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4381 Processor Model Group 3 Console Functions and Messages

SY24-4024-2

Third Edition (September 1985)

This is a major revision of, and obsoletes, SY24-4024-1. Technical changes to text and illustrations are indicated by a line to the left of the change.

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Preface

This book supplies information about the 4381 Processor display screens and is intended for customer engineers, development engineers, and support center personnel; therefore, some of the information in this book may not be suitable to you. The screen images in this book are intended as sample displays of typical functions; they do not show every situation.

If you are not familiar with the display console and keyboard, see "Display Console" on page 374 for a general description or see *IBM 4381 Processor Operations,* Order No. GA24-3949.

How This Book Is Organized

This book is organized by screen function and follows the order of the General Selection (Q) screen (see the table of contents).

If you are not familiar with the General Selection (Q) screen, use the alphabetic list of commands that follows.

If you do not know the screen command, use the normal index at the end of this book.

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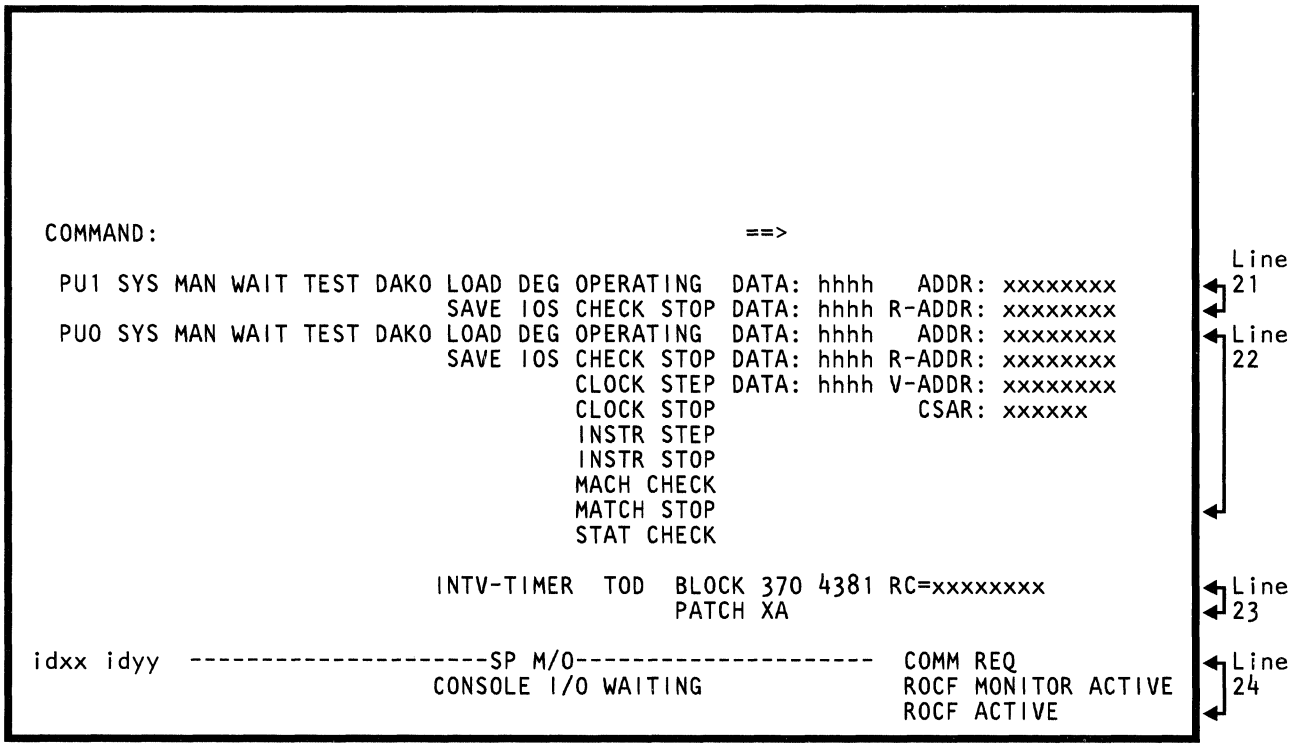
System Status



Information about the status of the system is displayed near the bottom of the display screen. A definition of each entry on the screen is given below.

BLOCK

Indicates that a block (a series of commands) is being processed or is waiting for an address match to occur.

CHECK STOP

Indicates that the processor is in the check-stop state.

CLOCK STEP

Indicates that the processor is in microword or clock-cycle-step mode and clock-stop state.

CLOCK STOP

Indicates that the processor is in the clock-stop state.

COMM REQ

Indicates that the COMM REQ key has been pressed.

CONSOLE I/O WAITING

Indicates that the console is in manual mode and that an I/O operation has been requested by the operating system. To return control of the console to the operating system, press the CHG DPLY key.

CSAR: xxxxxx

Displayed when the clock is stopped (occurs only in CE Mode or momentarily during some manual functions). The address displayed (xxxxx) is the last used control storage address (stored in the CSARBU register).

DATA: hhhh ADDR: xxxxxxxx

Displays the data (hhhh) at address (xxxxxxxx) when in instruction-stop or match-stop state. The address displayed for a stop condition is the location of the next instruction.

DATA: hhhh R-ADDR: xxxxxxxx

Displays the data (hhhh) at address (xxxxxxxx) when in instruction-stop or match-stop state. R-ADDR indicates that the processor is operating with real addresses.

DATA: hhhh V-ADDR: xxxxxxxx

Displays the data (hhhh) at address (xxxxxxxx) when in instruction-stop or match-stop mode. The address displayed for a stop condition is the location of the next instruction. V-ADDR indicates the processor is operating with virtual addresses.

DEG

Indicates instruction processing speeds are not normal (degraded) because of automatic hardware reconfiguration. For information about reconfiguration, see Volume A07, Diagnostics, "Overview."

idxx

Indicates the Module ID (idxx) of the last program loaded in the SP.

idyy

Indicates the Module ID (idyy) of the last data set loaded in the SP.

