(NEWORDLF) +
                LVLCHK( NO) SHARE( NO) NBRRCDS(1 )

     OVRDBF     FILE(CSTMR) TOFILE(CSTMR) LVLCHK( NO) +
                SHARE( NO)

     OVRDBF     FILE(DLVRYLOG) TOFILE(DLVRYLOG) LVLCHK( NO) +
                SHARE( NO)

     OVRDBF     FILE(ORDLINLF) TOFILE(ORDLINLF) +
                LVLCHK( NO) SHARE( NO) +
                SEQONLY( NO) NBRRCDS(12 )

     CALL       PGM(TPCCNCSRVR/DLVRYMTR)

     ENDCMTCTL

     ENDPGM
```

DLVRYMTR: Batch Portion of Delivery Transaction

```
PROCESS NOTRUNC NORANGE.
IDENTIFICATION DIVISION.
  PROGRAM-ID. DLVRY.
  AUTHOR. PPCOC.
  INSTALLATION. IBM-ROCHESTER.
  DATE-WRITTEN.
  DATE-COMPILED.

   C H A N G E S    &     U P D A T E S

   LATEST CHANGES LISTED FIRST

   MM/DD/YY   AUTHOR NAME         LINES CHANGED/ADDED: NNN


     DESCRIPTION OF CHANGE:



ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
  SOURCE-COMPUTER. IBM-AS4  .
  SOURCE-COMPUTER. IBM-AS4   WITH DEBUGGING MODE.
  OBJECT-COMPUTER. IBM-AS4  .
INPUT-OUTPUT SECTION.
FILE-CONTROL.
     SELECT DLVRICFF ASSIGN TO WORKSTATION-DLVRICFF-SI
         ORGANIZATION IS TRANSACTION
         FILE STATUS IS STATUS-IND MAJ-MIN.
   SELECT NEWORD
         ASSIGN TO DATABASE-NEWORDLF
```

```
           ORGANIZATION IS INDEXED
           ACCESS MODE IS DYNAMIC
           RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
           WITH DUPLICATES
           FILE STATUS IS NEWORD-FILE-STATUS.
      SELECT DISTRICT-FILE
           ASSIGN TO DATABASE-DSTRCT
           ORGANIZATION IS INDEXED
           ACCESS MODE IS RANDOM
           RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
           WITH DUPLICATES.
      SELECT ORDERS
           ASSIGN TO DATABASE-ORDERSLF
           ORGANIZATION IS INDEXED
           ACCESS MODE IS RANDOM
           RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
           WITH DUPLICATES.
      SELECT ORDERLINE
           ASSIGN TO DATABASE-ORDLINLF
           ORGANIZATION IS INDEXED
           ACCESS MODE IS DYNAMIC
           RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
           WITH DUPLICATES.
      SELECT CSTMR
           ASSIGN TO DATABASE-CSTMR
           ORGANIZATION IS INDEXED
           ACCESS MODE IS RANDOM
           RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
           WITH DUPLICATES.
      SELECT DLVRYLOG
           ASSIGN TO DATABASE-DLVRYLOG
           ORGANIZATION IS SEQUENTIAL.
D     SELECT ISO-IFILE
D          ASSIGN TO DATABASE-ISOIFILE
D          ORGANIZATION IS SEQUENTIAL
D          ACCESS IS SEQUENTIAL.
D     SELECT DBUG-FILE
D          ASSIGN TO FORMATFILE-DBUGPRT2
D          ORGANIZATION IS SEQUENTIAL
D          ACCESS IS SEQUENTIAL.
 I-O-CONTROL.
     COMMITMENT CONTROL FOR ORDERS ORDERLINE
                        DISTRICT-FILE CSTMR NEWORD.

 DATA DIVISION.
 FILE SECTION.
   FD  DLVRICFF
      LABEL RECORDS ARE STANDARD.
    1  ICFREC.
      COPY DDS-ALL-FORMATS OF DLVRICFF.

    5 DLVRY-O REDEFINES DLVRICFF-RECORD.
       6 FILLER               PIC X(2).
       6 DELIVERY-STATUS       PIC X.


 FD  NEWORD
     LABEL RECORDS ARE STANDARD
     DATA RECORD IS NEWORD-RECORD.
  1  NEWORD-RECORD.
     COPY DDS-NORCD OF NEWORDLF.
 FD DISTRICT-FILE
      LABEL RECORDS ARE STANDARD.
  1 DISTRICT-RECORD.
      COPY DDS-DSRCD OF DSTRCT.
 FD  ORDERS
     LABEL RECORDS ARE STANDARD
     DATA RECORD IS ORDERS-RECORD.
  1  ORDERS-RECORD.
     COPY DDS-ORRCD OF ORDERSLF.
 FD  ORDERLINE
     LABEL RECORDS ARE STANDARD.
  1  ORDERLINE-RECORD.
     COPY DDS-OLRCD OF ORDLINLF.
 FD  CSTMR
     LABEL RECORDS ARE STANDARD
     DATA RECORD IS CSTMR-RECORD.
  1  CSTMR-RECORD.
     COPY DDS-CSRCD OF CSTMR.
 FD  DLVRYLOG
     LABEL RECORDS ARE STANDARD
     DATA RECORD IS DLVRYLOG-RECORD.
  1  DLVRYLOG-RECORD.
     COPY DDS-LGRCD OF DLVRYLOG.
      5 LOG-REDEF REDEFINES LGRCD.
          6       TIMEB    PIC S9(8).
          6       TIMEA    PIC S9(8).
          6       UNDEL    PIC S9.
          6       WID      PIC S9(4) COMP-4.

DFD  DBUG-FILE
D    LABEL RECORDS ARE STANDARD
D    DATA RECORD IS DBUG-REC2.
D    1  DBUGPRT-REC2.
D    COPY DDS-DBUGRCD2 OF DBUGPRT2.
D       5  DBUG-REC2 REDEFINES DBUGRCD2-O.
D          6  DEBUG-DATA.
D              7  ISONUMBER            PIC 99.
D              7  TXTDATA              PIC X(4 ).
D              7  WID                  PIC S9(4).
D              7  DID                  PIC S9(2).
D              7  DATE6                PIC 9(8).
D              7  TIME6                PIC 9(6).
D              7  CID                  PIC S9(4).
D              7  CWID                 PIC S9(4).
D              7  CDID                 PIC S9(2).
D              7  CBAL                 PIC S9(11)V99.
D              7  PAYMNT               PIC S9(7)V99.
DFD  ISO-IFILE
D    LABEL RECORDS ARE STANDARD.
D 1  ISOIFILE-RECORD.
D    COPY DDS-ISOIRCD OF ISOIFILE.
D     5 ISO-IREC REDEFINES ISOIRCD.
D       6 ISOINUM PIC S9(4) COMP-4.

 WORKING-STORAGE SECTION.

  1 CSTMR-KEY.
    3 CSTMR-KEY-DATA OCCURS 5 TIMES.
       5  KNAM   PIC X(1 ).
       5  KVAL   PIC S9(9) COMP-4.

  1 CSTMR-HASH-PTR   USAGE POINTER.

  1 CSTMR-HASH-NAME  PIC X(1 ).
  1 FUNCT           PIC X(1).
  1 KEYS            PIC S9(9) COMP-4.
  1 RET-CODE        PIC S9(9) COMP-4.

  1  RET-CODE-PTR   USAGE POINTER.
  1  CSTMR-DEF-PTR  USAGE POINTER.
  1  CSTMR-KEY-PTR  USAGE POINTER.

D 1  CBAL2            PIC S9(11)V99 COMP-3.
D 1  ISOVALUE         PIC S999 COMP-3 VALUE  .

  1 UPDATER             PIC X(1) VALUE "3".
  1 FETCHR              PIC X(1) VALUE "1".
  1 FETCHUPDATE         PIC X(1) VALUE "2".

  1 CUST-KEYS           pic 9(1) comp-4 vALUE 3.
  1 STOCK-KEYS          pic 9(1) comp-4 VALUE 2.
  1 ITEM-KEYS           pic 9(1) comp-4 VALUE 1.



   1   TRANSACTION-INPUT.
         6    TXN-TYPE          PIC X.
         6    JOBNAME           PIC X(1 ).
         6    CLIENT-INPUT      PIC X(2 2).
         6 DLVRY-I REDEFINES CLIENT-INPUT.
           8 WID                PIC S9(4) COMP-4.
           8 CARRIER            PIC XX.
           8 D-TIME             PIC 9(8).
           8 D-DATE             PIC 9(6).

 77  STATUS-IND            PIC X(2).
 77  MAJ-MIN-SAV           PIC X(4).
 77  INDON                 PIC 1 VALUE B"1".
 77  INDOFF                PIC 1 VALUE B" ".
 77  LEN                   PIC 9(1 )V9(5) COMP.

  1 CMNF-INDIC-AREA.
    5  CMNF-INDIC         PIC 1 OCCURS 99 TIMES
                          INDICATOR 1.
  1 MAJ-MIN.
    5 MAJ                 PIC X(2).
    5 MIN                 PIC X(2).

  1  TPCDATE.
    5 TPCDATEDD       PIC  99.
    5 TPCDATEMM       PIC  99.
    5 TPCDATECC       PIC  99.
    5 TPCDATEYY       PIC  99.
  1  CURTIME.
    5 CURTIME6       PIC 9(6).
    5 FILLER         PIC 9(2).
  1  DATEINT.
    5 DATEIYY         PIC  99.
    5 DATEIMM         PIC  99.
    5 DATEIDD         PIC  99.

  1 DQDATA-FRM-CLNT.
    5 DQDATA-WHS  PIC S9(4) COMP-4.
    5 DQDATA-CARR PIC X(2).
    5 DQDATA-BTIM PIC S9(8).
    5 DQDATA-fill PIC S9(6).

D   1 TESTNUM               PIC 99 VALUE 1.

  1 OLINES-LEFT  PIC S9(2) COMP-4.

 77  ORDAMT PIC 9(9)V99.

  1  FILE-STATUS-ERROR-CDS.
    5  NEWORD-FILE-STATUS    PIC X(2).
  1  ORDERS-DELIVERED-TABLE.
      1  ORDER-LINE OCCURS 1  TIMES.
        15 ELEMENT-DISTRICT    PIC S99.
        15 ELEMENT-ORDER       PIC S9(6).
 77  WHS   PIC X(4).

 LINKAGE SECTION.

 PROCEDURE DIVISION.

 DELIVERY-PROGRAM.

     OPEN I-O NEWORD.
     OPEN I-O DISTRICT-FILE.
     OPEN I-O ORDERS.
     OPEN I-O CSTMR.
     OPEN I-O ORDERLINE.
     OPEN I-O DLVRICFF.
     OPEN EXTEND DLVRYLOG.
D    OPEN OUTPUT DBUG-FILE.
D    OPEN INPUT ISO-IFILE.

     MOVE "CSTMR"  TO CSTMR-HASH-NAME.
     MOVE "CID"    TO KNAM OF CSTMR-KEY-DATA(1).
     MOVE "CDID"   TO KNAM OF CSTMR-KEY-DATA(2).
     MOVE "CWID"   TO KNAM OF CSTMR-KEY-DATA(3).

     SET CSTMR-HASH-PTR TO ADDRESS OF CSTMR-HASH-NAME.
     SET RET-CODE-PTR   TO ADDRESS OF RET-CODE.
     SET CSTMR-DEF-PTR  TO ADDRESS OF CSTMR-RECORD.
     SET CSTMR-KEY-PTR  TO ADDRESS OF CSTMR-KEY.

 PROCESS-DELIVERY.
```

```
     READ DLVRICFF
     INTO TRANSACTION-INPUT INDICATORS ARE CMNF-INDIC-AREA.
     IF MAJ = "81"
        GO TO SHUTDOWN
     END-IF.

     MOVE DLVRY-I TO DQDATA-FRM-CLNT.

     MOVE D-TIME OF DLVRY-I TO LOGTIMEB OF DLVRYLOG-RECORD.

D    READ ISO-IFILE.
D    MOVE ISOINUM TO ISONUMBER, ISOVALUE.
     MOVE     TO NODID.
     MOVE     TO NOOID.
     MOVE " " TO UNDELDST.
     MOVE DQDATA-WHS TO NOWID, OWID, OLWID, CWID OF CSTMR-RECORD.
     MOVE DQDATA-WHS TO DWID.

     IF DQDATA-CARR = "99" THEN
       PERFORM SHUTDOWN.

     MOVE DQDATA-CARR TO OCARID.


     ACCEPT DATEINT    FROM DATE.
     Move "19" to TPCDatecc.
     If dateiyy < "7 " then
       Move "2 " to TPCDatecc.
     Move   DATEIYY     TO TPCDATEYY.
     Move   DATEIMM     TO TPCDATEMM.
     Move   DATEIDD    TO TPCDATEDD.

     ACCEPT CURTIME FROM TIME.

   THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
   FLAG IS SET AND IS FOR ISOLATION TEST USE

D    MOVE "DEL PRE-READ  " TO TXTDATA.
D    MOVE 1 TO CDID OF DBUG-REC2.
D    MOVE DQDATA-WHS TO CWID OF DBUG-REC2.
D    MOVE   TO CID OF DBUG-REC2.
D    MOVE 1 TO DID OF DBUG-REC2.
D    MOVE   TO PAYMNT OF DBUG-REC2.
D    MOVE DQDATA-WHS TO WID OF DBUG-REC2.
D    MOVE   TO CBAL OF DBUG-REC2.
D    MOVE CURTIME6 TO TIME6.
D    MOVE TPCDATE TO DATE6.
D    WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2".
     PERFORM 1  TIMES

       MOVE   TO ORDAMT
       ADD 1 TO NODID
       READ NEWORD
       IF NEWORD-FILE-STATUS = "23"
          MOVE NODID TO DID OF DISTRICT-RECORD
          READ DISTRICT-FILE
          READ NEWORD
          END-IF
D      IF NEWORD-FILE-STATUS = "23"
D        ACCEPT CURTIME FROM TIME
D        MOVE CURTIME6 TO TIME6
D        MOVE TPCDATE TO DATE6
D        MOVE NODID TO DID OF DBUG-REC2
D        MOVE "DEL NO NEWORDER" TO TXTDATA
D        WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2"
D        CALL "delayme"
D        READ NEWORD
D        ACCEPT CURTIME FROM TIME
D        MOVE CURTIME6 TO TIME6
D        MOVE TPCDATE TO DATE6
D        MOVE "DEL NO NEWORD2" TO TXTDATA
D        WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2"
D        END-IF
         IF NEWORD-FILE-STATUS = "23"
           MOVE "1" TO UNDELDST
         ELSE
           MOVE NODID TO ODID, OLDID, CDID OF CSTMR-RECORD
           MOVE NOOID TO OID, OLOID

           READ ORDERS
           MOVE DQDATA-CARR TO OCARID
           REWRITE ORDERS-RECORD

           READ ORDERLINE
           MOVE TPCDATE TO OLDLVD
           MOVE CURTIME6 TO OLDLVT
           REWRITE ORDERLINE-RECORD
           ADD OLAMNT TO ORDAMT

           SUBTRACT 1 FROM OLINES GIVING OLINES-LEFT

           PERFORM OLINES-LEFT TIMES
                READ ORDERLINE NEXT
                MOVE TPCDATE TO OLDLVD
                MOVE CURTIME6 TO OLDLVT
                REWRITE ORDERLINE-RECORD
                ADD OLAMNT TO ORDAMT
           END-PERFORM


         MOVE OCID TO CID OF CSTMR-RECORD
         MOVE CID  OF CSTMR-RECORD TO KVAL OF CSTMR-KEY-DATA(1)
         MOVE CDID OF CSTMR-RECORD TO KVAL OF CSTMR-KEY-DATA(2)
         MOVE CWID OF CSTMR-RECORD TO KVAL OF CSTMR-KEY-DATA(3)

           CALL "qdbrunha" USING BY VALUE
           CSTMR-HASH-PTR FETCHUPDATE CUST-KEYS CSTMR-KEY-PTR
                    CSTMR-DEF-PTR RET-CODE-PTR
           ADD ORDAMT TO CBAL OF CSTMR-RECORD
           ADD 1 TO CDELCNT

           CALL "qdbrunha" USING BY VALUE
                CSTMR-HASH-PTR UPDATER CUST-KEYS CSTMR-KEY-PTR
                     CSTMR-DEF-PTR RET-CODE-PTR

           DELETE NEWORD

                MOVE OID  OF ORDERS-RECORD
                       TO ELEMENT-ORDER(NODID)

           END-IF
         END-PERFORM.

   THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
   FLAG IS SET AND IS FOR ISOLATION TEST USE

D    IF ISOVALUE = 8 THEN GO TO DBG-SKP1.
D    IF ISOVALUE = 6 THEN
D      MOVE "DEL PRE-ROLLBK" TO TXTDATA
D    ELSE IF ISOVALUE = 5 THEN
D      MOVE "DEL PRE-COMMIT" TO TXTDATA.
D    MOVE 1 TO CDID OF DBUG-REC2.
D    MOVE DQDATA-WHS TO CWID OF DBUG-REC2.
D    MOVE 1 TO DID OF DBUG-REC2.
D    MOVE DQDATA-WHS TO WID OF DBUG-REC2.
D    MOVE CURTIME6 TO TIME6.
D    MOVE TPCDATE TO DATE6.
D    WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2".
D    CALL "delayme".
D    IF ISOVALUE = 6 THEN
D     ROLLBACK.
DDBG-SKP1.
           COMMIT.

   THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
   FLAG IS SET AND IS FOR ISOLATION TEST USE

D    IF ISOVALUE = 8 THEN GO TO DBG-SKP2.
D    IF ISOVALUE = 6 THEN
D      MOVE "DEL POST-ROLLBK" TO TXTDATA
D    ELSE IF ISOVALUE = 5 THEN
D      MOVE "DEL POST-COMMIT" TO TXTDATA.
D    MOVE 1 TO CDID OF DBUG-REC2.
D    MOVE DQDATA-WHS TO CWID OF DBUG-REC2.
D    MOVE 1 TO DID OF DBUG-REC2.
D    MOVE   TO PAYMNT OF DBUG-REC2.
D    MOVE DQDATA-WHS TO WID OF DBUG-REC2.
D    MOVE CBAL2 TO CBAL OF DBUG-REC2.
D    ACCEPT DATEINT    FROM DATE.
D    Move "19" to TPCDatecc.
D    If dateiyy < "7 " then
D      Move "2 " to TPCDatecc.
D    Move   DATEIYY     TO TPCDateYY.
D    Move   DATEIMM     TO TPCDateMM.
D    Move   DATEIDD     TO TPCDateDD.
D    ACCEPT CURTIME FROM TIME.
D    MOVE CURTIME6 TO TIME6.
D    MOVE TPCDATE TO DATE6.
D    WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2".
DDBG-SKP2.
     MOVE DQDATA-WHS TO WH OF DLVRYLOG-RECORD.
     ACCEPT LOGTIMEA FROM TIME.
     WRITE DLVRYLOG-RECORD.

     GO TO PROCESS-DELIVERY.

     EXIT.