INSTR STEP

Indicates that the processor is in instruction-step mode (and instruction-stop state).

INSTR STOP

Indicates that an instruction stop occurred. (Pressing the STOP key can cause this condition.)

INTV-TIMER

Displayed only when the interval timer is on.

IOS

Displayed when you press the STOP key. Indicates input/output suppression is active (no I/O operations are processed from any internal queues).

LOAD

Displayed during program load.

MACH CHECK

Indicates that the processor cannot operate or that error retry is in process.

MAN

Indicates that the processor is in a stopped condition.

MATCH STOP

Indicates that a match-stop occurred. If CSAR is displayed, a clock stop occurred. If DATA and ADDR are displayed, an instruction stop occurred. This also occurs while using the trace stop function (QABTxxxxx).

OPERATING

Indicates that the processor is operating (processing instructions).

PATCH

Indicates that a patch is being processed.

PUx

Indicates which processor the status information is associated with. It also indicates the TARGET PU-SWITCH setting. The targeted processor is indicated by a > at the beginning of its status line. If both processors are targeted, the > indicator appears on both status lines. (See "T TARGET PU-SWITCH" on page 9.)

RC=xxxxxxxx

Indicates the eight-digit reference code that identifies an error. The reference code is intensified until you press the ENTER key; after which, it returns to normal intensity. Sometimes an extension code is also displayed to aid in the problem analysis.

ROCF MONITOR ACTIVE

Indicates that the ROCF monitor is active.

ROCF ACTIVE

Indicates that ROCF (Remote Operator Console Facility) is active.

SAVE

Indicates that data has been successfully saved using the Store Status command (Q screen).

SP M/O

For Engineering use only.

STAT CHECK

Indicates that the processor status is unreliable.

SYS

Indicates the processor is being used for productive work (either running instructions or processing I/O information).

TEST DAKO

Indicates the following:

D Diagnostic mode was (or is) active. Re-IML to clear this indication.

A Compare/trace is active (QA).

K Check control is active (QK).

O Operation rate is active (QO).

\- If TEST alone appears (no D, A, K, or O), indicates that CE Mode is active.

TOD

Indicates that the Set Clock instruction (B204) can be given. The TOD indication automatically resets approximately six seconds after you enable the TOD function (QY).

WAIT

Indicates that the processor is in the wait state.

XA

Indicates that the processor is in S/370XA mode.

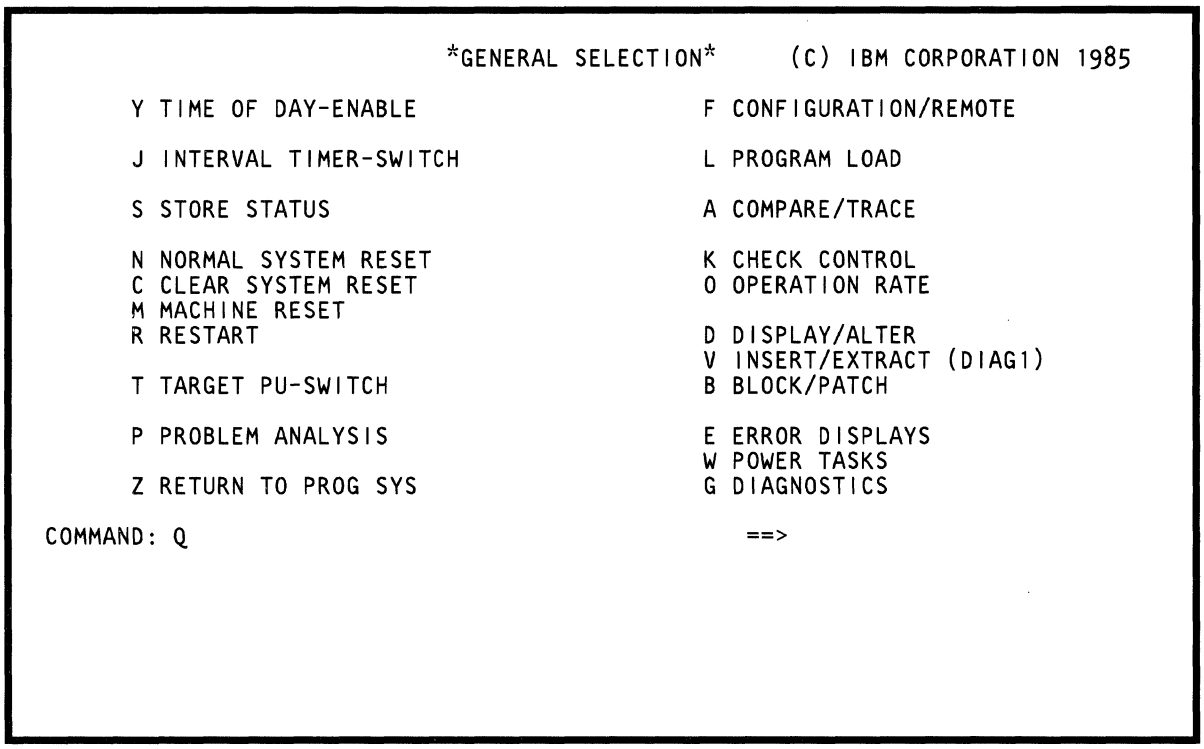
370

Indicates that the processor is in S/370 mode.

4381

Processor ID.

(Q) General Selection



The General Selection (Q) screen is the first screen to appear after you press the MODE SEL key. This screen has two groups of selections:

- The selections on the left side of the screen are immediate operations, and with the exception of RESTART (in MVS mode) and PROBLEM ANALYSIS, do not generate another display screen.
- The selections on the right side of the screen generate additional screens.

Selecting the General Selection Screen

To select the General Selection screen, press the MODE SEL key.

Selecting a Function from the Q Screen

To select a function from the Q screen:

1. Key the character(s) for the desired function.
2. Press the ENTER key.

   Note: If you specify QS for STORE STATUS, QN for NORMAL SYSTEM RESET, QC for CLEAR SYSTEM RESET, or QR for RESTART, the screen displays the long form of the command. Press the ENTER key one more time to perform the command.

Q Screen Options (Left Side of Screen)

Y TIME OF DAY-ENABLE

Use the following procedure, together with the Set Clock instruction (B204), to change the TOD clock value.

Key QY next to COMMAND, and press the ENTER key.

Screen control is immediately transferred to the Operating System screen. TOD is displayed at the bottom of the screen for approximately six seconds, and then TOD is automatically disabled.

J INTERVAL TIMER SWITCH

Note: This function is not used in S/370XA mode.

Use the following procedure to alternately switch on or off the Interval Timer switch (the Interval Timer switch is automatically set on at IML in S/370 mode).

Key QJ next to COMMAND, and press the ENTER key.

Whenever the switch is on, INTV-TIMER appears at the bottom of the screen.

Also with the switch on, real main storage location 80 is decreased approximately every 30 ms. When the location goes negative, an interrupt is generated. If the switch is not on, storage location 80 is available for use.

S STORE STATUS

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Use the following procedure to store the data listed below.

Key QSTO next to COMMAND, and press the ENTER key. (If you key QS instead of QSTO, you must press the ENTER key twice.)

The data stored is:

- PU timer - 8 bytes at 'D8'
- Clock Comparator - 8 bytes at 'E0'
- The Current PSW - 8 bytes at '100'
- Floating-point registers - 32 bytes at '160'
- General registers - 64 bytes at '180'
- Control registers - 64 bytes at '1C0'.

After the data is stored, SAVE is displayed on the screen, and the processor enters the stopped condition.

N NORMAL SYSTEM RESET or C CLEAR SYSTEM RESET

Use the following procedure to clear an error condition. If this procedure fails to clear an intermittent error, re-IML the processor with the QLM command.

To do a system reset:

1. Key either QNOR (for Normal System Reset) or QCLE (for Clear System Reset) next to COMMAND.

2. Press the ENTER key. (If you key QN instead of QNOR or QC instead of QCLE, you must press the ENTER key twice.)

A system reset (QNOR or QCLE):

- Clears waiting interrupts and machine check conditions.
- Saves all IML values (for example, ACB boundary).
- Saves all check control and address match values if set.
- Resets the channel control array.
- Sets all other latches to the system reset condition.
- Causes the following to stop:
  - The present PU instruction if any
  - All channels and control units
  - All adapters
  - All I/O devices.
- Resets the following manual functions:
  - Time-of-Day Enable
  - Save Indicator
  - Operation Control Rate (except I-step).

A QNOR system reset does not affect the values of the:

- PU timer
- Clock comparator
- General registers
- Floating-point registers
- Control registers
- Main storage
- Current PSW (unless a machine check is present).

A QCLE system reset:

- Initializes auxiliary storage and the control registers
- Clears main storage
- Zeros the values of any storage or registers whose contents can be modified by the system program. These include:
  - Current PSW
  - PU timer
  - Clock comparator
  - General registers
  - Floating-point registers.

Note that if you specify a QCLE system reset during a trace or a stop-on-main-storage-data-compare operation, a false match-stop can occur.

M MACHINE RESET (CE-Only)

Machine Reset is a CE-only function to be used under the direction of your support center. It is used to reset:

- All scan rings (QMR)
- A specific scan ring (QMRRxx).

A Machine reset does not:

- Use the PU microcode
- Clear or reset any arrays.

To reset all scan rings:

1. Key QMR next to COMMAND.

2. Press the ENTER key. This resets all scan rings (including clock-related scan rings).

Warning: The Refresh clock is turned on after the reset operation ends. Note that storage double-bit errors can occur while the Refresh clock is turned off; therefore, the processor no longer appears to be IMLed.

To reset a specific scan ring (the results are not predictable):

1. Key QMRRxx next to COMMAND. xx is the number of the ring to be reset.

2. Press the ENTER key.

R RESTART

Note: Processing unit selection is required to perform this function n. See "T TARGET PU-SWITCH" on page 9.

Use this function to start the processor again (an additional screen may be displayed if MVS has been IPLed).

To specify this function:

Key QRES next to COMMAND, and press the ENTER key. (If you key QR instead of QRES, you must press the ENTER key twice.)

If the processor is in the stopped condition, it starts with the program restart PSW. If it is in the operating condition, the PSW exchange occurs at the end of the present instruction after all interrupts for which the PU is enabled are processed.

To return the console to the control of the operating system:

1. Press the CHG DPLY key, or
2. Key QZ next to COMMAND, and press the ENTER key.

T TARGET PU-SWITCH

Use this function to select the processing unit to be used for manual functions that require processing unit selection.

See the desired screen to determine if that function requires processing unit selection.

To select a processing unit, enter QT and the processing unit number (0, 1, or 2) next to COMMAND. QT2 targets both processors. Entering QT without a number increments the processing unit by one.

PF1 can be used to perform the QT function.

The targeted processing unit is indicated by a > at the beginning of its status line. If both processing unit are targeted, the > indicator appears on both status lines 21 and 22.

Functions that allow both processing units to be targeted display PU0 information because only one screen can be displayed at a time. For all other functions, if both processing units are targeted and PU0 is configured, PU0 is selected. If both processing units are targeted and PU0 is not configured, PU1 is selected.

PU0 or PU1 appears on COMMAND line 20 of the function screens that require processing unit selection. This indicates which processing unit the displayed information is associated with.

Note: The QT function is not available in customer mode with only one processor configured.

P PROBLEM ANALYSIS

See the "(QP) Problem Analysis Screens" on page 10.

Z RETURN TO PROG SYS

To return control of the console to the operating system, key QZ next to COMMAND, and press the ENTER key.