  SHUTDOWN.
     CLOSE ORDERS
           ORDERLINE
           NEWORD
           CSTMR
           DISTRICT-FILE
           DLVRYLOG
           DLVRICFF.
D    CLOSE DBUG-FILE.
D    CLOSE ISO-IFILE.
     STOP RUN.
```

ATPCCMTRA: New Order Start Program

```
/  This program:  Begins commitment control                  +
                  Retrieves the warehouse id and district id    +
                    for each user                          /  +

          PGM

          DCL       VAR(&SSNWHSE) TYPE( CHAR) LEN(4)

          DCL       VAR(&DATALIB) TYPE( CHAR) LEN(1 ) +
                      VALUE(TPCCD697)
          DCL       VAR(&OBJLIB) TYPE( CHAR) LEN(1 ) +
                      VALUE(TPCCNCSRVR)
          DCL       VAR(&QNAME) TYPE( CHAR) LEN(1 ) VALUE(INITDTAQ)
          DCL       VAR(&QLIB) TYPE( CHAR) LEN(1 )
          DCL       VAR(&FLDLEN) TYPE( DEC) LEN(5  ) VALUE(6)
          DCL       VAR(&SSNDSTRCT) TYPE( CHAR) LEN(2)
          DCL       VAR(&VALUE) TYPE( CHAR) LEN(6)

          MONMSG    MSGID(CPF    )

          ADDLIBLE  LIB(&DATALIB)
          CHGJOB    RUNPTY(1 )
          OVRDBF    FILE(ORDLIN) TOFILE( FILE) SHARE( NO) +
                      SEQONLY( YES 16)
          OVRDBF    FILE(NEWORD) TOFILE( FILE) SHARE( NO) +
                      SEQONLY( YES 2)
          OVRDBF    FILE(ORDLINLF) TOFILE( FILE) NBRRCDS(15) +
                      SHARE( NO)
          OVRDBF    FILE(HSTRY) TOFILE( FILE) SHARE( NO) +
                      SEQONLY( NO)
          OVRDBF    FILE(ORDERS) TOFILE( FILE) WAITRCD( NOMAX) +
                      SHARE( NO) SEQONLY( YES 2)
          OVRDBF    FILE(ORDERSLF) TOFILE( FILE) WAITRCD( NOMAX) +
```

```
                SHARE( NO) SEQONLY( YES 2)
          OVRDBF    FILE(STOCKPF) TOFILE( FILE) WAITRCD(2) +
                SHARE( NO)
          OVRDBF    FILE(STOCK) TOFILE( FILE) WAITRCD(2) SHARE( NO)
          OVRDBF    FILE(CSTMRPF) TOFILE( FILE) WAITRCD(5) +
                SHARE( NO)
          OVRDBF    FILE(CSTMR) TOFILE( FILE) WAITRCD(5) SHARE( NO)
          OVRDBF    FILE(DSTRCT) TOFILE( FILE) SHARE( NO)
          OVRDBF    FILE(CSTMRLFNAM) SHARE( NO) NBRRCDS(5)
          OVRDBF    FILE(CSTMRLFCRT) SHARE( NO)
          OVRDBF    FILE(WRHS) TOFILE(WRHS) LVLCHK( NO) +
                SHARE( NO)
          STRCMTCTL LCKLVL( ALL)
          MONMSG    MSGID(CPF    )
 FIRSTCALL:  CALL      PGM(&OBJLIB/NOPAYOSMTR)
ENDIT:      ENDPGM
```

NOPAYOSMTR:Neworder, Payment, Order, Status Transactions Program

```
      PROCESS NOTRUNC NORANGE.
      IDENTIFICATION DIVISION.
        PROGRAM-ID. NOPAYOSMTR.
        AUTHOR. P/P COC
        INSTALLATION. IBM-ROCHESTER.
        DATE-WRITTEN.
        DATE-COMPILED.

         C H A N G E S    &    U P D A T E S

         LATEST CHANGES LISTED FIRST

         MM/DD/YY   AUTHOR NAME         LINES CHANGED/ADDED: NNN



      ENVIRONMENT DIVISION.
      CONFIGURATION SECTION.
        SOURCE-COMPUTER. IBM-AS4  .
        SOURCE-COMPUTER. IBM-AS4   WITH DEBUGGING MODE.
        OBJECT-COMPUTER. IBM-AS4  .
        INPUT-OUTPUT SECTION.
        FILE-CONTROL.
           SELECT MAINICFF ASSIGN TO WORKSTATION-MAINICFF-SI
                 ORGANIZATION IS TRANSACTION
                 FILE STATUS IS STATUS-IND MAJ-MIN.
           SELECT WAREHOUSE-FILE ASSIGN TO DATABASE-WRHS
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES.
           SELECT DISTRICT-FILE ASSIGN TO DATABASE-DSTRCT
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES
                FILE STATUS IS DISTRICT-FILE-STATUS.
           SELECT CUSTOMER-FILE ASSIGN TO DATABASE-CSTMR
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES
                FILE STATUS IS CUSTOMER-FILE-STATUS.
           SELECT ITEM-FILE ASSIGN TO DATABASE-ITEM
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES
                FILE STATUS IS ITEM-FILE-STATUS.
           SELECT STOCK-FILE ASSIGN TO DATABASE-STOCK
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES
                FILE STATUS IS STOCK-FILE-STATUS.
           SELECT NEWORDER-FILE ASSIGN TO DATABASE-NEWORD
                ORGANIZATION IS SEQUENTIAL
                FILE STATUS IS NEWORDER-FILE-STATUS.
           SELECT ORDERS-FILE ASSIGN TO DATABASE-ORDERSLF
                ORGANIZATION IS SEQUENTIAL.
           SELECT ORDERS-VIEW ASSIGN TO DATABASE-ORDERS
                ORGANIZATION IS INDEXED
                ACCESS MODE IS DYNAMIC
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES.
           SELECT ORDERLINE-FILE ASSIGN TO DATABASE-ORDLIN
                ACCESS MODE IS SEQUENTIAL.
           SELECT ORDERLINE-VIEW ASSIGN TO DATABASE-ORDLINLF
                ORGANIZATION IS INDEXED
                ACCESS MODE IS DYNAMIC
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES.
           SELECT HISTORY-FILE ASSIGN TO DATABASE-HSTRY
                ORGANIZATION IS SEQUENTIAL.
      D     SELECT DBUG-FILE
      D          ASSIGN TO FORMATFILE-DBUGPRT
      D          ORGANIZATION IS SEQUENTIAL
      D          ACCESS IS SEQUENTIAL.
      D     SELECT DBUG-FILE2
      D          ASSIGN TO FORMATFILE-DBUGPRT2
      D          ORGANIZATION IS SEQUENTIAL
      D          ACCESS IS SEQUENTIAL.
      D     SELECT ISO-IFILE
      D          ASSIGN TO DATABASE-ISOIFILE
      D          ORGANIZATION IS SEQUENTIAL
      D          ACCESS IS SEQUENTIAL.
           SELECT CUST-REL-FILE ASSIGN TO DATABASE-CSTMRPF
                ORGANIZATION IS RELATIVE
                ACCESS MODE IS RANDOM RELATIVE KEY IS CUSTREL.

      I-O-CONTROL.
        COMMITMENT CONTROL FOR WAREHOUSE-FILE
        COMMITMENT CONTROL FOR DISTRICT-FILE
        COMMITMENT CONTROL FOR CUSTOMER-FILE
        COMMITMENT CONTROL FOR CUST-REL-FILE
        COMMITMENT CONTROL FOR STOCK-FILE
        COMMITMENT CONTROL FOR ITEM-FILE
        COMMITMENT CONTROL FOR NEWORDER-FILE
        COMMITMENT CONTROL FOR ORDERS-FILE
        COMMITMENT CONTROL FOR ORDERS-VIEW
        COMMITMENT CONTROL FOR ORDERLINE-FILE
        COMMITMENT CONTROL FOR ORDERLINE-VIEW
        COMMITMENT CONTROL FOR HISTORY-FILE.
      DATA DIVISION.
      FILE SECTION.
      FD MAINICFF
       LABEL RECORDS ARE STANDARD.
       1  ICFREC.
       COPY DDS-ALL-FORMATS OF MAINICFF.

       5 NEWORD-O REDEFINES MAINICFF-RECORD.
           6   NEWORD-RESULT        PIC X.
           6   OENTTM               PIC S9(6).
           6   CLAST                PIC X(16).
           6   CCREDT               PIC X(2).
           6   CDCT                 PIC S999V99 COMP-3.
           6   OID                  PIC S9(8) COMP-4.
           6   WTAX                 PIC S9V9999 COMP-3.
           6   DTAX                 PIC S9V9999 COMP-3.
           6   TOTAMT               PIC S9(9)V9(2) COMP-3.
           6  OUTPUT-TABLE.
            1  OUTPUT-LINE OCCURS  16 TIMES.
              15 OUTPUT-STQTY       PIC S9(4) COMP-4.
              15 OUTPUT-BORG        PIC  X(1).
              15 OUTPUT-ITEM-INFO.
                2  OUTPUT-INAME       PIC X(24).
                2  OUTPUT-IPRICE      PIC S9(3)V9(2) COMP-3.
              15 OUTPUT-OLAMNT      PIC S9(5)V9(2) COMP-3.

         5 PAYMNT-O REDEFINES MAINICFF-RECORD.
           6 OUTPUT-FMT-NUM-3     PIC XX.
                                  17 = bad credit
                                  18 = no cid or clast
                                  19 = good credit
                                  88 = bad last name
           6 HDT.
             8 HDATE    PIC 9(8).
             8 HTIME    pic 9(6).
           6 WH-DATA.
             8 WADDR1   PIC X(2 ).
             8 WADDR2   PIC X(2 ).
             8 WCITY    PIC X(2 ).
             8 WSTATE   PIC X( 2).
             8 WZIP     PIC X(9).
           6 DST-DATA.
             8 DADDR1   PIC X(2 ).
             8 DADDR2   PIC X(2 ).
             8 DCITY    PIC X(2 ).
             8 DSTATE   PIC X( 2).
             8 DZIP     PIC X(9).
           6 CID        PIC S9(6) COMP-4.
           6 PAYMENT-CUST-INFO.
             8 CFIRST   PIC X(16).
             8 CINIT    PIC X( 2).
             8 CLAST    PIC X(16).
             8 CLDATE   PIC S9(8).
             8 CADDR1   PIC X(2 ).
             8 CCREDT   PIC X( 2).
             8 CADDR2   PIC X(2 ).
             8 CDCT     PIC S999V99 COMP-3.
             8 CCITY    PIC X(2 ).
             8 CSTATE   PIC X( 2).
             8 CZIP     PIC X(9).
             8 CPHONE   PIC X(16).
             8 CBAL     PIC S9(11)V9(2) COMP-3.
             8 CCRDLM   PIC S9(11)V9(2) COMP-3.
           6 MISC-CDATA.
             8  CDAT1    PIC X(5 ).
             8  CDAT2    PIC X(5 ).
             8  CDAT3    PIC X(5 ).
             8  CDAT4    PIC X(5 ).


        5  ORDSTS-O REDEFINES MAINICFF-RECORD.
            6 ORDSTS-FMT-NUM       PIC XX.
            6 OCID                PIC S9(6) COMP-4.
            6 CUSTINFO.
              8 CFIRST              PIC X(16).
              8 CINIT               PIC X(2).
              8 CLAST               PIC X(16).
            6 CBAL                PIC S9(11)V9(2) COMP-3.
            6 ORDERINFO.
              8 OID                  PIC S9(8) COMP-4.
              8 ODT.
                1  OENTDT              PIC 9(8).
                1  OENTTM              PIC 9(6).
              8 OCARID              PIC X(2).
              8 OLINENBR            PIC S9(2) COMP-4.
            6 OLINEINFO OCCURS 15 TIMES.
              7 DO-OLSPWH          PIC S9(4) COMP-4.
              7 DO-OLIID           PIC S9(6) COMP-4.
              7 DO-OLQTY           PIC S9(2) COMP-4.
              7 DO-OLAMNT          PIC S9(5)V9(2) COMP-3.
              7 DO-OLDLVD          PIC S9(8).
        5 STKLVL-O REDEFINES MAINICFF-RECORD.
            6 FILLER               PIC X(2).
            6 BLWSTK               PIC S9(2) COMP-4.
        5 DLVRY-O REDEFINES MAINICFF-RECORD.
            6 FILLER               PIC X(2).
            6 DELIVERY-STATUS        PIC X.
```

```
FD WAREHOUSE-FILE
   LABEL RECORDS ARE STANDARD.
  1 WAREHOUSE-REC.
     COPY DDS-WRRCD OF WRHS.
      5 WRHS-INFO REDEFINES WRRCD.
         6 FILLER           PIC X(12).
         6 WH-ADDRESS.
            8 WADDR1         PIC X(2 ).
            8 WADDR2         PIC X(2 ).
            8 CITYW          PIC X(2 ).
            8 STATEW         PIC X(2).
            8 ZIPW           PIC X(1 ).
FD DISTRICT-FILE
   LABEL RECORDS ARE STANDARD.
  1 DISTRICT-REC.
   COPY DDS-DSRCD OF DSTRCT.
     5  DISTRICT-INFO REDEFINES DSRCD.
        6 DIST-KEY.
           8 DID             PIC S9(2) COMP-4.
           8 DWID            PIC S9(4) COMP-4.
        6 FILLER            PIC X(1 ).
        6 DIST-ADDRESS.
           8 DADDR1          PIC X(2 ).
           8 DADDR2          PIC X(2 ).
           8 CITY            PIC X(2 ).
           8 STATE           PIC X(2).
           8 ZIP             PIC X(1 ).
FD  CUSTOMER-FILE
    LABEL RECORDS ARE STANDARD.
  1  CUSTOMER-REC.
      COPY DDS-CSRCD OF CSTMR.
      5  CUST-KEY REDEFINES CSRCD.
         6 CIDK     PIC S9(6) COMP-4.
         6 CDIDK    PIC S9(2) COMP-4.
         6 CWIDK    PIC S9(4) COMP-4.
      5  CUST-INFO-REC REDEFINES CSRCD.
         6 FILLER   PIC X(8).
         6 CUST-INFO.
            8 CFIRSTP  PIC X(16).
            8 CINITP   PIC X( 2).
            8 CLASTP   PIC X(16).
            8 CLDATEP  PIC S9(8).
            8 CADDR1P  PIC X(2 ).
            8 CCREDTP  PIC X( 2).
            8 CADDR2P  PIC X(2 ).
            8 CDCTP    PIC S9(1)V9(4) COMP-3.
            8 CCITYP   PIC X(2 ).
            8 CSTATEP  PIC X( 2).
            8 CZIPP    PIC X(1 ).
            8 CPHONEP  PIC X(16).
            8 CBAL     PIC S9(11)V99 COMP-3.
            8 CCRDLM   PIC S9(11)V99 COMP-3.

FD  CUST-REL-FILE
    LABEL RECORDS ARE STANDARD.
  1  CUST-REL-REC.
      COPY DDS-CSRCD OF CSTMRPF.
FD ITEM-FILE
   LABEL RECORDS ARE STANDARD.
  1 ITEM-REC.
   COPY DDS-ITRCD OF ITEM.
    5 ITEM-DEF REDEFINES ITRCD.
       6 ID-IID          PIC S9(6) COMP-4.
       6 ID-IMID         PIC S9(6) COMP-4.
       6 ITEM-INFO.
          8 ID-INAME     PIC X(24).
          8 ID-IPRICE    PIC S9(3)V99 COMP-3.
       6 ID-IDATA        PIC X(5 ).
FD STOCK-FILE
   LABEL RECORDS ARE STANDARD.
  1 STOCK-REC.
   COPY DDS-STRCD OF STOCK.
    5  STOCK-DEF REDEFINES STRCD.
        6  STOCK-IN.
           8 STWID1        PIC S9(4) COMP-4.
           8 STIID1        PIC S9(6) COMP-4.
       6 FILLER            PIC S9(4) COMP-4.
       6  DIST-INFO  OCCURS 1  TIMES.
           7  DIST-IN       PIC X(24).
FD NEWORDER-FILE
   LABEL RECORDS ARE STANDARD.
  1 NEWORDER-REC.
   COPY DDS-NORCD OF NEWORD.
FD ORDERS-FILE
   LABEL RECORDS ARE STANDARD.
  1 ORDERS-REC.
   COPY DDS-ORRCD OF ORDERSLF.
FD ORDERS-VIEW
   LABEL RECORDS ARE STANDARD.
  1 ORDERS-VIEW-REC.
   COPY DDS-ORRCD OF ORDERS.
FD ORDERLINE-FILE
   LABEL RECORDS ARE STANDARD.
  1 ORDERLINE-REC.
   COPY DDS-OLRCD OF ORDLIN.
    5 ORDERLIN-INPUT REDEFINES OLRCD.
       7 ORDER-KEY.
          8 OLOID              PIC S9(8) COMP-4.
          8 OLDID              PIC S9(2) COMP-4.
          8 OLWID              PIC S9(4) COMP-4.
          8 OLNBR              PIC S9(2) COMP-4.
       7 OL-INPUT.
          8 OL-INPUT-OLSPWH     PIC S9(4) COMP-4.
          8 OL-INPUT-OLIID      PIC S9(6) COMP-4.
          8 OL-INPUT-QTY        PIC S9(3) COMP-3.
       7 FILLER               PIC X(4).
       7 OLDATE-TIME           PIC X(14).
FD ORDERLINE-VIEW
   LABEL RECORDS ARE STANDARD.
  1 ORDERLINE-VIEW-REC.
   COPY DDS-OLRCD OF ORDLINLF.
    5 OL-STATUS-OUTPUT REDEFINES OLRCD.
       8 FILLER          PIC X(1 ).
       8 OL-INFO.
         1  OL-INFO-OLSPWH      PIC S9(4) COMP-4.
         1  OL-INFO-OLIID       PIC S9(6) COMP-4.
         1  OL-INFO-OLQTY       PIC S9(2) COMP-4.
         1  OL-INFO-OLAMNT      PIC S9(5)V9(2) COMP-3.
         1  OL-INFO-OLDLVD      PIC S9(8).
FD  HISTORY-FILE
    LABEL RECORDS ARE STANDARD
    DATA RECORD IS HISTORY-REC.
    1  HISTORY-REC.
    COPY DDS-HSRCD OF HSTRY.
       5 HIST-INFO REDEFINES HSRCD.
          7 HISTORY-DATA.
            9 PAY-DIST-KEY.
            1  DID             PIC S9(2) COMP-4.
            1  WID             PIC S9(4) COMP-4.
            9 PAY-CUST-KEY.
            1  CID             PIC S9(6) COMP-4.
            1  CDID            PIC S9(2) COMP-4.
            1  CWID            PIC S9(4) COMP-4.
          7 DATE-TIME.
            9 HDATE            PIC 9(8).
            9 HTIME            PIC 9(6).
          7 AMOUNT           PIC S9(5)V99 COMP-3.
          7 HDATA.
            9 WNAME            PIC X(1 ).
            9 FILLER           PIC XXXX.
            9 DNAME            PIC X(1 ).
DFD  DBUG-FILE
D   LABEL RECORDS ARE STANDARD
D   DATA RECORD IS DBUG-REC.
D    1  DBUGPRT-REC.
D   COPY DDS-DBUGRCD OF DBUGPRT.
D       5  DBUG-REC REDEFINES DBUGRCD-O.
D           6  DEBUG-DATA.
D               7  ISONUM               PIC XX.
D               7  TXTDATA              PIC X(4 ).
D               7  WID                  PIC S9(4).
D               7  DID                  PIC S9(2).
D               7  DATE6                PIC S9(8).
D               7  TIME6                PIC S9(6).
D               7  CID                  PIC S9(4).
D               7  OID                  PIC S9(8).
D               7  DEBUG-ITEM-INFO OCCURS 15 TIMES.
D                 8 DEBUG-OLSPWH         PIC S9(4).
D                 8 DEBUG-OLIID          PIC S9(6).
D                 8 DEBUG-OLQTY          PIC S9(3).
D                 8 DEBUG-IPRICE         PIC S9(5)V9(2).
DFD  DBUG-FILE2
D   LABEL RECORDS ARE STANDARD
D   DATA RECORD IS DBUG-REC2.
D    1  DBUGPRT-REC2.
D   COPY DDS-DBUGRCD2 OF DBUGPRT2.
D       5  DBUG-REC2 REDEFINES DBUGRCD2-O.
D           6  DEBUG-DATA.
D               7  ISONUM               PIC XX.
D               7  TXTDATA              PIC X(4 ).
D               7  WID                  PIC S9(4).
D               7  DID                  PIC S9(2).
D               7  DATE6                PIC S9(8).
D               7  TIME6                PIC S9(6).
D               7  CID                  PIC S9(4).
D               7  CWID                 PIC S9(4).
D               7  CDID                 PIC S9(2).
D               7  CBAL                 PIC S9(11)V99.
D               7  PAYMNT               PIC S9(7)V99.
DFD  ISO-IFILE
D   LABEL RECORDS ARE STANDARD.
D 1  ISOIFILE-RECORD.
D   COPY DDS-ISOIRCD OF ISOIFILE.
D    5 ISO-IREC REDEFINES ISOIRCD.
D      6 ISOINUM PIC S9(4) COMP-4.


 WORKING-STORAGE SECTION.