Q Screen Options (Right Side of Screen)

For information on these options, see the desired screens.

(QP) Problem Analysis Screens

```
                          *PROBLEM ANALYSIS*                          MSG01


PA OPTIONS AVAILABLE:  SELECT ONE OPTION, THEN PRESS ENTER.
     1 = START PROBLEM ANALYSIS ROUTINE
     2 = DISPLAY PA MESSAGE HISTORY
     3 = RUN PROCESSING UNIT ANALYSIS TEST
     4 = SEND SERVICE INFORMATION (IF RSF INSTALLED)
     5 = DISPLAY DETAILED PA DATA
     6 = CUSTOMER DATA AND SECURITY CONTROL
     7 = GO TO PART NUMBER AND FRU LIST PROGRAM
     8 = DISPLAY PROBLEM ANALYSIS FRU-LOGS
     9 = DISPLAY SERVICE TRANSMISSION HISTORY
     E = SERVICE ACTION COMPLETED


Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP
```

Use the QP screen to display the PA (Problem Analysis) options.

Note: Problem Analysis screens are configurable so that they can be displayed in another language. For information, see Volume A06, Service Aids, "Language Configuration."

Displaying All Problem Analysis Screen Options

To display all PA screen options:

1. Set the CE Mode switch to CE Mode. (If the CE Mode switch is set to Normal, Options 7, 8, 9, and E are not displayed.)

2. Key QP next to COMMAND, and press the ENTER key.

Selecting a PA Option

To select a PA option, key the number of the desired option next to QP on the COMMAND line, and press the ENTER key. For a description of options 1 through 9, see the desired screen.

Option E

Option E logs the current time in the support processor. This prevents PA Option 1 from displaying information about an old problem.

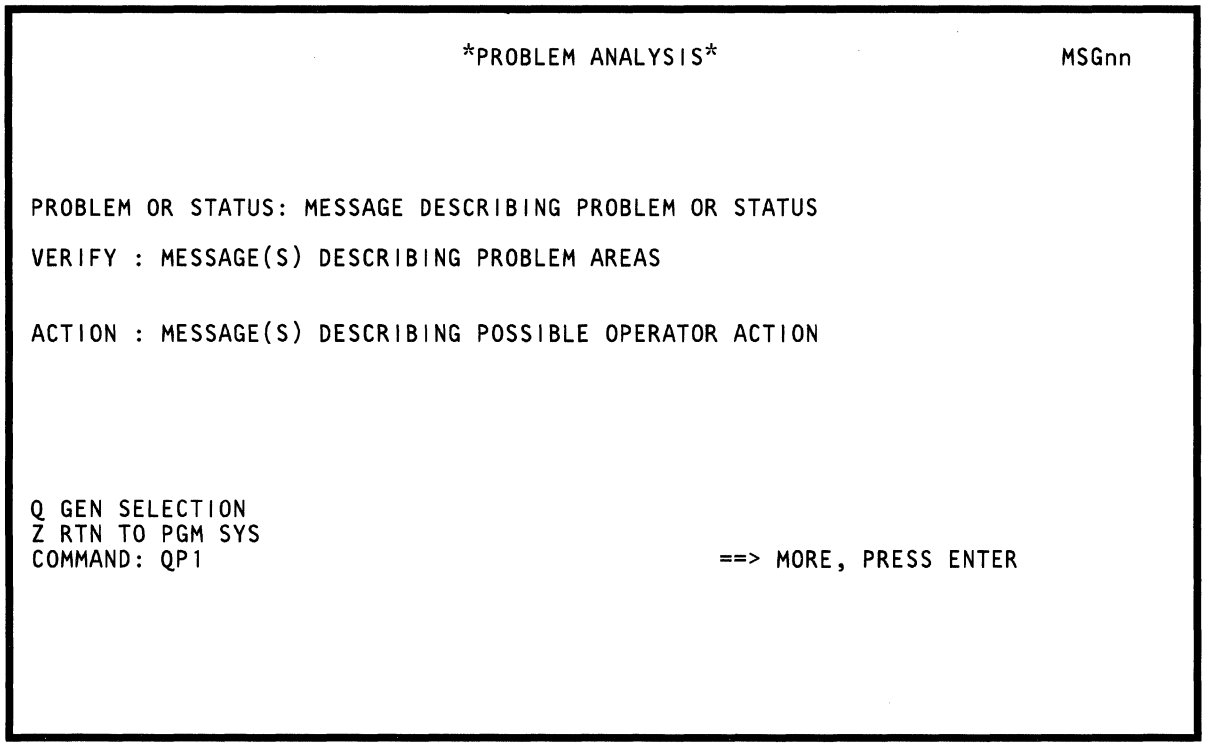
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 1: Start Problem Analysis Routine



These screens describe a problem or provide status information.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 2: Display PA Message History

```
                              *PROBLEM ANALYSIS*                          MSG33


RUN  OPT  OPTION START TIME  MESSAGE NUMBER-MESSAGE STATUS
 0    1   83/06/14 10:21:00  04 15-x 10-x
      3   83/06/14 10:25:00  17 19
 1    1   83/06/13 09:12:38  04 30-x
      -   00/00/00 00/00/00
 2    -   00/00/00 00/00/00
      3   83/05/10 15:24:21  17 19
 3    -   00/00/00 00/00/00
      -   00/00/00 00/00/00
 4    -   00/00/00 00/00/00
      -   00/00/00 00/00/00
 5    -   00/00/00 00/00/00
      -   00/00/00 00/00/00
SELECT A RUN, AN OPTION (OPT), AND A MESSAGE NUMBER, THEN PRESS ENTER.

Q GEN SELECTION
Z RTN TO PGM SYS
COMMAND: QP2                                        ==>
```

Use PA Option 2 to display a PA history of the last six QP1, QP3, or QP1 and QP3 screens.

The screen displays:

- The date and time the PA option was started (OPTION START TIME)
- The number(s) of the message(s) for a specific PA action (MESSAGE NUMBERS). The -x following the message number identifies which processing unit the message is associated with.

  -0 is PU0
  -1 is PU1
  -2 is both PUs
  blank is not a PU message.

  To display any of the original message screens, follow the instructions on the QP2 screen.

To invoke Option 2 from the PA Option screen, key 2 next to QP and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 3: Run Processing Unit Analysis Test

```
                              *PROBLEM ANALYSIS*                    MSG17



 WARNING: IML AND IPL WILL BE NEEDED AFTER THIS OPTION IS RUN.

 ACTION:  * PRESS ENTER TO CONTINUE.

                  OR

          * PRESS MODE-SEL KEY TO CANCEL AND RETURN TO GEN SELECTION SCREEN.

Q GEN SELECTION
Z RTN TO PGM SYS
COMMAND: QP3
```

Use PA Option 3 to run the Processing Unit Analysis (PUA) test. PUA verifies that the processor is operating correctly.

Warning: An IML/IPL is needed after this option is run.

To invoke Option 3 from the PA Option screen:

1. Key QP3 next to COMMAND, and press the ENTER key.

2. Insert the FUNC2 diskette, and press the ENTER key.

Respond to the messages displayed on the screen. When the test is completed, you are either told to report an error code to local service or that no problem was found.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 4: Send Service Information

```
                        *PROBLEM ANALYSIS*                              MSG32

IBM INSTALLATION DATA:
     REGION>__  BRANCH OFFICE>___  COUNTRY>___
     CUSTOMER NAME:>_____________________________
     STREET.CITY.STATE:>_____________________________

RSF: LINE SPEED (1=600, 2=1200 BPS) :>_
     DATA BLOCK SIZE (1=256B, 2=2KB):>_
     LINE PLATE INSTALLED (Y OR N)  :>_  (WORLD TRADE ONLY)


TO CALL LOCAL SERVICE:>_____________

PRIMARY SYSTEM:                      BACKUP SYSTEM:
     PHONE NUMBER:>1-800-525-0342         PHONE NUMBER:>1-800-237-8942
     ROUTING CODE:>RAL/R370/R             ROUTING CODE:>SF2/R370/R
ACTION:>FILL IN SPACES, THEN PRESS ENTER KEY.
Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP4                          ==>
```

```
                        *PROBLEM ANALYSIS*                              MSG2B
                 4381-010015   TO CALL LOCAL SERVICE: (nnnnnnnnnnnnnn)

                          YOUR NAME:>_____________
                     TELEPHONE NUMBER:>_____________ EXT ____
                   PROGRAM TYPE/LEVEL: _____________
                 SYSTEM STATUS (1=NOT WORKING, 2=WORKING):>_
                 IBM SUPPORT SYSTEM (1=PRIMARY, 2=BACKUP):>_
                   PROBLEM DESCRIPTION:>_____________________________________

                   SEND I/O DEVICE TRACE  (1=YES,2=NO) ?  _
                   SEND INSTRUCTION TRACE (1=YES,2=NO) ?  _
       SEND MAIN STORE DUMP (01-64 KB)? __ KB   START ADDRESS ________
                      PASSWORD FOR DUMP: ________
                         SEND MODULE ID: ________SEND SP DUMP (1=YES,2=NO): _
           ACTION:>FILL IN THE SPACES, THEN PRESS ENTER KEY
 Q GEN SELECTION
 Z RTN TO PGM SYS
  COMMAND:QP4


                                                 ==>
```

The top screen on the preceding page is filled in by the service representative when the system is installed. The other screen lets you send a service request and service information to your support structure.

For additional information, see Volume A06, Service Aids, "Send Service Information."

To update these screens:

1. Set the CE Mode switch to CE Mode.
2. Press the MODE SEL key to display the Q screen.
3. Key QP4 next to COMMAND, and press the ENTER key.

   The Service Request IBM Data screen appears (make any necessary changes).
4. Press the ENTER key.
5. The Service Request and Send Service Information screen appears.

   Complete the fields only as directed by your support structure. If a main storage dump is required, have the customer enter the password.

   Notes:

   a. A password is not required if the processor has not been IPLed.

   b. START ADDRESS must be a right-justified, four-byte address.
6. Press the ENTER key, and then do ACTION steps 1 and 2.

   If you entered invalid information, respond to the messages displayed on the screen.

   If you entered valid information, the data transfer starts.

   Note: To cancel transmission, hold the ALT key down and press the LINE DISC key.
7. When the data has been successfully transferred, the console returns to the Q screen or to control of the programming system (if the processor was IPLed).
8. Key QBTP next to COMMAND, and press the ENTER key.

   The Patch List screen appears. Verify whether any new patches (resulting from this option) have been received. If yes, install them as directed by your support structure.

PA Option 5: Display Detailed PA Data

```
                              *PROBLEM ANALYSIS*


PROBLEM ANALYSIS DETAIL SCREENS AVAILABLE:

                                        VALID LOGS FOR PU0   VALID LOGS FOR PU1
OPTION   SCREEN CONTENT                  0  1  2  3  4  5     0  1  2  3  4  5
  I    = IML ERROR DETAIL                X  X                 X
  M    = MICROCODE LOOP DETAIL              X
  L    = LOW STORAGE DETAIL                    X  X                       X  X
  T    = INSTRUCTION TRACE DETAIL              X                             X
  C    = CHANNEL AND I/O DEVICE DETAIL         X                             X

SELECT ONE OPTION, ONE VALID LOG NUMBER AND PU NUMBER, THEN PRESS ENTER
FOR EXAMPLE QP5T31


Q GEN SELECTION
Z RTN TO PGM SYS
COMMAND: QP5
```

Use this screen to select the detailed data you want to display. This data was saved by PA Option 1.

To invoke Option 5 from the PA Option screen, key 5 next to QP on the COMMAND line, and press the ENTER key.