 1 MAJ-MIN.
    3  MAJ    PIC X(2).
    3  MIN    PIC X(2).

 1 ITEM-KEY-PTR  USAGE POINTER.
 1 STOCK-KEY-PTR USAGE POINTER.
 1 CSTMR-KEY-PTR USAGE POINTER.

 1 ITEM-KEY.
   3 ITEM-KEY-DATA OCCURS 5 TIMES.
      5  KNAM   PIC X(1 ).
      5  KVAL   PIC S9(9) COMP-4.

 1 STOCK-KEY.
   3 STOCK-KEY-DATA OCCURS 5 TIMES.
      5  KNAM   PIC X(1 ).
      5  KVAL   PIC S9(9) COMP-4.

 1 CSTMR-KEY.
   3 CSTMR-KEY-DATA OCCURS 5 TIMES.
      5  KNAM   PIC X(1 ).
      5  KVAL   PIC S9(9) COMP-4.

 1 ITEM-HASH-NAME   PIC X(1 ).
 1 STOCK-HASH-NAME  PIC X(1 ).
 1 CSTMR-HASH-NAME  PIC X(1 ).

 1 ITEM-HASH-PTR    USAGE POINTER.
 1 STOCK-HASH-PTR   USAGE POINTER.
 1 CSTMR-HASH-PTR   USAGE POINTER.

 1 FUNCT           PIC X(1).
 1 KEYS            PIC S9(9) COMP-4.
 1 RET-CODE         PIC S9(9) COMP-4.

 1  RET-CODE-PTR    USAGE POINTER.

 1  ITEM-DEF-PTR    USAGE POINTER.
 1  STOCK-DEF-PTR   USAGE POINTER.
 1  CSTMR-DEF-PTR   USAGE POINTER.

 1 UPDATER              PIC X(1) VALUE "3".
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 1 FETCHR              PIC X(1) VALUE "1".
 1 FETCHUPDATE          PIC X(1) VALUE "2".

 1 CUST-KEYS            PIC 9(1) comp-4 VALUE 3.
 1 STOCK-KEYS           PIC 9(1) comp-4 VALUE 2.
 1 ITEM-KEYS            PIC 9(1) comp-4 VALUE 1.

 1 CMNF-INDIC-AREA.
   3 CMNF-INDIC    PIC 1 OCCURS 99 TIMES
                  INDICATOR 1.

  1  TRANSACTION-INPUT.
       6   TXN-TYPE          PIC X.
       6   JOBNAME           PIC X(1 ).
       6   CLIENT-INPUT      PIC X(2 2).
       6 NEWORD-I REDEFINES CLIENT-INPUT.
         8 CWID              PIC S9(4) COMP-4.
         8 CDID              PIC S9(2) COMP-4.
         8 CID               PIC S9(6) COMP-4.
         8 NUMBER-OF-ITEMS    PIC 9(2) BINARY.
         8 INPUT-LINE OCCURS 15 TIMES.
          1  OLSPWH           PIC S9(4) COMP-4.
          1  OLIID            PIC S9(6) COMP-4.
          1  OLQTY            PIC S9(2) COMP-4.
       6 PAYMENT-I REDEFINES CLIENT-INPUT.
         8 PAYMENT-TYPE       PIC X.
                             Payment type = C if by CID
                             Payment type = L if by CLAST
         8 HISTORY-DATA.
          9 PAY-DIST-KEY.
          1  DID              PIC S9(2) COMP-4.
          1  WID              PIC S9(4) COMP-4.
          9 PAY-CUST-KEY.
          1  CID              PIC S9(6) COMP-4.
          1  CDID             PIC S9(2) COMP-4.
          1  CWID             PIC S9(4) COMP-4.
         8 AMOUNT            PIC S9(5)V99 COMP-3.
         8 CLAST              PIC X(16).
         8 FILLER             PIC X(155).
       6 ORDSTS-I REDEFINES CLIENT-INPUT.
         8 ORDSTS-TYPE        PIC X.
         8 ORD-CUST-KEY.
          9 CID               PIC S9(6) COMP-4.
          9 DID               PIC S9(2) COMP-4.
          9 WID               PIC S9(4) COMP-4.
         8 CLAST              PIC X(16).
         8 FILLER             PIC X(165).
       6 STKLVL-I REDEFINES CLIENT-INPUT.
         8 WID                PIC S9(4) COMP-4.
         8 DID                PIC S9(2) COMP-4.
         8 THRESHOLD          PIC S9(2) COMP-4.
         8 BLWSTK             PIC S9(4) COMP-4.
       6 DLVRY-I REDEFINES CLIENT-INPUT.
         8 WID                PIC S9(4) COMP-4.
         8 CARRIER            PIC XX.
         8 D-DATE             PIC 9(8).
         8 D-TIME             PIC 9(8).

77 STATUS-IND PIC X(2).


 1 CWIDR    PIC S9(4) COMP-4.
 1 CDIDR    PIC S9(2) COMP-4.
 1 CLASTR   PIC X(16).
 1 CUSTREL     PIC 9(8) COMP-4.


 1 INPUT-ROW.
     5 STOCK-KEY-INPUT.
          1  OLSPWH           PIC S9(4) COMP-4.
          1  OLIID            PIC S9(6) COMP-4.
     5 OLQTY           PIC S9(2) COMP-4.

 1  CHAR-HIST-DATA.
    5 DID                PIC S99.
    5 WID                PIC S9(4).
    5 CID                PIC S9(6).
    5 CDID               PIC S99.
    5 CWID               PIC S9(4).
    5 AMOUNT             PIC S9(5)V99.


  1 ROLL-BACK-REQUIRED   PIC X(1).
  1 CMD1 PIC X(14) VALUE "DLYJOB DLY(3 )".
  1 CMD-LEN  PIC S9(1 )V9(5) COMP-3 VALUE 14.
  1 CONTR-1               PIC S99 COMP-4.

D 1 TESTNUM               PIC 99 VALUE 1.
D 1 J                    PIC S999 BINARY.

  1 DATEINT.
    6  YY              PIC 9(2).
    6  MMDD            PIC 9(4).

  1 DATETIME.
    5 TPCDATE.
      6  TPCMD            PIC 9(4).
      6  TPCCEN           PIC 9(2)  VALUE 19.
      6  TPCYEAR          PIC 9(2).
    5 CURTIME.
      6 CURTIME6       PIC 9(6).
      6 FILLER         PIC 9(2).
  1 DATETIME-INIT.
    5 TPCDATE-INIT         PIC 9(8) VALUE  .
    5 TPCTIME-INIT         PIC 9(6) VALUE  .
  1 DATETIME-CHARINIT REDEFINES DATETIME-INIT PIC X(14).

   1 CNTR                  PIC 99.
   1 CUST-INDEX   PIC S9(4)  USAGE BINARY.
   1 CUSTR-INDEX   PIC S9(4)  USAGE BINARY.
   1 CUSTOMER-ARRAY.
      3  CUSTOMER-ARRAY-ELEMENT   OCCURS 1   TIMES.
         5 CID     PIC S9(6) COMP-4.
         5 CDID    PIC S9(2) COMP-4.
         5 CWID    PIC S9(4) COMP-4.
  1 TEMP-DATA2       PIC X(468).

  1 HOST-DATA.
     3  HOST-ARRAY-ELEMENT   OCCURS 1   TIMES.
        5 RRN    PIC S9(9) COMP-4.

  1 ERROR-HDLNG-PARAMETERS.
     5  NEWORDER-FILE-STATUS          PIC X(2).
     5  ITEM-FILE-STATUS              PIC X(2).
     5  STOCK-FILE-STATUS             PIC X(2).
     5  CUSTOMER-STATUS-2             PIC X(2).
     5  DISTRICT-FILE-STATUS          PIC X(2).
     5  CUSTOMER-FILE-STATUS          PIC X(2).

  1  SWITCH-AREA.
     5  SW 3                          PIC 1.
      88 LOCK-OCCURRED             VALUE B"1".
      88 LOCK-OFF                 VALUE B" ".

  1 I       PIC S999 BINARY.

  1 NPOQLENB     PIC S99999 COMP-3 VALUE 67 .
  1 NPOQLEN      PIC S99999 COMP-3 VALUE 227.
  1 NPOQNAME.
    5 NPOQNAMEA       PIC X(5) VALUE "NOPAY".
    5 NPOQNAMEWHS     PIC X(4).
    5 NPOQNAMEWHSA REDEFINES NPOQNAMEWHS PIC S9(4).
    5 NPOQNAMEFIL     PIC X(1) VALUE " ".
  1 NPOQLIB       PIC X(1 ).
  1 NPOQWAIT     PIC S99999 COMP-3 VALUE -1.

  1  TRANSACTION-CONTROL-AREA.
     5  TXN-IND              PIC X VALUE " ".

  1 CONE   PIC X(1) VALUE "1".
  1 CTWO   PIC X(2) VALUE "2".
  1 CTHREE PIC X(3) VALUE "3".
  1 CFOUR  PIC X(4) VALUE "4".

  1 N1ONE  PIC 9(1) VALUE 1.
  1 NTWO   PIC 9(2) VALUE 2.
  1 NTHREE PIC 9(3) VALUE 3.
  1 NFOUR  PIC 9(4) VALUE 4.

 1  TOO-MANY.
     5 TOO-MANY-1.
       6 TOO-MANY-CID     PIC S9(6) COMP-4.
       6 TOO-MANY-DID     PIC S9(2) COMP-4.
       6 TOO-MANY-WID     PIC S9(4) COMP-4.
     6 TOO-MANY-CLAST      PIC X(16).


   EXEC SQL
     INCLUDE SQLCA
   END-EXEC.


  SQL ERROR/WARNING Messages

    EXEC SQL
     WHENEVER SQLERROR CONTINUE
    END-EXEC.

    EXEC SQL
     WHENEVER SQLWARNING CONTINUE
    END-EXEC.

  1 XX  PIC S9(2) COMP-4.

LINKAGE SECTION.

PROCEDURE DIVISION.

DECLARATIVES.

HANDLE-ERROR SECTION.

     USE AFTER STANDARD ERROR PROCEDURE ON STOCK-FILE.
     USE AFTER STANDARD ERROR PROCEDURE ON CUSTOMER-FILE.

I-O-ERROR-PARA.

     IF STOCK-FILE-STATUS = "9D"
      SET LOCK-OCCURRED TO TRUE.
     IF CUSTOMER-FILE-STATUS = "9D"
      SET LOCK-OCCURRED TO TRUE.

END DECLARATIVES.


  MAIN-LINE-ROUTINE.

     PERFORM SET-UP-ROUTINE.

     PERFORM TXN-PROC-STRT THRU
            TXN-PROC-END
       UNTIL TXN-IND = "1".

     PERFORM CLOSE-ROUTINE THROUGH END-OF-JOB.

     STOP RUN.



  CMD-KEY ROUTINE PERFORMS ALL DISPLAY FILE I/O AND
  DETERMINES WHAT TRANSACTION TYPE TO PROCESS.


TXN-PROC-STRT.

    READ MAINICFF
    INTO TRANSACTION-INPUT INDICATORS ARE CMNF-INDIC-AREA.
    IF MAJ = "81"
       MOVE "1" TO TXN-IND
       GO TO TXN-PROC-END
    END-IF.
```

```
D    READ ISO-IFILE.
D    MOVE ISOINUM TO TESTNUM, ISONUM of DBUG-REC, ISONUM OF
D    DBUG-REC2.

      IF TXN-TYPE OF TRANSACTION-INPUT = "N"

           MOVE " " TO ROLL-BACK-REQUIRED

           PERFORM NEW-ORDER-TRANSACTION
              THROUGH NEW-ORDER-TRANSACTION-EXIT

           WRITE ICFREC FORMAT IS "SNDDATA"
                INDICATORS ARE CMNF-INDIC-AREA

         ELSE
         IF TXN-TYPE OF TRANSACTION-INPUT = "P"

           PERFORM PAYMENT-TRANSACTION
              THROUGH PAYMENT-TRANSACTION-EXIT

           WRITE ICFREC FORMAT IS "SNDDATA"
                INDICATORS ARE CMNF-INDIC-AREA

         ELSE
         IF TXN-TYPE OF TRANSACTION-INPUT = "O"

           PERFORM ORDER-STATUS-TRANSACTION
              THROUGH ORDER-STATUS-TRANSACTION-EXIT

           WRITE ICFREC FORMAT IS "SNDDATA"
                INDICATORS ARE CMNF-INDIC-AREA

         ELSE

           WRITE ICFREC FORMAT IS "SNDDATA"
                INDICATORS ARE CMNF-INDIC-AREA
             MOVE "1" TO TXN-IND

         END-IF.

 TXN-PROC-END.
      EXIT.



 NEW-ORDER-TRANSACTION.

    ACCEPT CURTIME FROM TIME.
    ACCEPT DATEINT FROM DATE.
    MOVE YY TO TPCYEAR.
    MOVE MMDD TO TPCMD.

    MOVE CWID of NEWORD-I to CWID OF CUSTOMER-REC
                    WID OF WAREHOUSE-REC
                   DWID OF DSRCD
                  NOWID OF NEWORDER-REC
                   OWID OF ORDERS-REC.

    MOVE CDID OF NEWORD-I TO
                     CDID OF CUSTOMER-REC
                      DID OF DSRCD
                    NODID OF NEWORDER-REC
                     ODID OF ORDERS-REC.

    MOVE   CURTIME6 TO OENTTM OF NEWORD-O
                    OENTTM OF ORDERS-REC.
    MOVE   TPCDATE  TO OENTDT OF ORDERS-REC.


    MOVE CID OF NEWORD-I TO CID OF CUSTOMER-REC
                         OCID OF ORDERS-REC.

    MOVE NUMBER-OF-ITEMS TO OLINES OF ORDERS-REC.
    MOVE 1 TO OLOCAL OF ORDERS-REC.

    MOVE   TO TOTAMT.

 RE-DO-NEWORD.


  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D    MOVE "NEW ORDER PRE-READ  " TO TXTDATA OF DBUG-REC.
D    MOVE 9999 TO OID OF DBUG-REC.
D    PERFORM GET-ISOLATION-DATA-1.
D    WRITE DBUGPRT-REC FORMAT IS "DBUGRCD".


    MOVE CID  OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(1)
    MOVE CDID OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(2)
    MOVE CWID OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(3)

     CALL "qdbrunha" USING BY VALUE
          CSTMR-HASH-PTR FETCHUPDATE CUST-KEYS CSTMR-KEY-PTR
          CSTMR-DEF-PTR RET-CODE-PTR

     IF RET-CODE >
          IF RET-CODE = 1
              MOVE "2" TO ROLL-BACK-REQUIRED
         ELSE
            IF RET-CODE = 812
               SET LOCK-OFF TO TRUE
               ROLLBACK
               GO TO RE-DO-NEWORD
            END-IF
          END-IF

    ELSE


    READ DISTRICT-FILE
    INVALID KEY
        MOVE "2" TO ROLL-BACK-REQUIRED
    NOT INVALID KEY
    MOVE DNXTOR OF DISTRICT-REC   TO OID OF ORDERS-REC
                                  NOOID OF NEWORDER-REC

    PERFORM VARYING I FROM 1 BY 1 UNTIL I > NUMBER-OF-ITEMS
         MOVE INPUT-LINE(I) TO INPUT-ROW
         MOVE OLIID OF INPUT-ROW TO IID OF ITEM-REC


    MOVE OLIID OF INPUT-ROW TO KVAL OF ITEM-KEY-DATA(1)

     CALL "qdbrunha" USING BY VALUE
          ITEM-HASH-PTR FETCHR ITEM-KEYS ITEM-KEY-PTR
          ITEM-DEF-PTR RET-CODE-PTR

         IF RET-CODE >
            MOVE "1" TO ROLL-BACK-REQUIRED

         ELSE

            MOVE ITEM-INFO TO  OUTPUT-ITEM-INFO(I)

            MOVE ZERO TO CONTR-1

            INSPECT IDATA OF ITEM-REC
            TALLYING CONTR-1 FOR ALL "ORIGINAL"

            MOVE STOCK-KEY-INPUT TO STOCK-IN

    MOVE STWID1           TO KVAL OF STOCK-KEY-DATA(1)
    MOVE STIID1           TO KVAL OF STOCK-KEY-DATA(2)

    CALL "qdbrunha" USING BY VALUE
         STOCK-HASH-PTR FETCHUPDATE STOCK-KEYS STOCK-KEY-PTR
         STOCK-DEF-PTR RET-CODE-PTR

        IF RET-CODE >
             IF RET-CODE = 1
                 MOVE "2" TO ROLL-BACK-REQUIRED
            ELSE
               IF RET-CODE = 812
                  SET LOCK-OFF TO TRUE
                  ROLLBACK
                  GO TO RE-DO-NEWORD
               END-IF
             END-IF
            ELSE

  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D            IF TESTNUM = 7 THEN
D              IF I = 1 THEN
D                CALL "delayme"
D              END-IF
D            END-IF


             SUBTRACT OLQTY OF INPUT-ROW
                      FROM STQTY OF STOCK-REC
             IF STQTY OF STOCK-REC < 1  THEN
                 ADD 91 TO STQTY OF STOCK-REC
             END-IF


             IF (OLSPWH OF INPUT-ROW NOT EQUAL CWID OF
                                      NEWORD-I)
                 MOVE   TO OLOCAL   OF ORDERS-REC
                 ADD  1 TO STREMORD OF STOCK-REC
             END-IF

             ADD 1            TO STORDRS OF STOCK-REC
             ADD OLQTY OF INPUT-ROW TO STYTD OF STOCK-REC
      REWRITE STOCK-REC

      CALL "qdbrunha" USING BY VALUE
           STOCK-HASH-PTR UPDATER STOCK-KEYS STOCK-KEY-PTR
           STOCK-DEF-PTR RET-CODE-PTR
             IF CONTR-1 > ZERO THEN
                MOVE ZERO TO CONTR-1
                INSPECT STDATA OF STOCK-REC
                TALLYING CONTR-1 FOR ALL "ORIGINAL"
             END-IF

             IF CONTR-1 > ZERO
             THEN MOVE "B" TO OUTPUT-BORG(I)
             ELSE MOVE "G" TO OUTPUT-BORG(I)
             END-IF

           MULTIPLY OLQTY OF INPUT-ROW BY IPRICE
                GIVING OUTPUT-OLAMNT(I)

           ADD OUTPUT-OLAMNT(I) TO TOTAMT

           MOVE NORCD           TO ORDER-KEY
           MOVE I               TO OLNBR OF OLRCD
                                   OF ORDERLINE-REC
           MOVE INPUT-ROW    TO OL-INPUT
           MOVE OUTPUT-OLAMNT(I) TO OLAMNT OF OLRCD
                                    OF ORDERLINE-REC
           MOVE DIST-INFO(CDID OF NEWORD-I)
                              TO OLDSTI OF OLRCD
                                 OF ORDERLINE-REC

           MOVE DATETIME-CHARINIT TO OLDATE-TIME
           WRITE ORDERLINE-REC

           MOVE STQTY OF STOCK-REC TO OUTPUT-STQTY(I)
          END-IF
          END-IF
       END-PERFORM
       END-READ
      END-IF.

D    MOVE OID OF ORDERS-REC TO OID OF DBUG-REC.
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    ADD 1 TO DNXTOR OF DISTRICT-REC.

    REWRITE DISTRICT-REC.

    WRITE ORDERS-REC.

    WRITE NEWORDER-REC.

    READ WAREHOUSE-FILE.

    IF ROLL-BACK-REQUIRED NOT EQUAL " "
    THEN
  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D       MOVE "NEW ORDER PRE-RBACK " TO TXTDATA OF DBUG-REC
D       PERFORM GET-ISOLATION-DATA-1
D       WRITE DBUGPRT-REC FORMAT IS "DBUGRCD"
D       CALL "delayme"

       ROLLBACK
  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D       MOVE "NEW ORDER POST-RBACK" TO TXTDATA OF DBUG-REC
D       PERFORM GET-ISOLATION-DATA-2
D       WRITE DBUGPRT-REC FORMAT IS "DBUGRCD"
D       CLOSE DBUG-FILE
D       OPEN OUTPUT DBUG-FILE


       MOVE CLAST OF CUSTOMER-REC
                TO CLAST OF NEWORD-O
       MOVE CCREDT OF CUSTOMER-REC
                 TO CCREDT OF NEWORD-O
       MOVE OID OF ORDERS-REC
                TO OID OF NEWORD-O
      IF ROLL-BACK-REQUIRED = "1"
        MOVE "R" TO NEWORD-RESULT of NEWORD-O
      ELSE IF ROLL-BACK-REQUIRED = "2"
        MOVE "I" TO NEWORD-RESULT of NEWORD-O
      END-IF
      END-IF
        MOVE " " TO ROLL-BACK-REQUIRED
        GO TO NEW-ORDER-TRANSACTION-EXIT
    ELSE
  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D       MOVE "NEW ORDER PRE-COMMIT" TO TXTDATA OF DBUG-REC
D       PERFORM GET-ISOLATION-DATA-1
D       WRITE DBUGPRT-REC FORMAT IS "DBUGRCD"
D       CALL "delayme"



       COMMIT.