For a display of each option, see the following screens.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 5I: IML Error Detail Screen

```
   PA-DETAIL LOG-nn          *PROBLEM ANALYSIS*      SAVED: yy/mm/dd hh:mm:ss

PU0:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
PU1:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
MAIN STORE POINTERS:
ACB: XXXXXXXX        EML TABLE: XXXXXXXX        PER TABLE: XXXXXXXX
INTERNAL RECORD: XXXXXXXX        CHANNEL DIRECTORY: XXXXXXXX
         PU-IML ERROR OCCURRED IN EML TABLE
         AT MAIN STORE ADDRESS XXXXXXXX
         MAIN STORE DATA WAS                MAIN STORE SHOULD BE
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP5Ixx                              ==> MORE, PRESS ENTER
```

```
   PA-DETAIL LOG-nn          *PROBLEM ANALYSIS*      SAVED: yy/mm/dd hh:mm:ss

PU0:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
PU1:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
MAIN STORE POINTERS:
ACB: XXXXXXXX        EML TABLE: XXXXXXXX        PER TABLE: XXXXXXXX
INTERNAL RECORD: XXXXXXXX    SUBCHAN IMAGE: XXXXXXXX     C-U IMAGE: XXXXXXXX
         PU-IML ERROR OCCURRED IN EML TABLE
         AT MAIN STORE ADDRESS XXXXXXXX
         MAIN STORE DATA WAS                MAIN STORE SHOULD BE
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
 XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX    XXXXXXXX XXXXXXXX XXXXXXXX XXXXXXXX
Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP5Ixx                              ==> MORE, PRESS ENTER
```

Use this screen to determine where an IML error occurred.

To invoke Option I from the PA Option 5 screen, key i and a valid log number and PU number next to QP5 on the COMMAND line, and press the ENTER key.

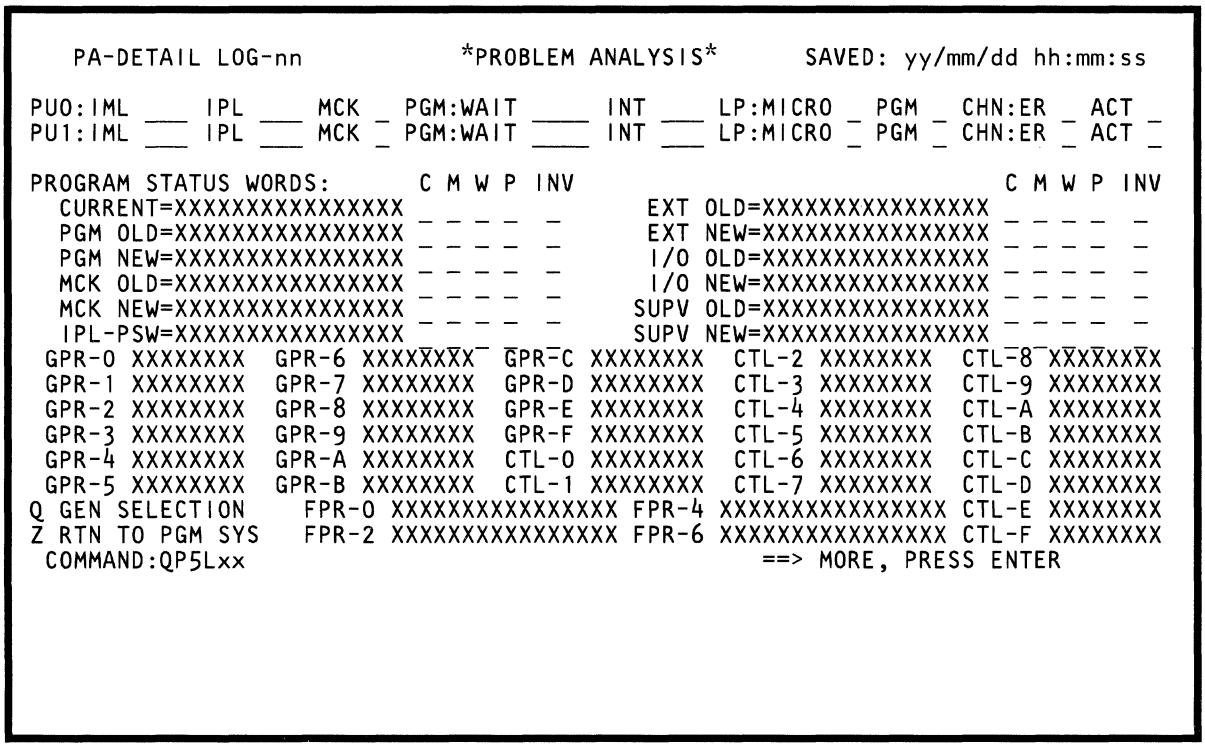
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 5L: Low Storage Detail Screen



Use this screen to display information about a possible software problem.

To invoke Option L from the PA Option 5 screen, key I and a valid log number and PU number next to QP5 on the COMMAND line, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 5M: Microcode Loop Detail Screens

```
   PA-DETAIL LOG-nn            *PROBLEM ANALYSIS*     SAVED: yy/mm/dd hh:mm:ss

PU0:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
PU1:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
MICROCODE LOOP ADDRESSES (32):      TRACE ADDRESS= __
 00:XXXXXX 01:XXXXXX 02:XXXXXX 03:XXXXXX 04:XXXXXX 05:XXXXXX 06:XXXXXX 07:XXXXXX
 08:XXXXXX 09:XXXXXX 0A:XXXXXX 0B:XXXXXX 0C:XXXXXX 0D:XXXXXX 0E:XXXXXX 0F:XXXXXX
 10:XXXXXX 11:XXXXXX 12:XXXXXX 13:XXXXXX 14:XXXXXX 15:XXXXXX 16:XXXXXX 17:XXXXXX
 18:XXXXXX 19:XXXXXX 1A:XXXXXX 1B:XXXXXX 1C:XXXXXX 1D:XXXXXX 1E:XXXXXX 1F:XXXXXX
EXT REG:     CH0  CH1  CH2  CH3  CH4  CH5  CH6  CH7  CH8  CH9  CHA CHB
 EXT.0(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.1(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.2(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.3(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.4(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.5(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.6(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
 EXT.7(0:1)  XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX XXXX
Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP5Mxx                                  ==> MORE, PRESS ENTER
```

```
   PA-DETAIL LOG-nn            *PROBLEM ANALYSIS*     SAVED: yy/mm/dd hh:mm:ss

PU0:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
PU1:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
MICROCODE LOOP ADDRESSES (32):      TRACE ADDRESS= __
 00:XXXXXX 01:XXXXXX 02:XXXXXX 03:XXXXXX 04:XXXXXX 05:XXXXXX 06:XXXXXX 07:XXXXXX
 08:XXXXXX 09:XXXXXX 0A:XXXXXX 0B:XXXXXX 0C:XXXXXX 0D:XXXXXX 0E:XXXXXX 0F:XXXXXX
 10:XXXXXX 11:XXXXXX 12:XXXXXX 13:XXXXXX 14:XXXXXX 15:XXXXXX 16:XXXXXX 17:XXXXXX
 18:XXXXXX 19:XXXXXX 1A:XXXXXX 1B:XXXXXX 1C:XXXXXX 1D:XXXXXX 1E:XXXXXX 1F:XXXXXX
PU-BYTE:  00 01 02 03 04 05 06 07
  EXT.0:  XX XX XX XX XX XX XX XX
  EXT.1:  XX XX XX XX XX XX XX XX
  EXT.2:  XX XX XX XX XX XX XX XX
  EXT.3:  XX XX XX XX XX XX XX XX
  EXT.4:  XX XX XX XX XX XX XX XX
  EXT.5:  XX XX XX XX XX XX XX XX
  EXT.6:  XX XX XX XX XX XX XX XX
  EXT.7:  XX XX XX XX XX XX XX XX
Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP5Mxx                                  ==> MORE, PRESS ENTER
```

Use this screen to display data if you suspect a software problem. Displayed are the last 32 microwords that were run and the contents of the hardware external register.

To invoke Option M from the PA Option 5 screen, key m and a valid log number and PU number next to QP5 on the COMMAND line, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 5T: Instruction Trace Detail Screen

```
   PA-DETAIL LOG-nn          *PROBLEM ANALYSIS*      SAVED: yy/mm/dd hh:mm:ss

PU0:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
PU1:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM _ CHN:ER _ ACT _
FIRST 90 ADDRESSES ARE:
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX
Q GEN SELECTION       NUMBER OF INSTRUCTIONS FOUND IN LOOP: xxxx
Z RTN TO PGM SYS
 COMMAND:QP5Txx                                    ==> MORE, PRESS ENTER
```

Use this screen to determine if the software is in a loop (470 or less instructions).

To invoke Option T from the PA Option 5 screen, key t and a valid log number and PU number next to QP5 on the COMMAND line, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 5C: Channel and I/O Device

```
  PA-DETAIL LOG-nn            *PROBLEM ANALYSIS*     SAVED: yy/mm/dd hh:mm:ss

PU0:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM - CHN:ER _ ACT _
PU1:IML ___ IPL ___ MCK _ PGM:WAIT ____ INT ___ LP:MICRO _ PGM - CHN:ER _ ACT _
CHAN NOT OPERATIONAL=_____ _____ _____ _____ _____ _____ _____ _____ LIMITED LOG=xxxxxxxx
CHANNEL INTERFACE CONTROL CHECKS:                    IFCC DETAILED LOG==>QE|DXXY:
 PCX,DEVPATH= ___,____ ___,____ ___,____ ___,____ ___,____ ___,____ ___,____ ___,____
              ___,____ ___,____ ___,____ ___,____ ___,____ ___,____ ___,____ ___,____
 I/O DEVICE ERRORS:
  DEVPATH=____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____
   US/CS= ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____
  DEVNUM =____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____
 I/O DEVICE WITH OPERATION NOT COMPLETE:
  DEVPATH=____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____
  DEVNUM =____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____
 CHNL BUSY, DEVICE OPERATION INCOMPLETE:
  DEVPATH=____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____
  DEVNUM =____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____ ____

Q GEN SELECTION
Z RTN TO PGM SYS
COMMAND: QP5Cxx                              ==> MORE, PRESS ENTER
```

Use this screen to determine whether a channel or I/O device problem caused a loop.

To invoke Option C from the PA Option 5 screen, key c and a valid log number and PU number next to QP5 on the COMMAND line, and press the ENTER key.