  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D       MOVE "NEW ORDER POST-COMIT" TO TXTDATA OF DBUG-REC.
D       PERFORM GET-ISOLATION-DATA-2.
D       WRITE DBUGPRT-REC FORMAT IS "DBUGRCD".
D       CLOSE DBUG-FILE.
D       OPEN OUTPUT DBUG-FILE.

    MOVE "G" TO NEWORD-RESULT of NEWORD-O
    MOVE CLAST OF CUSTOMER-REC
         TO CLAST OF NEWORD-O
    MOVE CCREDT OF CUSTOMER-REC
         TO CCREDT OF NEWORD-O
    MOVE CDCT of CUSTOMER-REC TO CDCT OF NEWORD-O
    MOVE WTAX of WAREHOUSE-REC TO WTAX OF NEWORD-O
    MOVE DTAX of DISTRICT-REC TO DTAX OF NEWORD-O
    MOVE OID OF ORDERS-REC TO
           OID OF NEWORD-O.


 NEW-ORDER-TRANSACTION-EXIT.

    EXIT.


D GET-ISOLATION-DATA-1.
D     ACCEPT CURTIME FROM TIME
D     ACCEPT DATEINT FROM DATE
D     MOVE YY TO TPCYEAR
D     MOVE MMDD TO TPCMD
D     MOVE CDID OF NEWORD-I TO DID OF DBUG-REC
D     MOVE CID OF NEWORD-I TO CID OF DBUG-REC
D     MOVE cwid of NEWORD-I TO WID OF DBUG-REC
D     MOVE TPCDATE TO DATE6 OF DBUG-REC
D     MOVE CURTIME6 TO TIME6 OF DBUG-REC
D     MOVE TESTNUM TO ISONUM OF DBUG-REC
D     PERFORM VARYING J FROM 1 BY 1 UNTIL J = 16
D       MOVE OLSPWH OF INPUT-LINE(J) TO DEBUG-OLSPWH(J)
D       MOVE OLIID OF INPUT-LINE(J) TO DEBUG-OLIID(J)
D       MOVE OLQTY OF INPUT-LINE(J) TO DEBUG-OLQTY(J)
D       MOVE   TO DEBUG-IPRICE(J)
D     END-PERFORM.


D GET-ISOLATION-DATA-2.
D     MOVE OID OF ORDERS-REC TO OID OF DBUG-REC.
D     ACCEPT CURTIME FROM TIME
D     ACCEPT DATEINT FROM DATE
D     MOVE YY TO TPCYEAR
D     MOVE MMDD TO TPCMD
D     MOVE CDID OF NEWORD-I TO DID OF DBUG-REC
D     MOVE CID OF NEWORD-I TO CID OF DBUG-REC
D     MOVE cwid of NEWORD-I TO WID OF DBUG-REC
D     MOVE TPCDATE TO DATE6  OF DBUG-REC
D     MOVE CURTIME6 TO TIME6  OF DBUG-REC
D     MOVE TESTNUM TO ISONUM OF DBUG-REC
D     PERFORM VARYING J FROM 1 BY 1 UNTIL J = 16
D       MOVE OLSPWH OF INPUT-LINE(J) TO DEBUG-OLSPWH(J)
D       MOVE OLIID OF INPUT-LINE(J) TO DEBUG-OLIID(J)
D       MOVE OLQTY OF INPUT-LINE(J) TO DEBUG-OLQTY(J)
D       IF OLIID OF INPUT-LINE(J) <= 1
D       MOVE OUTPUT-IPRICE(J) TO DEBUG-IPRICE(J)
D       ELSE
D       MOVE   TO DEBUG-IPRICE(J)
D       END-IF
D     END-PERFORM.


D GET-ISOLATION-DATA-3.
D     ACCEPT CURTIME FROM TIME
D     ACCEPT DATEINT FROM DATE
D     MOVE YY TO TPCYEAR
D     MOVE MMDD TO TPCMD
D     MOVE DID OF ORDSTS-I TO DID OF DBUG-REC
D     MOVE CID OF ORDSTS-I TO CID OF DBUG-REC
D     MOVE WID of ORDSTS-I TO WID OF DBUG-REC
D     MOVE TPCDATE TO DATE6 OF DBUG-REC
D     MOVE CURTIME6 TO TIME6 OF DBUG-REC
D     MOVE TESTNUM TO ISONUM OF DBUG-REC
D     PERFORM VARYING J FROM 1 BY 1 UNTIL J = 16
D       MOVE   TO DEBUG-OLSPWH(J)
D       MOVE   TO DEBUG-OLIID(J)
D       MOVE   TO DEBUG-OLQTY(J)
D       MOVE   TO DEBUG-IPRICE(J)
D     END-PERFORM.


D GET-ISOLATION-DATA-4.
D     ACCEPT CURTIME FROM TIME
D     ACCEPT DATEINT FROM DATE
D     MOVE YY TO TPCYEAR
D     MOVE MMDD TO TPCMD
D     MOVE DID OF ORDSTS-I TO DID OF DBUG-REC
D     MOVE CID OF ORDSTS-I TO CID OF DBUG-REC
D     MOVE WID of ORDSTS-I TO WID OF DBUG-REC
D     MOVE TPCDATE TO DATE6 OF DBUG-REC
D     MOVE CURTIME6 TO TIME6 OF DBUG-REC
D     MOVE TESTNUM TO ISONUM OF DBUG-REC
D     PERFORM VARYING J FROM 1 BY 1 UNTIL J = 16
D       MOVE DO-OLSPWH(J) TO DEBUG-OLSPWH(J)
D       MOVE DO-OLIID(J) TO DEBUG-OLIID(J)
D       MOVE DO-OLQTY(J) TO DEBUG-OLQTY(J)
D       MOVE   TO DEBUG-IPRICE(J)
D     END-PERFORM.



 PAYMENT-TRANSACTION.

    MOVE HISTORY-DATA OF PAYMENT-I TO HISTORY-DATA OF HIST-INFO.
    MOVE AMOUNT OF PAYMENT-I TO AMOUNT OF HIST-INFO.

    ACCEPT DATEINT FROM DATE.
    MOVE YY TO TPCYEAR.
    MOVE MMDD TO TPCMD.
    ACCEPT CURTIME FROM TIME.

    MOVE  DATETIME TO DATE-TIME OF HIST-INFO, HDT, ODT.

  THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
  FLAG IS SET AND IS FOR ISOLATION TEST USE

D   MOVE "PAY PRE-READ  " TO TXTDATA OF DBUG-REC2.
D   MOVE CDID OF CUSTOMER-REC TO CDID OF DBUG-REC2.
D   MOVE CWID OF CUSTOMER-REC TO CWID OF DBUG-REC2.
D   MOVE CID OF PAYMENT-I TO CID OF DBUG-REC2.
D   MOVE CDID OF CUSTOMER-REC TO DID OF DBUG-REC2.
D   MOVE AMOUNT OF PAYMENT-I TO
D         PAYMNT OF DBUG-REC2.
D   MOVE WID OF PAYMENT-I TO WID OF DBUG-REC2.
D   MOVE    TO CBAL OF DBUG-REC2.
D   MOVE CURTIME6 TO TIME6 OF DBUG-REC2.
D   MOVE TPCDATE TO DATE6 OF DBUG-REC2.
D   WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2".


    IF PAYMENT-TYPE EQUAL "C"
    MOVE PAY-CUST-KEY OF PAYMENT-I TO CUST-KEY
        OF CUSTOMER-REC
       PERFORM CUSTOMER-BY-NUMBER
    ELSE
    MOVE CWID OF PAYMENT-I TO CWID OF CSRCD OF CUST-REL-REC
    MOVE CDID OF PAYMENT-I TO CDID OF CSRCD OF CUST-REL-REC
    MOVE CLAST OF PAYMENT-I TO CLAST OF CUST-REL-REC


         PERFORM CUSTOMER-BY-NAME THRU CUSTOMER-BY-NAME-EXIT.

D   MOVE CBAL OF CSRCD OF CUSTOMER-REC TO CBAL OF DBUG-REC2.
    SUBTRACT AMOUNT OF PAYMENT-I
           FROM CBAL OF CSRCD OF CUSTOMER-REC.

    ADD AMOUNT OF PAYMENT-I
        TO CYTD OF CUSTOMER-REC.

    ADD 1 TO CPAYCNT OF CUSTOMER-REC.
    MOVE CUST-INFO TO PAYMENT-CUST-INFO.
    MOVE CBAL OF CSRCD OF CUSTOMER-REC TO CBAL OF PAYMNT-O.
    MOVE CCRDLM OF CSRCD OF CUSTOMER-REC
        TO CCRDLM OF PAYMNT-O.
    MULTIPLY CDCT OF CSRCD OF CUSTOMER-REC BY 1   GIVING
        CDCT OF PAYMNT-O.

    MOVE SPACES              TO MISC-CDATA.
    IF CCREDT OF CSRCD OF CUSTOMER-REC = "BC" THEN
      MOVE CDATA OF CSRCD OF CUSTOMER-REC (1:468)
         TO TEMP-DATA2
      MOVE TEMP-DATA2
         TO CDATA OF CSRCD OF CUSTOMER-REC (32:468)

      MOVE DID OF HISTORY-DATA OF HIST-INFO
```

```
                        TO DID OF CHAR-HIST-DATA
      MOVE WID OF HISTORY-DATA OF HIST-INFO
                        TO WID OF CHAR-HIST-DATA
      MOVE CID OF HISTORY-DATA OF HIST-INFO
                        TO CID OF CHAR-HIST-DATA
      MOVE CDID OF HISTORY-DATA OF HIST-INFO
                         TO CDID OF CHAR-HIST-DATA
      MOVE CWID OF HISTORY-DATA OF HIST-INFO
                         TO CWID OF CHAR-HIST-DATA
      MOVE AMOUNT OF HIST-INFO
                           TO AMOUNT OF CHAR-HIST-DATA
      MOVE CHAR-HIST-DATA TO CDATA OF CUSTOMER-REC(1:31)
      MOVE CDATA OF CUSTOMER-FILE TO MISC-CDATA
     END-IF.
     MOVE CUSTOMER-REC TO CUST-REL-REC.
     IF PAYMENT-TYPE EQUAL "C"
         CALL "qdbrunha" USING BY VALUE
              CSTMR-HASH-PTR UPDATER CUST-KEYS CSTMR-KEY-PTR
              CSTMR-DEF-PTR RET-CODE-PTR
     ELSE
           REWRITE CUSTOMER-REC

     END-IF.
     MOVE  PAY-DIST-KEY OF PAYMENT-I TO DIST-KEY.

     READ DISTRICT-FILE INVALID KEY
         MOVE "77" TO OUTPUT-FMT-NUM-3
         ROLLBACK
         GO TO PAYMENT-TRANSACTION-EXIT.

     ADD AMOUNT OF PAYMENT-I
        TO DYTD OF DISTRICT-REC.

     REWRITE DISTRICT-REC.

     MOVE WID OF PAYMENT-I TO WID OF WAREHOUSE-REC.


     READ WAREHOUSE-FILE.

     ADD AMOUNT OF PAYMENT-I
        TO WYTD OF WAREHOUSE-REC.

     REWRITE WAREHOUSE-REC.

     MOVE WNAME OF WAREHOUSE-REC TO
           WNAME OF HDATA OF HIST-INFO.
     MOVE DNAME OF DISTRICT-REC TO
           DNAME OF HDATA OF HIST-INFO.

     WRITE HISTORY-REC.

   THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
   FLAG IS SET AND IS FOR ISOLATION TEST USE

D    MOVE "PAY PRE-COMMIT" TO TXTDATA OF DBUG-REC2.
D    MOVE CDID OF CUSTOMER-REC TO CDID OF DBUG-REC2.
D    MOVE CWID OF CUSTOMER-REC TO CWID OF DBUG-REC2.
D    MOVE CID OF PAYMENT-I TO CID OF DBUG-REC2.
D    MOVE CDID OF CUSTOMER-REC TO DID OF DBUG-REC2.
D    MOVE WID OF PAYMENT-I TO WID OF DBUG-REC2.
     MOVE AMOUNT OF PAYMENT-I TO
           PAYMNT OF DBUG-REC2.
D    ACCEPT CURTIME FROM TIME.
D    MOVE CURTIME6 TO TIME6 OF DBUG-REC2.
D    MOVE TPCDATE TO DATE6 OF DBUG-REC2.
D    WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2".
D               CALL "delayme".


     COMMIT.

   THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
   FLAG IS SET AND IS FOR ISOLATION TEST USE

D    MOVE "PAY POST-COMMIT" TO TXTDATA OF DBUG-REC2.
D    MOVE CDID OF CUSTOMER-REC TO CDID OF DBUG-REC2.
D    MOVE CWID OF CUSTOMER-REC TO CWID OF DBUG-REC2.
D    MOVE CID OF PAYMENT-I TO CID OF DBUG-REC2.
D    MOVE CDID OF CUSTOMER-REC TO DID OF DBUG-REC2.
     MOVE AMOUNT OF PAYMENT-I TO
           PAYMNT OF DBUG-REC2.
D    MOVE WID OF PAYMENT-I TO WID OF DBUG-REC2.
D    MOVE CBAL OF CSRCD OF CUSTOMER-REC TO CBAL OF DBUG-REC2.
D    ACCEPT CURTIME FROM TIME.
D    MOVE CURTIME6 TO TIME6 OF DBUG-REC2.
D    MOVE TPCDATE TO DATE6 OF DBUG-REC2.
D    WRITE DBUGPRT-REC2 FORMAT IS "DBUGRCD2".
D    CLOSE DBUG-FILE2.
D    OPEN OUTPUT DBUG-FILE2.


     MOVE DIST-ADDRESS TO DST-DATA.
     MOVE WH-ADDRESS TO WH-DATA.
     MOVE CID OF CUSTOMER-REC TO CID OF PAYMNT-O.

     IF CCREDT OF CUSTOMER-REC = "BC"
     THEN MOVE "17" TO OUTPUT-FMT-NUM-3
     ELSE MOVE "19" TO OUTPUT-FMT-NUM-3
     END-IF.

 END-WAREHOUSE-UPDATE.
 PAYMENT-TRANSACTION-EXIT.

 CUSTOMER-BY-NUMBER.
        MOVE CID  OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(1)
        MOVE CDID OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(2)
        MOVE CWID OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(3)

        CALL "qdbrunha" USING BY VALUE
             CSTMR-HASH-PTR FETCHUPDATE CUST-KEYS CSTMR-KEY-PTR
             CSTMR-DEF-PTR RET-CODE-PTR

        IF RET-CODE >
          IF RET-CODE = 1
               MOVE "77" TO OUTPUT-FMT-NUM-3
               ROLLBACK
               GO TO PAYMENT-TRANSACTION-EXIT
             ELSE
                IF RET-CODE = 812
                   SET LOCK-OFF TO TRUE
                   GO TO CUSTOMER-BY-NUMBER
                END-IF
             END-IF
           END-IF.

 CUSTOMER-BY-NAME.

     MOVE CWID OF CUST-REL-REC TO CWIDR.
     MOVE CDID OF CUST-REL-REC TO CDIDR.
     MOVE CLAST OF CUST-REL-REC TO CLASTR.

     EXEC SQL DECLARE C1 CURSOR FOR
     SELECT RRN(CSTMRPF)
     FROM CSTMRPF
     WHERE CLAST = :CLASTR AND CDID = :CDIDR AND
     CWID = :CWIDR
     END-EXEC.

     EXEC SQL OPEN C1
     END-EXEC.

     EXEC SQL FETCH C1 FOR 1   ROWS INTO :HOST-ARRAY-ELEMENT
     END-EXEC.
     MOVE SQLERRD OF SQLCA(3) TO XX.

     EXEC SQL CLOSE C1
     END-EXEC.

     IF XX =
        IF TXN-TYPE = 'P'
        MOVE "77" TO OUTPUT-FMT-NUM-3
        ROLLBACK
        GO TO payment-transaction-EXIT
        END-IF
        IF TXN-TYPE = 'O'
        MOVE "62" TO ORDSTS-FMT-NUM
        ROLLBACK
        GO TO ORDER-STATUS-TRANSACTION-EXIT
        END-IF
     END-IF


     IF XX = 1
        CALL "TOOMANY" USING CWIDR, CDIDR, CLASTR, CUSTREL
     ELSE
        COMPUTE CUST-INDEX = (XX + 1) / 2
        MOVE HOST-ARRAY-ELEMENT(CUST-INDEX) TO CUSTREL
     END-IF.

 CUSTOMER-BY-NAME-EXIT.

     READ CUST-REL-FILE.
             IF LOCK-OCCURRED
                SET LOCK-OFF TO TRUE
                ROLLBACK
                GO TO CUSTOMER-BY-NAME
             END-IF
     MOVE CUST-REL-REC TO CUSTOMER-REC.




 ORDER-STATUS-TRANSACTION.

   THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
   FLAG IS SET AND IS FOR ISOLATION TEST USE

D    MOVE "ORDER STATUS PRE-READ  " TO TXTDATA OF DBUG-REC.
D    MOVE   TO OID OF DBUG-REC
D    PERFORM GET-ISOLATION-DATA-3.
D    WRITE DBUGPRT-REC FORMAT IS "DBUGRCD".

     MOVE WID OF ORDSTS-I TO OWID OF ORDERS-VIEW-REC.
     MOVE DID OF ORDSTS-I TO ODID OF ORDERS-VIEW-REC.
     MOVE ORD-CUST-KEY OF ORDSTS-I TO CUST-KEY OF CUSTOMER-REC.
 ORDER-STATUS-READS.
     IF ordsts-type = "C" THEN
        MOVE CID  OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(1)
        MOVE CDID OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(2)
        MOVE CWID OF CUSTOMER-REC TO KVAL OF CSTMR-KEY-DATA(3)

        CALL "qdbrunha" USING BY VALUE
             CSTMR-HASH-PTR FETCHUPDATE CUST-KEYS CSTMR-KEY-PTR
             CSTMR-DEF-PTR RET-CODE-PTR
        IF RET-CODE >
          IF RET-CODE = 1
                MOVE "62" TO ORDSTS-FMT-NUM
                GO TO ORDER-STATUS-TRANSACTION-EXIT
             ELSE
                IF RET-CODE = 812
                   SET LOCK-OFF TO TRUE
                   GO TO ORDER-STATUS-READS
                END-IF
             END-IF
          END-IF
     ELSE
        MOVE CLAST OF ORDSTS-I TO CLAST OF CUST-REL-REC
        MOVE CLAST OF CUST-REL-REC TO CLAST OF PAYMENT-I
        MOVE WID OF ORDSTS-I TO CWID OF CUST-REL-REC
        MOVE DID OF ORDSTS-I TO CDID OF CUST-REL-REC
        PERFORM CUSTOMER-BY-NAME THROUGH
            CUSTOMER-BY-NAME-EXIT
     END-IF.
     MOVE CID OF CUSTOMER-REC TO OCID OF ORDERS-VIEW-REC
                                 OCID OF ORDSTS-O.
     MOVE 999999 TO OID OF ORDERS-VIEW-REC.

     START ORDERS-VIEW KEY NOT < EXTERNALLY-DESCRIBED-KEY
     INVALID KEY
            MOVE "62" TO ORDSTS-FMT-NUM
```

```
            GO TO ORDER-STATUS-TRANSACTION-EXIT.
      READ ORDERS-VIEW PRIOR
D              IF TESTNUM = 9 THEN
D                 CALL "delayme"
D              END-IF

      MOVE OWID OF ORDERS-VIEW-REC TO
           OLWID OF ORDERLINE-VIEW-REC.
      MOVE ODID OF ORDERS-VIEW-REC TO
           OLDID OF ORDERLINE-VIEW-REC.
      MOVE OID OF ORDERS-VIEW-REC TO
           OLOID OF ORDERLINE-VIEW-REC OID OF ORDSTS-O.
      MOVE 1 TO OLNBR OF ORDERLINE-VIEW-REC.
      MOVE OLINES OF ORDERS-VIEW-REC TO
           OLINENBR OF ORDSTS-O.
      MOVE OCARID OF ORDERS-VIEW-REC TO
           OCARID OF ORDSTS-O.
      MOVE OENTDT OF ORDERS-VIEW-REC TO
           OENTDT OF ORDSTS-O.
      MOVE OENTTM OF ORDERS-VIEW-REC TO
           OENTTM OF ORDSTS-O.

      READ ORDERLINE-VIEW
      MOVE OL-INFO TO OLINEINFO(1)

      PERFORM varying I
            from 2 by 1 until I > OLINES OF ORDERS-VIEW-REC

         READ ORDERLINE-VIEW NEXT
         MOVE OL-INFO TO OLINEINFO(I)

      END-PERFORM.

        MOVE I TO ORDSTS-FMT-NUM.
D       MOVE OID OF ORRCD OF ORDERS-VIEW-REC TO OID OF DBUG-REC.
      COMMIT.

    THE FOLLOWING CODE WILL ONLY BE INCLUDED WHEN THE
    FLAG IS SET AND IS FOR ISOLATION TEST USE

D     MOVE "ORDER STATUS POST-COMMIT " TO TXTDATA OF DBUG-REC.
      MOVE   TO OID OF DBUG-REC
D     PERFORM GET-ISOLATION-DATA-4.
D     WRITE DBUGPRT-REC FORMAT IS "DBUGRCD".
D     CLOSE DBUG-FILE.
D     OPEN OUTPUT DBUG-FILE.


      MOVE CBAL OF CSRCD OF CUSTOMER-REC TO CBAL OF ORDSTS-O.
      MOVE CFIRST OF CUSTOMER-REC TO CFIRST OF ORDSTS-O.
      MOVE CINIT OF CUSTOMER-REC TO CINIT OF ORDSTS-O.
      MOVE CLAST OF CUSTOMER-REC TO CLAST OF ORDSTS-O.

 ORDER-STATUS-TRANSACTION-EXIT.
       EXIT.




 SET-UP-ROUTINE.

      ACCEPT DATEINT FROM DATE.
      MOVE YY TO TPCYEAR.
      MOVE MMDD TO TPCMD.
      IF YY < 7  THEN
        MOVE 2  TO TPCCEN.


 OPEN FILES
     OPEN  I-O   DISTRICT-FILE
                 WAREHOUSE-FILE
                 STOCK-FILE
                 CUSTOMER-FILE
                 CUST-REL-FILE
                 MAINICFF.
     OPEN INPUT  ITEM-FILE
                 ORDERLINE-VIEW
                 ORDERS-VIEW.
     OPEN EXTEND ORDERLINE-FILE.
     OPEN EXTEND ORDERS-FILE.
     OPEN EXTEND NEWORDER-FILE.
D    OPEN INPUT  ISO-IFILE.
D    OPEN OUTPUT DBUG-FILE.
D    OPEN OUTPUT DBUG-FILE2.
     OPEN EXTEND HISTORY-FILE.

     MOVE "ITEM_1"          TO ITEM-HASH-NAME.
     MOVE "IID"            TO KNAM OF ITEM-KEY-DATA(1).

     SET ITEM-HASH-PTR TO ADDRESS OF ITEM-HASH-NAME.
     SET RET-CODE-PTR TO ADDRESS OF RET-CODE.
     SET ITEM-DEF-PTR TO ADDRESS OF ITEM-DEF.
     SET ITEM-KEY-PTR TO ADDRESS OF ITEM-KEY.

     MOVE "STOCK"           TO STOCK-HASH-NAME.
     MOVE "STIID"           TO KNAM OF STOCK-KEY-DATA(2).
     MOVE "STWID"           TO KNAM OF STOCK-KEY-DATA(1).

     SET STOCK-HASH-PTR TO ADDRESS OF STOCK-HASH-NAME.
     SET RET-CODE-PTR  TO ADDRESS OF RET-CODE.
     SET STOCK-DEF-PTR TO ADDRESS OF STOCK-DEF.
     SET STOCK-KEY-PTR TO ADDRESS OF STOCK-KEY.

     MOVE "CSTMR"           TO CSTMR-HASH-NAME.
     MOVE "CID"            TO KNAM OF STOCK-KEY-DATA(1).
     MOVE "CDID"           TO KNAM OF STOCK-KEY-DATA(2).
     MOVE "CWID"           TO KNAM OF STOCK-KEY-DATA(3).

     SET CSTMR-HASH-PTR TO ADDRESS OF CSTMR-HASH-NAME.
     SET RET-CODE-PTR   TO ADDRESS OF RET-CODE.
     SET CSTMR-DEF-PTR  TO ADDRESS OF CUSTOMER-REC.
     SET CSTMR-KEY-PTR  TO ADDRESS OF CSTMR-KEY.
     MOVE SPACES TO HDATA OF HIST-INFO
                    OCARID OF ORDERS-REC.
     MOVE ZEROES TO OLDLVD OF ORDERLINE-REC
                    OLDLVT OF ORDERLINE-REC.

 CLOSE-ROUTINE.
 CLOSE ALL FILES
     CLOSE      DISTRICT-FILE
                STOCK-FILE
                CUSTOMER-FILE
                ITEM-FILE
                WAREHOUSE-FILE
                CUST-REL-FILE
                ORDERLINE-VIEW
                ORDERS-VIEW
                ORDERLINE-FILE
                ORDERS-FILE
                NEWORDER-FILE
D               DBUG-FILE
D               DBUG-FILE2
                HISTORY-FILE
                MAINICFF.

 END-OF-JOB.
     STOP RUN.
```

TOOMANY: Handles More Than 100 Customer Last Names

```
 PROCESS NOTRUNC NORANGE.
 IDENTIFICATION DIVISION.


   TOO MANY Program

      Files Accessed:   - CSTMR     (Read)
      Views Used:       - CSTMRLFNAM (C1 - SQL)


   PROGRAM-ID. TOOMANY.
   AUTHOR. DEPT-53G.
   INSTALLATION. IBM-ROCHESTER.
   DATE-WRITTEN.  9- 3-95.
   DATE-COMPILED. 12-14-92.
 ENVIRONMENT DIVISION.
 CONFIGURATION SECTION.
   SOURCE-COMPUTER. IBM-AS4  .
   SOURCE-COMPUTER. IBM-AS4  . WITH DEBUGGING MODE.
   OBJECT-COMPUTER. IBM-AS4  .

 DATA DIVISION.


 WORKING-STORAGE SECTION.


  1 HOST-VARIABLES.
     5 VWID                  PIC S9(4) COMP-4.
     5 VDID                  PIC S9(2) COMP-4.
     5 VCID                  PIC S9(6) COMP-4.
     5 VCLAST                 PIC X(16).
     5 VCFIRST                PIC X(16).
     5 VCOUNT                   PIC S9(4) COMP-4.
     5 RRN    PIC S9(9) COMP-4.
  1 I                       PIC S9(4) COMP-4.


    SQL INCLUDE

     EXEC SQL
       INCLUDE SQLCA
     END-EXEC.


    SQL ERROR/WARNING Messages

     EXEC SQL
       WHENEVER SQLERROR CONTINUE
     END-EXEC.

     EXEC SQL
       WHENEVER SQLWARNING CONTINUE
     END-EXEC.


 LINKAGE SECTION.

   1 CWIDR    PIC S9(4) COMP-4.
   1 CDIDR    PIC S9(2) COMP-4.
   1 CLASTR   PIC X(16).
   1 CUSTREL  PIC 9(8) COMP-4.

 PROCEDURE DIVISION USING CWIDR, CDIDR, CLASTR, CUSTREL.


 START-OF-PROGRAM.


     MOVE CWIDR TO VWID.
     MOVE CDIDR TO VDID.
     MOVE CLASTR TO VCLAST.

     EXEC SQL
     SELECT COUNT( )
     INTO :VCOUNT
```

```
          FROM CSTMRPF
          WHERE (CWID = :VWID
                AND CDID = &colonVDID AND CLAST = :VCLAST)
          END-EXEC.

          COMPUTE VCOUNT = 1    VCOUNT + 1.
          DIVIDE VCOUNT BY 2  GIVING VCOUNT ROUNDED.

          EXEC SQL DECLARE C1 CURSOR FOR
          SELECT RRN(CSTMRPF)
          FROM CSTMRPF
          WHERE CLAST = :VCLAST AND CDID = :VDID AND
          CWID = :VWID
          END-EXEC.

          EXEC SQL OPEN C1
          END-EXEC.

          PERFORM VARYING I FROM 1 BY 1 UNTIL I > VCOUNT

          EXEC SQL FETCH C1 INTO :RRN
          END-EXEC

          END-PERFORM.

          EXEC SQL CLOSE C1
          END-EXEC.

          MOVE RRN TO CUSTREL.


         EXIT.
```

ATPCCMTRS: Stock Level Start Program

```
           PGM

           DCL       VAR(&WRHS) TYPE( CHAR) LEN(4)

           DCL       VAR(&QLIB) TYPE( CHAR) LEN(1 )
           DCL       VAR(&DATALIB) TYPE( CHAR) LEN(1 ) +
                       VALUE(TPCCD697)
           DCL       VAR(&APPLIB) TYPE( CHAR) LEN(1 ) +
                       VALUE(TPCCNCSRVR)


           MONMSG    MSGID(CPF    )
           CHGJOB    RUNPTY(2 ) LOG(4    SECLVL) LOGCLPGM( YES)

  /        RTVDTAARA  DTAARA(TPCCINFO/DATALIB) RTNVAR(&DATALIB)  /
           ADDLIBLE   LIB(&APPLIB) /  TPC-C application programs +
                       and display file  /
           MONMSG    MSGID(CPF    )
           ADDLIBLE   LIB(&DATALIB) /  TPC-C data base library  /
           MONMSG    MSGID(CPF    )

           OVRDBF    FILE(ORDLINPF) TOFILE(ORDLINPF) +
                      NBRRCDS(16) LVLCHK( NO) +
                      SEQONLY( YES 16)

           OVRDBF    FILE(ORDLINLF) TOFILE(ORDLINLF) +
                      NBRRCDS(16) LVLCHK( NO) +
                      SEQONLY( YES 16)

           OVRDBF    FILE(ORDLIN) TOFILE(ORDLIN) +
                      NBRRCDS(16) LVLCHK( NO) +
                      SEQONLY( YES 16)

           OVRDBF    FILE(DSTRCT) TOFILE(DSTRCT) LVLCHK( NO) +
                     SHARE( YES)

           OVRDBF    FILE(STOCKPF) TOFILE(STOCKPF) WAITRCD(2   ) +
                      LVLCHK( NO)

           OVRDBF    FILE(STOCK) TOFILE(STOCK) LVLCHK( NO)

           STRCMTCTL  LCKLVL( CS)
 FIRSTCALL:  CALL      PGM(&APPLIB/STKLVLMTR)

ENDIT:      ENDPGM
```

STKLVLMTR: Stock Level Transaction Program

```
      PROCESS NOTRUNC NORANGE.
      IDENTIFICATION DIVISION.


       Stock Level Program       (Transaction 5 (PF6 of TPCC))

          Files Accessed:   - DSTRCT    (Read)
                            ORDLIN    (Read)
                            STOCK     (Read)

          Views Used:       - ORDERLINLF (C1 - SQL)
                            STOCKLF3   (C1 - SQL)

          Join Position 1:    ORDLIN

          Join Position 2:    STOCK

       This program retrieves the number of unique items ordered
       in the last 2  orders that have a stock quantity less than
       the threshold level entered.  The threshold will be between
       1  and 2 .

       The home Warehouse ID and Library of the data queues are
       passed to this program as parameters.  All jobs processed by
       this program are received from a data queue and the results
       sent out using a returning data queue.  One Stock Level
       program operates for 1  districts (ATPCCs) of a warehouse;
       therefore, only the district value and threshold are
       reinitialized with each job processed.  A threshold value of
       99 will terminate Stock Level.

       Processing the Stock Level transactions consists of:
       1.  Read ICF file and wait for an entry
       2.  Reading the DSTRCT file
       3.  Calculating the order range
       4.  Read the ORDERLINE and STOCK files (Avg of 2   reads)
       5.  Count the number of records selected.
       6.  Write to ICF file to return the answer to the user


       PROGRAM-ID. STKLVL.
       AUTHOR. DEPT-53G.
       INSTALLATION. IBM-ROCHESTER.
       DATE-WRITTEN.  9- 3-95.
       DATE-COMPILED. 12-14-92.
      ENVIRONMENT DIVISION.
      CONFIGURATION SECTION.
        SOURCE-COMPUTER. IBM-AS4  .
        OBJECT-COMPUTER. IBM-AS4  .
        INPUT-OUTPUT SECTION.
        FILE-CONTROL.
          SELECT DSTRCT
                ASSIGN TO DATABASE-DSTRCT
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES
                FILE STATUS IS DISTRICT-FILE-STATUS.
          SELECT ORDERLINE
                ASSIGN TO DATABASE-ORDLINLF
                ORGANIZATION IS INDEXED
                ACCESS MODE IS DYNAMIC
                FILE STATUS IS ORDERLINE-FILE-STATUS
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES.
          SELECT STOCK
                ASSIGN TO DATABASE-STOCK
                ORGANIZATION IS INDEXED
                ACCESS MODE IS RANDOM
                FILE STATUS IS STOCK-FILE-STATUS
                RECORD KEY IS EXTERNALLY-DESCRIBED-KEY
                WITH DUPLICATES.
          SELECT STOCICFF ASSIGN TO WORKSTATION-STOCICFF-SI
                 ORGANIZATION IS TRANSACTION
                 FILE STATUS IS STATUS-IND MAJ-MIN.
        I-O-CONTROL.
          COMMITMENT CONTROL FOR DSTRCT ORDERLINE.

        DATA DIVISION.
        FILE SECTION.
      FD  DSTRCT
          LABEL RECORDS ARE STANDARD
          DATA RECORD IS DSTRCT-RECORD.
       1  DSTRCT-RECORD.
          COPY DDS-DSRCD OF DSTRCT.
      FD  ORDERLINE
          LABEL RECORDS ARE STANDARD
          DATA RECORD IS ORDERLINE-RECORD.
       1  ORDERLINE-RECORD.
          COPY DDS-OLRCD OF ORDLINLF.
      FD  STOCK
          LABEL RECORDS ARE STANDARD
          DATA RECORD IS STOCK-RECORD.
       1  STOCK-RECORD.
          COPY DDS-STRCD OF STOCK.
       FD STOCICFF
          LABEL RECORDS ARE STANDARD.
        1  ICFREC.
          COPY DDS-ALL-FORMATS OF STOCICFF.

        5 STKLVL-O REDEFINES STOCICFF-RECORD.
            6 FILLER                PIC X(2).
            6 BLWSTK                PIC S9(2) COMP-4.



      WORKING-STORAGE SECTION.

       1 STOCK-KEY.
        3 STOCK-KEY-DATA OCCURS 5 TIMES.
          5  KNAM   PIC X(1 ).
          5  KVAL   PIC S9(9) COMP-4.

       1 STOCK-HASH-PTR   USAGE POINTER.

       1 STOCK-HASH-NAME  PIC X(1 ).
       1 FUNCT           PIC X(1).
       1 KEYS            PIC S9(9) COMP-4.
       1 RET-CODE         PIC S9(9) COMP-4.

       1  RET-CODE-PTR    USAGE POINTER.
       1  STOCK-DEF-PTR   USAGE POINTER.
       1 STOCK-KEY-PTR USAGE POINTER.


       1 UPDATER              PIC X(1) VALUE "3".
       1 FETCHR               PIC X(1) VALUE "1".
       1 FETCHUPDATE           PIC X(1) VALUE "2".

       1 CUST-KEYS             PIC 9(1) COMP-4 VALUE 3.
       1 STOCK-KEYS            PIC 9(1) COMP-4 VALUE 2.
```

```
 1 ITEM-KEYS            PIC 9(1) COMP-4 VALUE 1.


 1 MAJ-MIN.
    3  MAJ    PIC X(2).
    3  MIN    PIC X(2).

 1 CMNF-INDIC-AREA.
    3 CMNF-INDIC    PIC 1 OCCURS 99 TIMES
                  INDICATOR 1.

  1   TRANSACTION-INPUT.
        6    TXN-TYPE          PIC X.
        6    JOBNAME           PIC X(1 ).
        6    CLIENT-INPUT      PIC X(2 2).
        6 STKLVL-I REDEFINES CLIENT-INPUT.
          8 WID               PIC S9(4) COMP-4.
          8 DID               PIC S9(2) COMP-4.
          8 THRESHOLD          PIC S9(2) COMP-4.
          8 BLWSTK            PIC S9(4) COMP-4.

77 STATUS-IND PIC X(2).
 1  ITEM-TABLE.
    5  ITEM-TABLE-ELEMENT OCCURS 3   TIMES.
        7  ITEM-TABLE-KEY.
           9  ITEM-TABLE-IID      PIC S9(6).

77  DISTRICT-FILE-STATUS     PIC X(2).
77  ORDERLINE-FILE-STATUS    PIC X(2).
77  STOCK-FILE-STATUS       PIC X(2).

 1  NUMBER-OF-ITEMS         PIC S9(5) COMP-4.

77 DUPS             PIC S9(5) COMP-4.
77 HIORDER           PIC S9(9) COMP-4.
77 LOORDER           PIC S9(9) COMP-4.
77 IN-LOOP           PIC S9(5) COMP-4.
77 OUT-LOOP          PIC S9(5) COMP-4.


LINKAGE SECTION.


PROCEDURE DIVISION.


START-OF-PROGRAM.


STOCK-WATCH-PROGRAM.

      OPEN INPUT DSTRCT
           INPUT STOCK
           INPUT ORDERLINE
      OPEN I-O STOCICFF

    READ STOCICFF
    INTO TRANSACTION-INPUT INDICATORS ARE CMNF-INDIC-AREA.
    IF MAJ = "81"
       GO TO END-OF-PROGRAM
    END-IF.


    MOVE "STOCK"           TO STOCK-HASH-NAME.
    MOVE "STWID"           TO KNAM OF STOCK-KEY-DATA(1).
    MOVE "STIID"           TO KNAM OF STOCK-KEY-DATA(2).

    SET STOCK-HASH-PTR  TO ADDRESS OF STOCK-HASH-NAME.
    SET RET-CODE-PTR    TO ADDRESS OF RET-CODE.
    SET STOCK-DEF-PTR   TO ADDRESS OF STOCK-RECORD.
    SET STOCK-KEY-PTR   TO ADDRESS OF STOCK-KEY.

LOOP-FOREVER.

    MOVE WID OF STKLVL-I TO DWID, OLWID, STWID.

    MOVE DID OF STKLVL-I TO DID OF DSRCD, OLDID.

    READ DSTRCT.

   Select all Detail Order Lines for the Last 2  Orders
   that are below the threshold and also match a unique
   stock item.

    SUBTRACT 1  FROM DNXTOR GIVING HIORDER.
    SUBTRACT 2  FROM DNXTOR GIVING LOORDER.
READ-ORDERLINE-FILE.

    MOVE LOORDER  TO OLOID OF ORDERLINE-RECORD.

    MOVE   TO NUMBER-OF-ITEMS.

    READ ORDERLINE.

    MOVE OLIID TO STIID.

    MOVE WID OF STKLVL-I    TO KVAL OF STOCK-KEY-DATA(1)
    MOVE STIID            TO KVAL OF STOCK-KEY-DATA(2)

     CALL "qdbrunha" USING BY VALUE
          STOCK-HASH-PTR FETCHR STOCK-KEYS STOCK-KEY-PTR
          STOCK-DEF-PTR RET-CODE-PTR
    IF STQTY IS LESS THAN THRESHOLD
       ADD 1 TO NUMBER-OF-ITEMS
       MOVE STIID TO ITEM-TABLE-IID(NUMBER-OF-ITEMS)
    END-IF.

READ-ORDERLINE-FILE-NEXT.

    READ ORDERLINE NEXT AT END GO TO SORT-ITEM-TABLE
    END-READ

    IF OLDID NOT EQUAL TO DID OF STKLVL-I
      GO TO SORT-ITEM-TABLE
    END-IF

    IF (OLOID > HIORDER) THEN GO TO SORT-ITEM-TABLE
       ELSE
        MOVE OLIID TO STIID

    MOVE WID OF STKLVL-I    TO KVAL OF STOCK-KEY-DATA(1)
    MOVE STIID            TO KVAL OF STOCK-KEY-DATA(2)

     CALL "qdbrunha" USING BY VALUE
          STOCK-HASH-PTR FETCHR STOCK-KEYS STOCK-KEY-PTR
          STOCK-DEF-PTR RET-CODE-PTR
        IF STQTY IS LESS THAN THRESHOLD
          ADD 1 TO NUMBER-OF-ITEMS
          MOVE STIID TO ITEM-TABLE-IID(NUMBER-OF-ITEMS)
        END-IF
    END-IF

    GO TO READ-ORDERLINE-FILE-NEXT.

SORT-ITEM-TABLE.
     COMMIT

    PERFORM DISTINCT-SORT.

DISPLAY-ANSWER.
    WRITE ICFREC FORMAT IS "SNDDATA"
         INDICATORS ARE CMNF-INDIC-AREA.

    READ STOCICFF
    INTO TRANSACTION-INPUT INDICATORS ARE CMNF-INDIC-AREA.
    IF MAJ = "81"
       GO TO END-OF-PROGRAM
    END-IF.

    GO TO LOOP-FOREVER.

DISTINCT-SORT.
    IF NUMBER-OF-ITEMS >
      MOVE 1 TO BLWSTK OF STKLVL-O
      PERFORM VARYING OUT-LOOP FROM 2 BY 1 UNTIL OUT-LOOP
           IS GREATER THAN NUMBER-OF-ITEMS
        MOVE   TO DUPS
        PERFORM VARYING IN-LOOP FROM 1 BY 1 UNTIL IN-LOOP
           IS EQUAL TO OUT-LOOP
          IF ITEM-TABLE-ELEMENT(IN-LOOP) =
            ITEM-TABLE-ELEMENT(OUT-LOOP)
           ADD 1 TO DUPS
           END-IF
        END-PERFORM
       IF DUPS =
          ADD 1 TO BLWSTK OF STKLVL-O
          END-IF
      END-PERFORM
      ELSE MOVE   TO BLWSTK OF STKLVL-O.

END-OF-PROGRAM.

    STOP RUN.
    EXIT.
```

DLVRICFF: Delivery ICF File on Server

```
A
A
A           ICF file for NEW ORDER transaction
A
A
A    File level indicators:
A
A                                INDARA
A
A
A           ICF RECORD FORMATS
A
A         R RCVDATA                TEXT('DATA RECEIVED FROM -
A                                 THE REMOTE SYSTEM.')
A           RCVFLD      23 A       TEXT('RECORD KEY')
A         R SNDDATA                TEXT('DATA SENT TO THE   -
A                                 REMOTE SYSTEM.')
A           SNDFLD      67 A       TEXT('RECORD KEY')
A         R EVOKPGM                TEXT('EVOKE THE TARGET   -
A                                 PROGRAM.')
A  5                              EVOKE(&LIB/&PGMID)
A                                 SECURITY(3  USER)
A           PGMID        1 A  P
A           LIB          1 A  P
A         R ENDREC
```

MAINICFF: Neworder/Payment/Order Status ICF Files on Server

```
A
A
A           ICF file for NEW ORDER transaction
A
A
A    File level indicators:
A
```

```
A                                INDARA
A
A                               RCVTRNRND(15 'END OF DATA')
A
A  3                             DETACH
A
A                               INDTXT(3  '3 ->DETACH TARG-
A                               ET PROGRAM.')
A
A                               RCVDETACH(35 'RECEIVED   -
A                               DETACHED.')
A
A
A
A           ICF RECORD FORMATS
A
A         R RCVDATA               TEXT('DATA RECEIVED FROM -
A                               THE REMOTE SYSTEM.')
A           RCVFLD      23 A      TEXT('RECORD KEY')
A         R SNDDATA               TEXT('DATA SENT TO THE   -
A                               REMOTE SYSTEM.')
A           SNDFLD      67 A      TEXT('RECORD KEY')
A         R EVOKPGM               TEXT('EVOKE THE TARGET   -
A                               PROGRAM.')
A                               SECURITY(3  USER)
A                               EVOKE(TPCCNCSRVR/ATPCCMTRA)
A         R ENDREC
```

STOCICFF: Stock Level ICF File on Server

```
A
A
A           ICF file for NEW ORDER transaction
A
A
A    File level indicators:
A
A                                INDARA
A
A                               RCVTRNRND(15 'END OF DATA')
A
A  3                             DETACH
A
A                               INDTXT(3  '3 ->DETACH TARG-
A                               ET PROGRAM.')
A
A                               RCVDETACH(35 'RECEIVED   -
A                               DETACHED.')
A
A
A
A           ICF RECORD FORMATS
A
A         R RCVDATA               TEXT('DATA RECEIVED FROM -
A                               THE REMOTE SYSTEM.')
A           RCVFLD      23 A      TEXT('RECORD KEY')
A         R SNDDATA               TEXT('DATA SENT TO THE   -
A                               REMOTE SYSTEM.')
A           SNDFLD      67 A      TEXT('RECORD KEY')
A         R EVOKPGM               TEXT('EVOKE THE TARGET   -
A                               PROGRAM.')
A                               SECURITY(3  USER)
A                               EVOKE(TPCCNCSRVR/ATPCCMTRS)
A         R ENDREC
```

Appendix E. RTE Scripts

RTE Parameters

```
/  NOTICE! Variables can be a maximum of 2   characters in length  /

/                /
/  Hosts section  /
/                /
MASTER rte41
SLAVES r1,r5,r6,r7,r8,r9,r1 ,r11,r12,r13,r14,r15,r16,r17,r18,r19,r2 ,r21,
 r22,r23,r24,r25,r26,r27,r28,r29,r3 ,r34,r36,r38,r39,r4 ,r42,r43,r44,r66,
 r67,r81,r82,r83,r84,r85,r86,r87,r88,r89,r9 ,r91,r92,r93,r94,r95,r96,r97,
 r98,r99

/                 /
/  Reports section  /
/                 /
OUTPUT_GROUPS = "FULL"
OUTPUTNAME = "runs/TPCC"
FULL = "r1 r5 r6 r7 r8 r9 r1  r11 r12 r13 r14 r15 r16 r17 r18 r19 r2  r21
  r22 r23 r24 r25 r26 r27 r28 r29 r3  r34 r36 r38 r39 r4  r42 r43 r44 r66
  r67 r81 r82 r83 r84 r85 r86 r87 r88 r89 r9  r91 r92 r93 r94 r95 r96 r97
  r98 r99"
WINDOW = "2 :  "

/                       /
/  Client Login section  /
/                       /
CLIENT MARINERS tpccuser pete96july
CLIENT TWINS    tpccuser pete96july
CLIENT BLUEJAYS tpccuser pete96july
CLIENT ROYALS   tpccuser pete96july
CLIENT EXPOS    tpccuser pete96july
CLIENT ANGELS   tpccuser pete96july
CLIENT WHITESOX tpccuser pete96july
CLIENT PHILLIES tpccuser pete96july
CLIENT METS     tpccuser pete96july
CLIENT REDS     tpccuser pete96july
CLIENT DODGERS  tpccuser pete96july
CLIENT PADRES   tpccuser pete96july
CLIENT BRACKETS tpccuser pete96july
CLIENT COMMA    tpccuser pete96july
CLIENT COLON    tpccuser pete96july
CLIENT DASH     tpccuser pete96july
CLIENT ELLIPSES tpccuser pete96july
CLIENT HYPHEN   tpccuser pete96july
CLIENT PERIOD   tpccuser pete96july
CLIENT QUESTION tpccuser pete96july

/                                    /
/  Terminal Emulation Program section  /
/                                    /
PROGRAM me525  "/usr/bin/me525  %s 2>&1"     /  Without SNA  /
PROGRAM me525 s "/usr/bin/me525  -s %s 2>&1" /  With SNA    /

/                      /
/  Sub-network section  /
/                      /
/  Specify an emulator program and a group of slaves to use together  /
SUB_NETWORK x 1t me525   r5,r6
SUB_NETWORK x 2t me525   r7,r8
SUB_NETWORK x 3t me525   r26,r27
SUB_NETWORK x 4t me525   r28,r29
SUB_NETWORK x 5t me525   r3 ,r34
SUB_NETWORK x 6t me525   r36,r38
SUB_NETWORK x 7t me525   r39,r4
SUB_NETWORK x 8t me525   r42,r43
SUB_NETWORK x 9t me525   r44,r66
SUB_NETWORK x1 t me525   r67,r81
SUB_NETWORK x11t me525   r82,r83
SUB_NETWORK x12t me525   r84
SUB_NETWORK x13t me525   r9,r1
SUB_NETWORK x14t me525   r11,r12
SUB_NETWORK x15t me525   r14,r15
SUB_NETWORK x16t me525   r16,r17
SUB_NETWORK x17t me525   r18,r19
SUB_NETWORK x18t me525   r2 ,r21
SUB_NETWORK x19t me525   r22,r23
SUB_NETWORK x2 t me525   r24,r25
SUB_NETWORK x21t me525   r85,r86
SUB_NETWORK x22t me525   r87,r88
SUB_NETWORK x23t me525   r89
SUB_NETWORK x24t me525   r9 ,r91
SUB_NETWORK x25t me525   r1
SUB_NETWORK x26t me525   r92
SUB_NETWORK x27t me525   r93
SUB_NETWORK x28t me525   r94
SUB_NETWORK x29t me525   r95
SUB_NETWORK x3 t me525   r96
SUB_NETWORK x31t me525   r97
SUB_NETWORK x32t me525   r98
SUB_NETWORK x33t me525   r99
SUB_NETWORK x34t me525   r13

/                   /
/  Start run section  /
/                   /
START TWINS    x 1t 9
START TWINS    x13t 63
START MARINERS  x 2t 9
START MARINERS  x14t 63
START BLUEJAYS  x 3t 9
START BLUEJAYS  x15t 63
START ROYALS    x 4t 9
START ROYALS    x16t 63
START EXPOS     x 5t 9
START EXPOS     x17t 63
START ANGELS    x 6t 9
START ANGELS    x18t 63
START WHITESOX  x 7t 9
START WHITESOX  x19t 63
START PHILLIES  x 8t 9
START PHILLIES  x2 t 63
START METS      x 9t 9
START METS      x21t 63
START REDS      x1 t 9
START REDS      x22t 63
START DODGERS   x11t 95
START DODGERS   x23t 375
START DODGERS   x25t 2 5
START PADRES    x12t 45
START PADRES    x24t 75
START PADRES    x34t 33
START COLON     x26t 33
START BRACKETS  x27t 33
START ELLIPSES  x28t 33
START HYPHEN    x29t 33
START COMMA     x3 t 33
START PERIOD    x31t 33
START QUESTION  x32t 33
START DASH      x33t 33

/                     /
/  Run Length section  /
/                     /
RAMPUP   = 4 :
RUNTIME  = 2:  :
RAMPDOWN = 2 :
INTERVAL = 2:    /  Interval to calculate mix from  /

/                         /
/  Global Variable section  /
/                         /
NOBEGIN              =
KEYSTROKE_PACKET_SIZE = 1

MAX_CONCURRENT_SPAWN  = 2
SPAWN_COUNT          = 1
LOGIN_TIMEOUT        = 12   /  seconds  /
BEGIN_WAIT           = 18

/                /
/  Flags section  /
/                /
#define TES_FLAG_TRACE         x      1
#define TES_FLAG_KEYSTROKE_TIME  x     2
#define TES_FLAG_LOCAL_LOG      x     4
#define TES_FLAG_LOCAL_TRACE    x     8

SETFLAG ALL TES_FLAG_TRACE
SETFLAG ALL TES_FLAG_LOCAL_TRACE

/                              /
/  Transaction Settings section  /
/                              /
/         Think Time, Menu Delay, Resp Delay, %desired, % min, % max  /
NEWORDER =    "12.2 ,     .  ,        .  "
PAYMENT  =    "12.2 ,     .  ,        .  ,     43.2,   42. ,  45.3"
ORDSTAT  =    "1 .2 ,     .  ,        .  ,      4.1,   3.95,   4.4"
DELIVERY =    " 5.2 ,     .  ,        .  ,      4.1,   3.95,   4.4"
STOCKLEV =    " 5.2 ,     .  ,        .  ,      4.1,   3.95,   4.4"
```

Declarations

```
/                                                                      /
/     user_tpcc.h                                                    /
/                                                                      /

#ifndef USER_TPCC_H
#define USER_TPCC_H
/                                                                      /
/     run-time constant for customer last name from   to 255,          /
/     run-time constant for customer id from   to 1 23,               /
/     run-time constant for item id from   to 8191.                   /
/                                                                      /
#define   LASTC    117
#define   CUSTC    319
#define   ITEMC    3849

/                                                                      /
/     transaction type                                               /
/                                                                      /
#define   NEWORDER  1
#define   PAYMENT          2
#define   ORDSTAT          3
#define   DELIVERY  4
#define   STOCKLEV  5

/                                                                      /
/     transaction structures                                         /
/                                                                      /
struct neword_struct {
    char          invalid; /  transaction completed sucessfully  /
    long          did;
    long          cid;
    long          oid;          /  Order-ID returned from client  /
    long          nloop;          /  number of order line, avg = 15  /
```

```
    char          oremote; /  1 for remote order, 1 %  /
    long          olremote;        /  number of remote order line, 1%  /
    char          rollback;        /  actually saw rollback text on screen  /
    struct items_struct {
         long          olswid;
         long          oliid;
         long          olquantity;
    } item[15];
};

struct payment_struct {
    char          invalid; /  transaction completed sucessfully  /
    long did;
    long cid;
    long cwid;
    long cdid;
    char clast[17];
    double amount;
    char byname;                   /  1 for by last name,   for by id  /
    char remote;                   /  1 for remote wardhouse,   otherwise  /
};

struct ordstat_struct {
    char          invalid; /  transaction completed sucessfully  /
    long did;
    long cid;
    char clast[17];
    char byname;                   /  1 for by last name,   for by id  /
};

struct delivery_struct {
    char          invalid; /  transaction completed sucessfully  /
    char carrier;
};

struct stocklev_struct {
    char          invalid; /  transaction completed sucessfully  /
    long threshold;
};

struct generic_struct {
    char          invalid; /  transaction completed sucessfully  /
};

union transaction_info {
    char  invalid;
    struct generic_struct  generic;
    struct neword_struct  neword;
    struct payment_struct  payment;
    struct ordstat_struct  ordstat;
    struct delivery_struct delivery;
    struct stocklev_struct stocklev;
};

struct UserGlobal {
    int total_users;
    int max_warehouses;
    int keystroke_sleep;
    int login_timeout;
    int keystroke_packet_size;
    double chances[MAX_TRAN_TYPE];
    double think[MAX_TRAN_TYPE];
    double emulex_response[MAX_TRAN_TYPE];
    double emulex_menu    [MAX_TRAN_TYPE];
};

struct UserLocal {
    int Warehouse;
    int District;
};

struct user_data_header {
};

extern UserGlobal  shmglobal;
extern UserLocal   shmlocal;

#endif
```

Master Script

```
/                                                                       /
/      user_master.C                                                    /
/                                                                       /

#define _H_CUR 1
#include <cur  .h>
#undef _H_CUR 1
extern "C" {
#include "data/cur 1.h"
int wrefresh (WINDOW  );
int wclrtoeol(WINDOW  );
int setupterm(char ,FILE ,int );
int nodelay(int);
int keypad(int);
int wgetch(WINDOW  );
}
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <unistd.h>
#include "data/rte.h"
#include "data/Stats.h"
#include "data/misc.h"
#include "user_tpcc.h"

struct header_s {
    int slave;
    int num;
    int type;
    int num_timestamps;
    int user_data_length;
    int data_type;
};


char  get_variable(char  name);
int get_variable(char  name, int  number);
int send_global_data(void);
int make_ratios (double  buffer);
extern int ramp_up_complete;
extern int interval_start_time, interval_stop_time;
extern "C" int strcasecmp(char  s1, char  s2);
extern "C" int strncasecmp(char  s1, char  s2, int n);

struct UserSpawnData {
    int Warehouse;
    int District;
};

int user_statistics_print(void);
int user_spawn(int  length, char  buffer);
int user_finished(int length, char  buffer);

extern SlaveStatus slave_status[MAX_SLAVES];

extern Stats status[MAX_TRAN_TYPE][MAX_TIMES];
extern WINDOW  statistics_win;
extern UserGlobal  shmglobal;

/  Transaction mix parameters  /
double ratio_desired[6], ratio_min[6], ratio_max[6],
                ratio_range[6];
char  ratio_names[] = { "RTE", "NEWORDER", "PAYMENT", "ORDSTAT", "DELIVERY",
                  "STOCKLEV", NULL };
char  Status_Names[] = {"Menu", "Keying", "Response", "Think"};


char  transaction_names[] = { "RTE", "New Order", "Payment", "Order Stat",
                     "Delivery", "Stock Level", NULL };

static int current_status = 2, status_needs_refresh = 1;

int user_statistics_print(void) {
    int i;
    static int count =  ;
    double ratios[6];
    if (status_needs_refresh) {
         count =  ;
         status_needs_refresh =  ;
         wmove  (statistics_win,  ,  );
         wprintw (statistics_win, "%11s %8s %8s %8s %8s %8s %6s %6s %6s",
                  Status_Names[current_status], "9 %", "Avg", "Min", "Max",
                  "Samples", "Ratio", "Mix", "Think");
    }
    make_ratios(ratios);


    for (i = 1; i <= 5; i++) {
         /  The reason we do this is because calculating the percentiles
            is expensive  /
         if (count % 1  ==  ) {
             wmove  (statistics_win, i,  );
             wprintw (statistics_win, "%11s %8.2f",
                      transaction_names[i], status[i][current_status]
                           .ninety()/1   . );
             count =  ;
         }
         wmove  (statistics_win, i, 21);
         wprintw (statistics_win, "%8.2f %8.2f %8.2f %8d %6.2f %6.2f %6.2f",
                  status[i][current_status].average()/1   . ,
                  status[i][current_status].min()/1   . ,
                  status[i][current_status].max()/1   . ,
                  status[i][current_status].samples(),
                  ratios[i], shmglobal->chances[i],
                  status[i][3].average()/1   . );
    }
    wmove  (statistics_win, 7,  );

    extern int runtime_counts[MAX_TRAN_TYPE];
    extern int begin_time, ramp_up, run_time;
    int start = interval_start_time;
    int stop  = interval_stop_time;
    double interval = ((double)(stop-start) / (1    6 ));
    double samples = status[1][2].samples();
    if (interval <=   || samples <=  ) {
         wprintw (statistics_win, "TPM-C: %7s / ", "-------");
    } else {
         wprintw (statistics_win, "TPM-C: %7.2f / ", samples/interval);
    }
    samples = runtime_counts[1];
    if (samples >  ) {
         start = begin_time+((ramp_up>= )?ramp_up: );
         if (run_time >   && stop > begin_time + ramp_up + run_time) {
             stop = begin_time + ramp_up + run_time;
         }
         interval = (double)(stop - start)/(1   .  6 . );
         wprintw (statistics_win, "%7.2f", samples/interval);
    } else {
         wprintw (statistics_win, "-------");
    }

    count++;
    return RTE_OK;
}

const int MAX_WAREHOUSES = 21  ;
const int DISTRICT_SIZE  = 1 ;
int num_warehouses = -1;
int warehouses[MAX_WAREHOUSES DISTRICT_SIZE];
int user_spawn(int number, int  length, char  buffer) {
    int i, min_index;
    UserSpawnData  ptr = (UserSpawnData  )buffer;
     length = sizeof( ptr);

    min_index =  ;
```

```
    for (i = 1; i < (num_warehouses) DISTRICT_SIZE && i < MAX_WAREHOUSES DISTRICT_SIZE; i++) {
         if (warehouses[i] < warehouses[min_index]) {
             min_index = i;
         }
    }

    ptr->Warehouse = min_index / DISTRICT_SIZE + 1;
    ptr->District  = min_index % DISTRICT_SIZE + 1;
    warehouses[min_index]++;
    return RTE_OK;
}

int user_finished(int length, char  buffer) {
    UserSpawnData  ptr = (UserSpawnData  )buffer;
    int temp = (ptr->Warehouse-1) 1 +ptr->District-1;
    warehouses[temp]--;
    return RTE_OK;
}


double limit(double min, double max, double val) {
    if (val < min)
         return min;
    if (val > max)
         return max;
    return val;
}


int make_ratios (double  buffer) {
    int neword   = status[NEWORDER][ ].samples();
    int payment  = status[PAYMENT] [ ].samples();
    int ordstat  = status[ORDSTAT] [ ].samples();
    int delivery = status[DELIVERY][ ].samples();
    int stocklev = status[STOCKLEV][ ].samples();
    int total    = neword + payment + ordstat + delivery + stocklev;
    int i;

    if (total ==  ) {
         buffer[NEWORDER] = 1  . ;
         for (i = 2; i < 6; i++) {
             buffer[i] = ratio_desired[i];
             buffer[NEWORDER] -= buffer[i];
         }
         return  ;
    }

    buffer[PAYMENT] = (double)payment / (double)total   1  . ;
    buffer[ORDSTAT] = (double)ordstat / (double)total   1  . ;
    buffer[DELIVERY] = (double)delivery / (double)total   1  . ;
    buffer[STOCKLEV] = (double)stocklev / (double)total   1  . ;
    buffer[NEWORDER] = 1  . - buffer[PAYMENT] - buffer[ORDSTAT]
                            - buffer[DELIVERY] - buffer[STOCKLEV];

    return total;
}

int user_global_update(int  length, char  buffer) {
    UserGlobal  shmglobal = (UserGlobal  )buffer;
    static double last[6];
    static int users_last=-1;
    double ratios[6];
    double current[6];
    int i, different =  ;
    int desired =  ;

     length = sizeof( shmglobal);

    make_ratios(ratios);

    /  Calculate ratios we want for next time  /
    if (ramp_up_complete) {
         current[NEWORDER] = 1  . ;
         for (i = 2; i < 6; i++) {
             if (ratio_desired[i] > ratios[i]) {
                  current[i] = ratio_max[i];
             } else {
                  current[i] = 2 ratio_desired[i] - ratios[i];
                  if (current[i] < ratio_min[i])
                      current[i] = ratio_min[i];
             }
             current[NEWORDER] -= current[i];
         }
    } else {
         for (i = 1; i < 6; i++) {
             current[i] = ratio_desired[i];
         }
    }

    /  Add up all the users  /
    shmglobal->total_users =  ;
    for (i =  ; i < MAX_SLAVES; i++) {
         shmglobal->total_users += slave_status[i].active;
         desired             += slave_status[i].desired;
    }
    /  Count up number of warehouses we WANT to have  /
    if (num_warehouses <  ) {
         num_warehouses = (desired-1)/1 +1;
    }
    shmglobal->max_warehouses = num_warehouses;


    for (i = 2; i < 6; i++) {
         if (current[i] != last[i])
             different = 1;
    }

    // Don't send if it's the same as last time
    if ( !different && shmglobal->total_users == users_last ) {
         return RTE_ERROR;
    }

    users_last = shmglobal->total_users;
    for (i = 1; i < 6; i++) {
         shmglobal->chances[i] = last[i] = current[i];
    }
    send_global_data();

    return RTE_OK;
}


int parse_array(char  string, int max, int  buffer) {
    int i, rc;
    char  ptr;
    char  temp = strdup(string);
    ptr = strtok(temp, ",");
    for (i =  ; ptr && i < max; i++) {
         rc = sscanf(ptr, "%d", &buffer[i]);
         if (rc < 1) {
             free(temp);
             return i;
         }
         ptr = strtok(NULL, ",");
    }
    free(temp);
    return i;
}

int parse_array(char  string, int max, double  buffer) {
    int i, rc;
    char  ptr;
    char  temp = strdup(string);
    ptr = strtok(temp, ",");
    for (i =  ; ptr && i < max; i++) {
         rc = sscanf(ptr, "%lf", &buffer[i]);
         if (rc < 1) {
             free(temp);
             return i;
         }
         ptr = strtok(NULL, ",");
    }
    free(temp);
    return i;
}


int user_init() {
    double  dbuffer[32];
    int   rc, i;
    char  ptr;

    if (get_variable("KEYSTROKE_SLEEP", &shmglobal->keystroke_sleep) != RTE_OK) {
         shmglobal->keystroke_sleep =  ;
    }
    if (get_variable("LOGIN_TIMEOUT", &shmglobal->login_timeout) != RTE_OK) {
         shmglobal->login_timeout = 12 ; /  2 minutes  /
    }
    if (get_variable("KEYSTROKE_PACKET_SIZE", &shmglobal->keystroke_packet_size) != RTE_OK) {
         shmglobal->keystroke_packet_size =  ;
    }
    shmglobal->login_timeout  = 1   ;
    if (get_variable("WAREHOUSES", &num_warehouses) != RTE_OK) {
         num_warehouses = -1;
    }
    iprint(IPRINT_INFO, "Login Timeout = %s\n", mstoa(shmglobal->login_timeout,  ));
    iprint(IPRINT_INFO, "Keystroke Sleep = %s\n", mstoa(shmglobal->keystroke_sleep 1   ,  ));
    iprint(IPRINT_INFO, "Keystroke Packet Size= %d\n", shmglobal->keystroke_packet_size);
    if (num_warehouses >=  ) {
         iprint(IPRINT_INFO, "Fixed Warehouses to = %d\n", num_warehouses);
    }

    if (!(ptr = get_variable("NEWORDER"))) {
         iprint_error ("Error. NEWORDER variable not found\n");
         exit (1);
    }
    if (parse_array(ptr, 3, dbuffer)!=3) {
         iprint_error ("Error. NEWORDER should be think, emulex_menu, emulex_response");
         exit (1);
    }
    shmglobal->think         [NEWORDER] = dbuffer[ ];
    shmglobal->emulex_menu    [NEWORDER] = dbuffer[1];
    shmglobal->emulex_response[NEWORDER] = dbuffer[1];

    for (i = 2; i < 6; i++) {
         if (!(ptr = get_variable(ratio_names[i])) ||
             (parse_array(ptr, 6, dbuffer)!=6)) {
             iprint(__FILE__, __LINE__, IPRINT_ERROR,
                   "Error. %s should be think, emulex_delay, desired, min, max",
                    ratio_names[i]);
             exit (1);
         }
         shmglobal->think[i]          = dbuffer[ ];
         shmglobal->emulex_menu[i]     = dbuffer[1];
         shmglobal->emulex_response[i] = dbuffer[2];
         ratio_desired[i]             = dbuffer[3];
         ratio_min[i]                 = dbuffer[4];
         ratio_max[i]                 = dbuffer[5];
         ratio_range[i]               = ratio_max[i]-ratio_min[i];
    }

    return RTE_OK;
}

int user_extra_data(header_s  header) {
    int i;
    int num_timestamps;

    if (header->data_type != RTE_ITEM_KEYSTROKE_TIMES)
         return RTE_OK;
    int  times = (int  )((char  )header+sizeof(struct header_s));
    num_timestamps = header->user_data_length / 4 - 1;

    iprint (IPRINT_TRACE, "Keystroke times = ");
    for (i =   ; i < num_timestamps; i++) {
         iprint (IPRINT_TRACE, "%d ", times[i]);
    }
    iprint (IPRINT_TRACE, "\n", times[i]);

    return RTE_OK;
}
```

```
int user_process_command(char  command) {
    char buffer[256],  ptr;
    int i, found, len;
    strncpy (buffer, command, 256);
    ptr = strtok (buffer, " \t");
    found =  ;
    if (!strcasecmp (ptr, "display")) {
        while (ptr && (ptr = strtok(NULL, " \t"))) {
            if ( ptr == '\ ')
                continue;
            for (i =  ; i < 5; i++) {
                len = min(strlen(Status_Names[i]), strlen(ptr));
                if (!strncasecmp (ptr, Status_Names[i], len)) {
                    status_needs_refresh = found = 1;
                    current_status = i;
                    return RTE_OK;
                }
            }
            printf ("Unknown type to display: %s\n", ptr);
        }
    }
    printf ("Unknown Command: %s\n", command);
    return RTE_ERROR;
}


int user_begin() {
    return RTE_OK;
}

void user_make_header(char  buffer) {
    int i;
    struct user_data_header  data = (struct user_data_header  )buffer;
}
```

User Script

```
/                                                                       /
/      user_slave.C                                                /
/                                                                       /

/                                                                       /
/                  TPCC FILE FOR ALL USERS                          /
/                                                                       /
#include <stdio.h>
#include <stdlib.h>
#include <unistd.h>
#include <string.h>
#include <sys/types.h>
#include <sys/time.h>
#include <sys/timers.h>
#include <time.h>
#include "rte_slave.h"
#include "user_tpcc.h"

extern SHM_Slave  shm;
extern TableEntrySlave  shmentry;
extern DriverStatus    status;
extern echo_trace(char  );
extern echo_trace();
extern char  expect_save;

const char  SQL_TPERRNO_MESSAGE = "tperrno";
const char  SQL_RTN_MESSAGE =    "rtn:";
const char  SQL_FATAL_MESSAGE =   "SQL Fatal Error";
const char  ROLLBACK_MESSAGE =    "ITEM NUMBER IS NOT VALID";

int           WHSEID;              /  warehouse number for each users  /

/                                                                       /
/  The "uniform()" function has range of the absolute value of the       /
/  difference between the min. and the max values upto 2147483647.       /
/                                                                       /
/ ------------------------------------------------------ /
/  NURand                                          /
/ ------------------------------------------------------ /
/  A: 255 for C_LAST, 1 23 for C_ID, 8191 for OL_I_ID    /
/  x:   for C_LAST, 1 for C_ID and OL_I_ID             /
/  y: 999 for C_LAST, 3    for C_ID, 1     for OL_I_ID   /
/ ------------------------------------------------------ /
long
NURand(int A, int x, int y, long cval)
{
    return ((((long) uniform((long)  , (long) A) | (long) uniform((long) x, (long) y))
      + cval) % (y - x + 1)) + x;
}

/ ------------------------------------------------------ /
/  getname                                         /
/ ------------------------------------------------------ /
/  generates a random number from   to 999 inclusive     /
/  a random name is generated by associating a random    /
/  string with each digit of the generated number       /
/  three strings are concatenated to generate lastname   /
/ ------------------------------------------------------ /
char
getname()
{
    char          last_name_parts[] =
    {
     "BAR",
     "OUGHT",
     "ABLE",
     "PRE",
     "PRES",
     "ESE",
     "ANTI",
     "CALLY",
     "ATION",
     "EING"
    };
    char          lastname[128];
    int           random_num;

    random_num = NURand(255,  , 999, LASTC);
    strcpy(lastname, last_name_parts[random_num / 1  ]);
    random_num %= 1  ;
    strcat(lastname, last_name_parts[random_num / 1 ]);
    random_num %= 1 ;
    strcat(lastname, last_name_parts[random_num]);
    return (lastname);
}


#define KEY_PF1 "  1q"
#define KEY_PF2 "  2q"
#define KEY_PF3 "  3q"
#define KEY_PF4 "  4q"
#define KEY_PF5 "  5q"
#define KEY_PF6 "  6q"

/                                                                       /
/                    Delivery Transaction                          /
/                                                                       /
int
Delivery()
{
    static struct delivery_struct delivery, delivery_new;
    char          carrier[32];
    int           resp, charlen;
    double         think_max, think_DEL;
    char         const  ptr;

    delivery_new.invalid =  ;

    /  Calculate what we are going to enter next time  /
    delivery_new.carrier = uniform(1, 1 );       /  carrier # 1 to 1   /
    sprintf(carrier, "%d\n", delivery_new.carrier);


    set_typing_delay( );
    transaction_sleep_do();
    transaction_start(DELIVERY, sizeof(delivery), &delivery);       /  logging  /
    delivery = delivery_new;
    echo_trace ("Waiting for Menu (DELIVERY)");
    transmit(KEY_PF4);          /  menu option 4  /
    resp = expect("CMD4IIoff");        /  screen position  /
    if (resp == ERROR) {
         iprint (IPRINT_ERROR, "Slave %d: Failed to receive Delivery screen\n",
          shmentry->num);
         return (ERROR);
    }
    charlen = strlen(carrier);
    set_typing_delay(2    / charlen + 1);
    usleep(shmglobal->emulex_menu[DELIVERY] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of menu, beginning of keying
                                            time  /
    echo_trace ("Keying");
    transmit(carrier);
    transaction_mark(WHERE_NOW);       /  end of keying, beginning of
                                            response time  /
    echo_trace ("Wait for Response");
    set_typing_delay( );
    transmit("\r");
    resp = expect("EnterIIoff");

    if (resp == ERROR) {
         iprint (IPRINT_ERROR, "Slave %d: Failed to receive Delivery response\n",
           shmentry->num);
         return (ERROR);
    }
    usleep(shmglobal->emulex_response[DELIVERY] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of response, beginning of
                                            think time  /
    if (expect_after_match (SQL_TPERRNO_MESSAGE)) {
         delivery.invalid = 1;
         if (ptr = expect_after_match (SQL_RTN_MESSAGE)) {
             iprint (IPRINT_ERROR, "Slave %d: Delivery found '%s'\n",
                    shmentry->num, ptr);
         } else {
             iprint (IPRINT_ERROR, "Slave %d: Delivery found '%s'\n",
                    shmentry->num, SQL_TPERRNO_MESSAGE);
         }
         return RTE_ERROR;
    }
    if (expect_after_match (SQL_FATAL_MESSAGE)) {
         delivery.invalid = 1;
         iprint (IPRINT_ERROR, "Slave %d: Delivery found '%s'\n", shmentry->num,
           SQL_FATAL_MESSAGE);
         return RTE_ERROR;
    }
    echo_trace ("Thinking");
    transaction_sleep_set(neg_exp_4(shmglobal->think[DELIVERY]) 1    . );
    return (RTE_OK);
}

/                                                                       /
/                    New Order Transaction                          /
/                                                                       /
int
NewOrder()
{
    static struct neword_struct neword, neword_new;
    int           RBtrans, remoteflag, i, resp, charlen, whses, low_whse=1;
    double         think_max, think_NO;
    char          buff[1 24], district[32], customer[32],
                  warehouse[32], item[32], quantity[32];
    char          const  ptr;


    neword_new.rollback= ;
    neword_new.invalid =  ;

    /    SECTION TO DETERMINE ROLLBACK TRANSACTION FOR 1% OF NEW ORDERS    /
    RBtrans =  ;
```

```
    if (uniform(1, 5   ) <= 5 )
         RBtrans = 1;

    neword_new.did = uniform(1, 1 );    /  district number  /
    sprintf(district, "%d\n", neword_new.did);
    strcpy(buff, district);
    neword_new.cid = NURand(1 23, 1, 3   , CUSTC);  /  customer # 1 to 3     /
    sprintf(customer, "%d\n", neword_new.cid);
    strcat(buff, customer);

    neword_new.nloop = uniform(5, 15);  /  for 5 to 15 iterations  /
    remoteflag =  ;          /  for remote orders  /
    neword_new.olremote= ;    /  find total number of remote order-lines  /

    whses = shmglobal->max_warehouses;

    for (i =  ; i < neword_new.nloop; i++) {
         neword_new.item[i].olswid = WHSEID;
         if (whses > 1 && (uniform( . , 1  . ) < 1. )) {
            /  for 1% of items (if   uniform()== )  /
            /  Generate a uniform whse number that's different from WHSEID  /
            while (neword_new.item[i].olswid == WHSEID) {
                 neword_new.item[i].olswid =
                     (long) uniform((long) low_whse, (long)whses);
            }

            neword_new.olremote++;    /  find total number of remote order-lines  /
            remoteflag = 1;
         }
         sprintf(warehouse, "%d\n", neword_new.item[i].olswid);
         strcat(buff, warehouse);

         if (neword_new.nloop == i+1 && RBtrans) /  If last iteration of loop  /
            neword_new.item[i].oliid = 999999;  /  and a RollBack
                                                   transaction.  /
         else {
            neword_new.item[i].oliid = NURand(8191, 1, 1     , ITEMC);       /  item 1 to
             1  ,     /
         }
         sprintf(item, "%d\n", neword_new.item[i].oliid);
         strcat(buff, (item));
         neword_new.item[i].olquantity = uniform(1, 1 );  /  quantity 1 to 1   /
         sprintf(quantity, "%d\n", neword_new.item[i].olquantity);
         strcat(buff, quantity);
    }                            /  end of for n_loop  /

    if (remoteflag == 1)     /  1 for remote orders  /
         neword_new.oremote = 1;
    else
         neword_new.oremote =  ;

    transaction_sleep_do();
    transaction_start(NEWORDER, sizeof(neword), &neword);  /  logging  /
    neword = neword_new;
    echo_trace ("Waiting for Menu (NEWORDER)");
    set_typing_delay( );
    transmit(KEY_PF1);       /  menu option 1  /
    resp = expect("CMD1IIoff");
    if (resp == ERROR) {
         iprint (IPRINT_ERROR, "Slave %d: Failed to receive NewOrder screen\n", shmentry->num);
         return (ERROR);
    }
    usleep(shmglobal->emulex_menu[NEWORDER] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of menu, beginning of keying
                                          time  /
    echo_trace ("Keying");
    charlen = strlen(buff);
    set_typing_delay(18    / charlen + 1);
    if (shmentry->flags & TES_FLAG_KEYSTROKE_TIME) {
         transmit_timed(buff);
    } else {
         transmit(buff);
    }
    transaction_mark(WHERE_NOW);       /  end of keying, beginning of
                                          response time  /
    echo_trace ("Wait for Response");
    set_typing_delay( );
    transmit("\r");
    resp = expect("EnterIIoff");
    if (resp == ERROR) {
         iprint (IPRINT_ERROR, "Slave %d: Failed to receive New Order response\n", shmentry->num);
         return (ERROR);
    }
    usleep(shmglobal->emulex_response[NEWORDER] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of response, beginning of
                                          think time  /
    /  Grab order id from return string  /
    if (RBtrans)
      neword.rollback=1;
    echo_trace ("Thinking");
    transaction_sleep_set(neg_exp_4(shmglobal->think[NEWORDER]) 1   . );

    if (shmentry->flags & TES_FLAG_KEYSTROKE_TIME) {
         log_data(RTE_ITEM_KEYSTROKE_TIMES, keystroke_length sizeof(int),keystroke_times);
    }
    return (RTE_OK);
}

/                                                                    /
/                 Order Status Transaction                         /
/                                                                    /
int
OrderStatus()
{
    static struct ordstat_struct ordstat, ordstat_new;
    char          buff[1 24], district[32], customer[32];
    int           resp, charlen;
    double         think_max, think_OS;
    char         const  ptr;

    ordstat_new.invalid =  ;

    ordstat_new.did = uniform(1, 1 );  /  district number 1 to 1   /
    sprintf(district, "%d\n", ordstat_new.did);
    strcpy(buff, district);
    if (uniform(1, 1  ) <= 6 ) {/  for 6 % of transactions  /
         strcpy(ordstat_new.clast, getname());  /  by customer last name  /
         if (ordstat_new.clast[ ] < 'A' || ordstat_new.clast[ ] > 'Z') {
            iprint (IPRINT_ERROR, "ASSERTION: OrderStatus getname() returns invalid name!
              '%s'\n", ordstat_new.clast);
         }
         sprintf(customer, "\n%s\n", ordstat_new.clast);
         ordstat_new.byname = 1;
         ordstat_new.cid =  ;
    } else {
         ordstat_new.cid = NURand(1 23, 1, 3   , CUSTC);  /  cust. # 1 to 3     /
         sprintf(customer, "%d\n\n", ordstat_new.cid);
         ordstat_new.byname =  ;
         ordstat_new.clast[ ] = (char) NULL;
    }
    strcat(buff, customer);

    set_typing_delay( );
    transaction_sleep_do();
    transaction_start (ORDSTAT, sizeof(ordstat), &ordstat); /  logging  /
    ordstat = ordstat_new;
    echo_trace ("Waiting for Menu (ORDSTAT)");
    transmit(KEY_PF5);       /  menu option 3  /
    resp = expect("CMD5IIoff");        /  screen position  /
    if (resp == ERROR) {
         iprint (IPRINT_ERROR, "Slave %d: Failed to receive Order Status screen\n",
           shmentry->num);
         return (ERROR);
    }
    charlen = strlen(buff);
    set_typing_delay(2    / charlen + 1);
    usleep(shmglobal->emulex_menu[ORDSTAT] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of menu, beginning of keying
                                          time  /
    echo_trace ("Keying");
    transmit(buff);
    transaction_mark(WHERE_NOW);       /  end of keying, beginning of
                                          response time  /
    echo_trace ("Wait for Response");
    set_typing_delay( );
    transmit("\r");
    resp = expect("EnterIIoff");       /  screen position  /
    if (resp == ERROR) {
         iprint (IPRINT_ERROR, "Slave %d: Failed to receive Order Status response\n",
           shmentry->num);
         return (ERROR);
    }
    usleep(shmglobal->emulex_response[ORDSTAT] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of response, beginning of
                                          think time  /
    if (expect_after_match (SQL_TPERRNO_MESSAGE)) {
         ordstat.invalid = 1;
         if (ptr = expect_after_match (SQL_RTN_MESSAGE)) {
            iprint (IPRINT_ERROR, "Slave %d: Order status found '%s'\n",
                    shmentry->num, ptr);
         } else {
            iprint (IPRINT_ERROR, "Slave %d: Order status found '%s'\n",
                    shmentry->num, SQL_TPERRNO_MESSAGE);
         }
         return RTE_ERROR;
    }
    if (expect_after_match (SQL_FATAL_MESSAGE)) {
         iprint (IPRINT_ERROR, "Slave %d: Order Status found '%s'\n", shmentry->num,
           SQL_FATAL_MESSAGE);
         ordstat.invalid = 1;
         return RTE_ERROR;
    }
    echo_trace ("Thinking");
    transaction_sleep_set(neg_exp_4(shmglobal->think[ORDSTAT]) 1   . );
    return (RTE_OK);
}

/                                                                    /
/                    Payment Transaction                             /
/                                                                    /
int
Payment()
{
    static struct payment_struct payment, payment_new;
    int           dollars, cents;
    int           resp, charlen, whses, low_whse = 1;
    double         think_max, think_PAY;
    char          buff[1 24], district[32], customer[32],
                  waredist[32], amount[32];
    char         const  ptr;

    payment_new.invalid =  ;
    payment_new.did = uniform(1, 1 );  /  district number 1 to 1   /
    sprintf(district, "%d\n", payment_new.did);
    strcpy(buff, district);

    if (uniform(1, 1  ) <= 6 ) {/  for 6 % of transactions  /
         strncpy(payment_new.clast, getname(), 17);      /  by customer last name  /
         if (payment_new.clast[ ] < 'A' || payment_new.clast[ ] > 'Z') {
            iprint (IPRINT_ERROR, "ASSERTION: payment_new getname() returns invalid name!
              '%s'\n", payment_new.clast);
            exit (1 );
         }
         sprintf(customer, "%s\n", payment_new.clast);
         payment_new.byname = 1;
         payment_new.cid =  ;
    } else {
         payment_new.cid = NURand(1 23, 1, 3   , CUSTC);  /  cust. # 1 to 3     /
         sprintf(customer, "%d\n", payment_new.cid);
         payment_new.byname =  ;
         payment_new.clast[ ] = (char) NULL;
    }
    if (payment_new.byname)   /  using C_LAST  /
         strcat(buff, "\n");
    else                      /  using C_ID  /
         strcat(buff, customer);

    whses = shmglobal->max_warehouses;

    if (whses < 2 || uniform(1, 1  ) <= 85) {/  for 85 % of transactions  /
         payment_new.cwid = WHSEID;
```

```
        payment_new.cdid = payment_new.did;
        payment_new.remote =  ;
    } else {                        /  for 15 % of transactions  /
        payment_new.cwid = WHSEID;
        while (payment_new.cwid == WHSEID) {
            payment_new.cwid = (long) uniform((long)low_whse, (long) whses);
            /  warehouse 1 to max whses  /
        }
        payment_new.remote = 1;
        payment_new.cdid = uniform(1, 1 );     /  district 1 to 1   /
    }
    sprintf(waredist, "%d\n%d\n", payment_new.cwid, payment_new.cdid);
    strcat(buff, waredist);

    if (payment_new.byname)   /  using C_LAST  /
        strcat(buff, customer);
    else                    /  using C_ID  /
        strcat(buff, "\n");

    dollars = uniform(1, 5   );       /  dollar amt = 1 to 5     /
    if (dollars == 5   )
        cents =  ;
    else
        cents = uniform( , 99);
    payment_new.amount = ((double) dollars) + ((double) cents) / 1  . ;
    sprintf(amount, "%d.%2.2d\n", dollars, cents);
    strcat(buff, amount);    /  1.   to 5   .    /

    set_typing_delay( );
    transaction_sleep_do();
    transaction_start(PAYMENT, sizeof(payment), &payment); /  logging  /
    payment = payment_new;
    echo_trace ("Waiting for Menu (PAYMENT)");
    transmit(KEY_PF2);       /  menu option 2  /
    resp = expect("CMD2IIoff");        /  screen position  /
    if (resp == ERROR) {
        iprint (IPRINT_ERROR, "Slave %d: Failed to receive Payment screen\n", shmentry->num);
        return (ERROR);
    }
    charlen = strlen(buff);
    set_typing_delay(3    / charlen + 1);
    usleep(shmglobal->emulex_menu[PAYMENT] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of menu, beginning of keying
                                            time  /
    echo_trace ("Keying");
    transmit(buff);

    transaction_mark(WHERE_NOW);       /  end of keying, beginning of
                                            response time  /
    echo_trace ("Wait for Response");
    set_typing_delay( );
    transmit("\r");
    resp = expect("EnterIIoff");               /  screen position  /
    if (resp == ERROR) {
        iprint (IPRINT_ERROR, "Slave %d: Failed to receive Payment response\n", shmentry->num);
        return (ERROR);
    }
    usleep(shmglobal->emulex_response[PAYMENT] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of response, beginning of
                                            think time  /
    if (expect_after_match (SQL_TPERRNO_MESSAGE)) {
        payment.invalid = 1;
        if (ptr = expect_after_match (SQL_RTN_MESSAGE)) {
            iprint (IPRINT_ERROR, "Slave %d: Payment status found '%s'\n",
                shmentry->num, ptr);
        } else {
            iprint (IPRINT_ERROR, "Slave %d: Payment status found '%s'\n",
                shmentry->num, SQL_TPERRNO_MESSAGE);
        }
        return RTE_ERROR;
    }
    if (expect_after_match (SQL_FATAL_MESSAGE)) {
        iprint (IPRINT_ERROR, "Slave %d: Payment found '%s'\n", shmentry->num,
          SQL_FATAL_MESSAGE);
        payment.invalid = 1;
        return RTE_ERROR;
    }
    echo_trace ("Thinking");
    transaction_sleep_set(neg_exp_4(shmglobal->think[PAYMENT]) 1   . );
    return (RTE_OK);
}

/                                                                       /
/                  Stock Level Transaction                          /
/                                                                       /
int
StockLevel()
{
    static struct stocklev_struct stocklevel, stocklevel_new;
    char          threshold[32];
    int           resp, charlen;
    double        think_max, think_SL;
    char         const  ptr;

    stocklevel_new.invalid =  ;
    stocklevel_new.threshold = uniform(1 , 2 );  /  uniform no. between 1  and
                                                    2   /
    sprintf(threshold, "%d\n", stocklevel_new.threshold);

    set_typing_delay( );
    transaction_sleep_do();
    transaction_start(STOCKLEV, sizeof(stocklevel), &stocklevel); /  logging  /
    stocklevel = stocklevel_new;
    echo_trace ("Waiting for Menu (STOCKLEV)");
    transmit(KEY_PF6);       /  menu option 5  /
    resp = expect("CMD6IIoff");  /  screen position  /
    if (resp == ERROR) {
        iprint (IPRINT_ERROR, "Slave %d: Failed to receive Stock Level screen\n",
          shmentry->num);
        return (ERROR);
    }
    charlen = strlen(threshold);
    set_typing_delay(2    / charlen + 1);
    usleep(shmglobal->emulex_menu[STOCKLEV] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of menu, beginning of keying
                                            time  /
    echo_trace ("Keying");
    transmit(threshold);

    transaction_mark(WHERE_NOW);       /  end of keying, beginning of
                                            response time  /
    echo_trace ("Wait for Response");
    set_typing_delay( );
    transmit("\r");
    resp = expect("EnterIIoff");       /  screen position  /
    if (resp == ERROR) {
        iprint (IPRINT_ERROR, "Slave %d: Failed to receive Stock Level response\n",
          shmentry->num);
        return (ERROR);
    }
    usleep(shmglobal->emulex_response[STOCKLEV] 1      . + .9);
    transaction_mark(WHERE_NOW);       /  end of response, beginning of
                                            think time  /
    if (expect_after_match (SQL_TPERRNO_MESSAGE)) {
        stocklevel.invalid = 1;
        if (ptr = expect_after_match (SQL_RTN_MESSAGE)) {
            iprint (IPRINT_ERROR, "Slave %d: Stock Level status found '%s'\n",
                shmentry->num, ptr);
        } else {
            iprint (IPRINT_ERROR, "Slave %d: Stock Level status found '%s'\n",
                shmentry->num, SQL_TPERRNO_MESSAGE);
        }
        return RTE_ERROR;
    }
    if (expect_after_match (SQL_FATAL_MESSAGE)) {
        iprint (IPRINT_ERROR, "Slave %d: Stock Level found '%s'\n", shmentry->num,
          SQL_FATAL_MESSAGE);
        stocklevel.invalid = 1;
        return RTE_ERROR;
    }
    echo_trace ("Thinking");
    transaction_sleep_set(neg_exp_4(shmglobal->think[STOCKLEV]) 1   . );
    return (RTE_OK);
}

/                                                                       /
/     MAIN()                                                          /
/                                                                       /
int
user_transaction()
{
    char          logout[32];
    double        ntask;
    int           resp;

    if (shmentry->flags & TES_FLAG_KEYSTROKE_TIME) {
        int rc;
        /  Wait for specified period of time  /
        sleep (shmglobal->keystroke_sleep);
        /  Quit after one transaction  /
        shm->lock(shmentry->pid);
        shmentry->flags |= TES_FLAG_DIE;
        shm->unlock(shmentry->pid);
        rc = NewOrder();
        iprint (IPRINT_INFO, "Slave %d: Keystroke timing setting die flag\n",
          shmentry->num);
        return rc;
    }
    /                                                                       /
    /     CHOOSE ONE OF THE TRANSACTIONS                                  /
    /                                                                       /
    ntask = (double) uniform( . , 1  . );
    if (ntask <= shmglobal->chances[DELIVERY])
        return Delivery();
    ntask -= shmglobal->chances[DELIVERY];
    if (ntask <= shmglobal->chances[ORDSTAT])
        return OrderStatus();
    ntask -= shmglobal->chances[ORDSTAT];
    if (ntask <= shmglobal->chances[PAYMENT])
        return Payment();
    ntask -= shmglobal->chances[PAYMENT];
    if (ntask <= shmglobal->chances[STOCKLEV])
        return StockLevel();
    return NewOrder();

#if
    if (resp != RTE_OK) {             /  logoff if response is not correct  /
        strcpy(logout, "9\r");        /  menu option 9  /
        transmit(logout);
        resp = expect("tpcc_cstux_inf:");
        return (ERROR);
    } else
        return (RTE_OK);
#endif
}                                 /  end of main  /

int user_parameter_change(void) {
    #if
    int i;
    iprint(IPRINT_TRACE, "Slave %d: total_users = %d\n", shmentry->num);
    iprint(IPRINT_TRACE, "Slave %d: chances    = ", shmentry->num);
    for (i =  ; i < MAX_TRAN_TYPE; i++)
        iprint(IPRINT_TRACE, "%6.2f ", shmglobal->chances[i]);
    iprint(IPRINT_TRACE, "\nSlave %d: think      = ", shmentry->num);
    for (i =  ; i < MAX_TRAN_TYPE; i++)
        iprint(IPRINT_TRACE, "%6.2f ", shmglobal->think[i]);
    iprint(IPRINT_TRACE, "\n");
    #endif
    return RTE_OK;
}

const int MAX_LOGIN_RETRY = 5  ;
int user_login(char  user, char  password, void  data) {
    extern char ttyname_original[TTYNAME_LEN];
    UserLocal  localdata = (UserLocal  )data;
    int rc;
    int retry =  ;
    int timeout_value = shmglobal->login_timeout;
    char buffer[256];
        char outBuf[8192];
        int i;
        char test;
```

```
    set_typing_delay( );

    iprint(IPRINT_INFO, "slave %d: looking for login prompt!!!\n",
        shmentry->num);

    rc = expect("IBM", timeout_value);
    if (rc != RTE_OK) {
        iprint(IPRINT_ERROR, "slave %d: didn't get login prompt.\n");
        return RTE_ERROR;
    }

    rc = expect("(B", timeout_value);
    if (rc != RTE_OK) {
        iprint(IPRINT_ERROR, "slave %d: didn't get login prompt.\n");
        return RTE_ERROR;
    }

    iprint(IPRINT_INFO, "slave %d: got login prompt!!!!.\n", shmentry->num);
    rc = transmit (user);
    rc = transmit ("\t");
    rc = transmit (password);
    rc = transmit ("\r");
    iprint(IPRINT_INFO,
        "slave %d: sent username/password; waiting for response.\n",
        shmentry->num);

    rc = expect2 ("TPCCUSER","\ 33[18;7H");

    if (rc == RTE_ERROR) {
        iprint (IPRINT_ERROR, "Slave %d: Failed expecting prompt\n",
            shmentry->num);
          return RTE_ERROR;
    }
    iprint(IPRINT_INFO,
        "slave %d: signed on; return code %d\n", shmentry->num, rc);
    if (rc == 1)  // Handle message about user already signed on
    {
       iprint(IPRINT_INFO, "Slave %d:Handling message about user signed on\n");
       rc = transmit ("\r");
       expect("\ 33[18;7H");
    }
    iprint(IPRINT_INFO, "slave %d: got response; starting application\n",
        shmentry->num);

    iprint(IPRINT_INFO, "about to run firstpgm1\n");

    rc = transmit("firstpgm1\r");
    rc = expect("\ 33[19C");

    iprint(IPRINT_INFO, "slave %d: entering home warehouse/district.\n",
          shmentry->num);

          iprint(IPRINT_INFO, "slave %d, about to do expect", shmentry->num);
          rc = expect("Warehouse", timeout_value);
          iprint(IPRINT_INFO, "expect return code = %d", rc);

for (i =  ; i < 35; i++)
{
        incIndex();
}
for (i =  ; i < 4; i++)
{
        buffer[i] = readChar();
        incIndex();
}
buffer[4] = '\ ';
iprint(IPRINT_INFO, "slave: %d, warehouse is: %s\n", shmentry->num,
                        buffer);
localdata->Warehouse = atoi(buffer);
iprint(IPRINT_INFO, "%d\n", localdata->Warehouse);

        rc = expect("District", timeout_value);
        for (i =  ; i < 41; i++)
        {
                incIndex();
        }

        buffer[ ] = readChar();
        incIndex();
        buffer[1] = readChar();
        buffer[2] = '\ ';

        localdata->District = atoi(buffer);
        iprint(IPRINT_INFO, "slave: %d, district is %d\n",
                        shmentry->num, localdata->District);

        sprintf(buffer, "\r");
        rc=transmit(buffer);
        // Send it again
        sprintf(buffer, "\r");
        rc = transmit (buffer);
   rc = expect ("\ 33[2;29H", timeout_value);


   if (rc != RTE_OK) {
      iprint (IPRINT_ERROR, "Slave %d: Failed expecting initial screen\n",
          shmentry->num);
       return RTE_ERROR;
   }
   iprint(IPRINT_INFO, "slave %d: logged in.\n", shmentry->num);
   /  Now switch the emulator so it does not update the screen  /
   transmit("\  4");  /  CTRL-D will switch to no show mode  /
   transmit("J");  /  Tells 525  to keep going, not quit  /

   return RTE_OK;
}

int user_init () {
   extern int expect_save_active;
   WHSEID = shmlocal->Warehouse;

   status->max_transmit =  shmglobal->keystroke_packet_size;
   expect_save_active = 1;
   return RTE_OK;
}

int user_cleanup () {
   transmit(KEY_PF3);       /  exit tpcc application  /
   expect("IIoff");
   transmit("signoff\r");    /  end user's session  /
   expect("IIoff");
   transmit("\  4\  4");  /  quits out of e525   /
   transaction_start( ,  , NULL); // Just something to clear out the buffer...
   return RTE_OK;
}
```

Appendix F. 180-Day DASD Requirements

This appendix documents the information required to calculate the 180-Day DASD requirements for the TPC Benchmark C measurements on the IBM AS/400e server s40-2261 system. Also included is the calculation used to determine the amount of DASD required for the 8 hours of journal space.

Section "IBM AS/400e server s40-2261--180-Day DASD Requirements" shows the values used in the calculation of the 180-Day Space. Also used were the formulas provided in Clause 4.2.3 of the TPC Benchmark C Standard Specification. These formulas are:

Daily-Growth	=	{dynamic-space/(W*62.5)} *tpmC
Daily-Spread	=	MAX (0, Free-Space – 1.5*Daily-Growth)
180-Day-Space	=	Static-Space + 180*(Daily-Growth+Daily-Spread)

IBM AS/400e server s40-2261--180-Day DASD Requirements

```
Static Files       Number of Warehouses        21              tpmC          25149.75
File name                Customer       District       Item    New Order     Stock       Warehouse
Number of Records           63             21          1         189          21              21
Data Space               4246213 176      21 5344    9445376   2 7917 56    6447 71232      2 48
Index Space               1197498368       466944    18432     345  6 8     368   2 48       73728
Add'l Index               35158999 4                               12288        12288
Add'l Index                    12288

Dynamic Files
File name                   History          Orderline          Orders
Initial Records               63               63  25238         63
Size Per Record           55.   5 28571      61.   21 963     32.   487619
Initial Data Space           3465 3168          3843167243       2 16 3 72
Initial Index Space                           16179 32 64       2338349 56
Add'l Index                                      12288       1 39163392
Add'l Index
Configured Space              4158 38 16        46116159488      2419236864
Free Space                    693  6336         7684487 58       4 32 6144

Static Space               141244566118
Dynamic Space               4391273483
Free Space                  878 699538
Daily Growth                8414432783
Daily Spread
18  Day Space              1655842467 88
System Software               1689
SubTotal                  1657531467 88
Journal Space              171452 43273

Total DASD Required        182898351 361
DASD Priced               1829469
Difference                   485489639
```

IBM AS/400e server s40-2261--Journal DASD Requirements

To determine the amount of DASD required for the 8 hours of journal, a series of tests were run for an extended period. Through these tests it was determined that an average of 6,817,246 bytes of DASD are required per tpmC.

Appendix G. Auditor Letter

Information Paradigm

TPC TRANSACTION PROCESSING PERFORMANCE COUNCIL

Certified Auditor

Test Sponsor: Karl R. Huppler
Advisory Programmer
IBM Corp Dept 53G
3605 Highway 52 N.
Rochester, MN 55901

Aug 8, 1997

I verified the TPC Benchmark™ C performance of the following configuration:

Platform: AS/400 9406 Model S40 with FC 2261
DataBase Manager: DB2/400 Integrated Relational Database
Operating System: OS/400 Version 4 Release 1

The results were:

CPU's	Memory	Disks	NewOrder 90% Response Time	tpmC
Server: AS/400 9406 S40-2261				
12 x 125 MHz PowerPC AS A35	17 GB	190 x 8589 MB DASD	1.75 Seconds	25,149.75
Twenty Clients (see note), specification for each AS/400-9401 150-0194 priced client				
1 x 50 MHz PowerPC AS A10	192 MB	2 x 4194 MB DASD	n/a	n/a

In my opinion, these performance results were produced in compliance with the TPC 3.3 requirements for the benchmark. The following verification items were given special attention:

- The transactions were correctly implemented
- The database records were the proper size
- The database was properly scaled and populated
- The ACID properties were met
- Input data was generated according to the specified percentages

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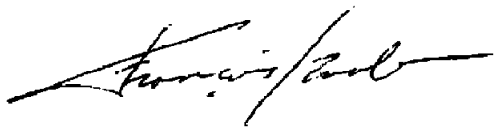
- The transaction cycle times included the required keying and think times
- The reported response times were correctly measured.
- At least 90% of all delivery transactions met the 80 Second completion time limit
- All 90% response times were under the specified maximums
- The measurement interval was representative of steady state conditions
- The reported measurement interval was 20 minutes
- At least 5 file synchronization cycles occurred during the measurement interval
- Measurement repeatability was verified
- The 180 day storage requirement was correctly computed
- The system pricing was verified for major components and maintenance

Additional Audit Notes:

The tested configuration included (8) priced clients model AS/400-9401 150-0194 (192 MB) and (12) non-priced clients model AS/400-9406 510-2144 (1GB). The priced configuration includes (64) AS/400-9401 150-0194 systems. Based on data analysis done for each type of client, it is my opinion that this substitution does not materially affect performance

Respectfully Yours,



François Raab
President

AS/400 9406 S40-2261

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