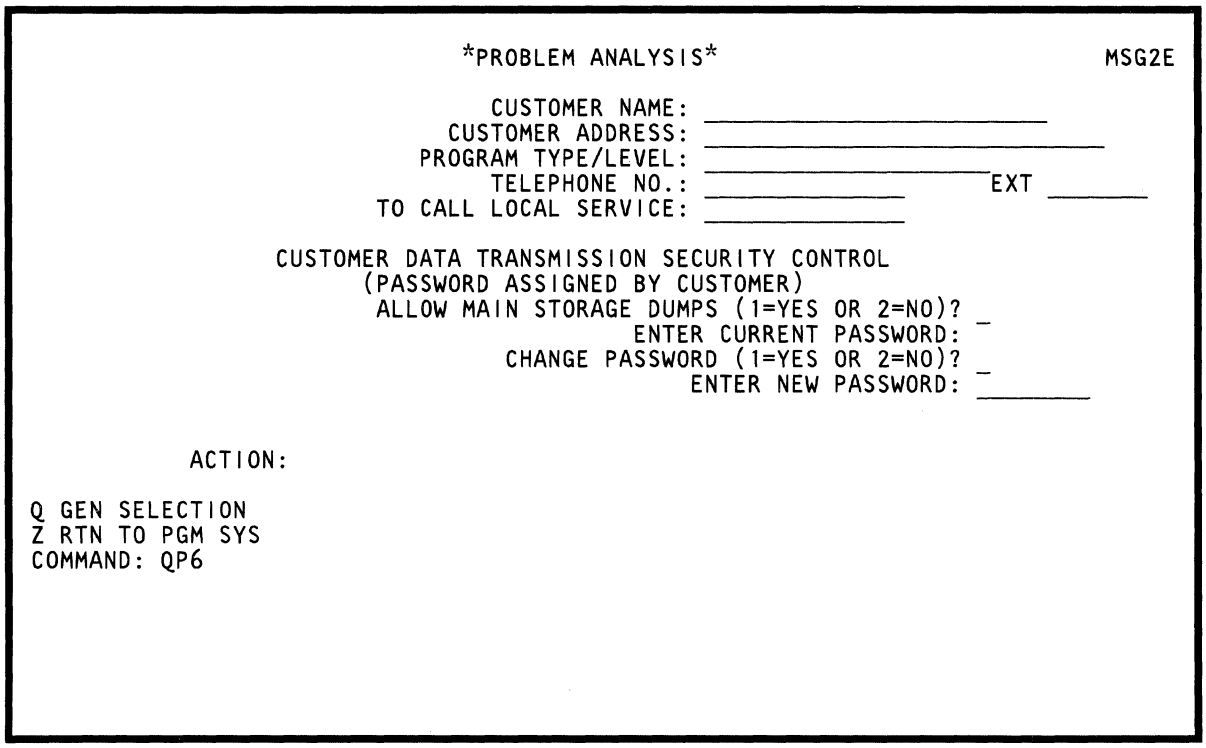
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 6: Customer Data and Security Control Screen



Use this screen to assign a password or to change the local service telephone number. Respond to the directions displayed on the screen.

To invoke Option 6 from the PA Option screen, key 6 next to QP on the COMMAND line, and press the ENTER key.

For additional information, see Volume A06, Service Aids, "Customer Data and Security Control (Problem Analysis)."

PA Option 7: PA Log Part Numbers

```
                              *PA LOG PART NUMBERS*
ACTION: *RECORD THIS REFERENCE CODE: UURRRRIS
*RECORD THE FRU LOCATION AND REPLACEMENT SEQUENCE,
          UNDERLINING ANY INTENSIFIED FRUS.
         *GO TO REPAIR PROCEDURE PR1001
                               LOG ID NUMBER: PAxx
                        REPLACEMENT
                         SEQUENCE     LOCATION     P/N
                            01        XXXXXXX    NNNNNNN
                            02        XXXXXXX    NNNNNNN
                            03        XXXXXXX    NNNNNNN
                            04        XXXXXXX    NNNNNNN
                            05        XXXXXXX    NNNNNNN
                            06        XXXXXXX    NNNNNNN
                            07        XXXXXXX    NNNNNNN
                            08        XXXXXXX    NNNNNNN


 COMMAND: QP7PAxx                 >
```

Use this screen to determine which (or if) FRUs need to be exchanged. The screen also displays:

- The last PUA log number (PAxx)
- The log reference number (if one exists)
- A Repair Procedure.

To invoke Option 7PA from the PA Option screen:

1. Set the CE Mode switch to CE Mode.
2. Key 7PA and the PA number next to QP on the COMMAND line, and press the ENTER key.

For additional information, see Volume A06, Service Aids, "FRU Replacement Procedure."

PA Option 7: Go to Part Number and FRU List Program (CE-only)

```
                    *COMPONENT LOCATIONS AND PART NUMBERS*          PAGE n OF n
 LOCATION  P/N       LOCATION  P/N       LOCATION  P/N       LOCATION   P/N
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN
 LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL NNNNNNN     LLLLLLL  NNNNNNN


COMMAND: QP7                                    ==> MORE, PRESS ENTER
```

Use this screen to update FRU part numbers. The screen also displays:

- The last PUA log number (PAxx)
- The log reference number (if one exists)
- A Repair Procedure.

To invoke Option 7 from the PA Option screen:

1. Set the CE Mode switch to CE Mode.
2. Key 7 next to QP on the COMMAND line, and press the ENTER key.

For additional information, see Volume A06, Service Aids, "Component Location and Part Number Update Procedure."

PA Option 8: Display PA FRU-Logs (CE-only)

```
                        *PROBLEM ANALYSIS FRU-LOGS*                PAGE n OF n

LOG RECORD NUMBER          :      PA04              PA03              PA02
LOG TIME STAMP             :yy/mm/dd hh:mm:ss  yy/mm/dd hh:mm:ss  yy/mm/dd hh:mm:ss

PRIME FAILURE SEVERITY     : SYSTEM DAMAGE     CATASTROPHIC ERR   CATASTROPHIC ERR
PRIME REFERENCE CODE/EXT   :xxxxxxxx xxxxxxxx  xxxxxxxx xxxxxxxx  xxxxxxxx xxxxxxxx
REFERENCE CODES 2-3        :xxxxxxxx xxxxxxxx  xxxxxxxx xxxxxxxx  xxxxxxxx xxxxxxxx
REFERENCE CODES 4-5        :xxxxxxxx xxxxxxxx  xxxxxxxx xxxxxxxx  xxxxxxxx xxxxxxxx
PUA REFERENCE CODE/EXT     :xxxxxxxx-xxxxxxxx  xxxxxxxx-xxxxxxxx  xxxxxxxx-xxxxxxxx

FRU COUNT DISPLAY/TOTAL    :     02 04             00 08             00 00
FAILURE RESULT             .ISOLATED           INTERMITTENT      NO ISOLATION
FAILING TEST/CORELOAD-ID:    xxxx xx             xxxx xx           xxxx xx

FRU LOCATIONS (0-8 MAX)    :_______ _______    _______ _______    _______ _______
                            _______ _______    _______ _______    _______ _______
Q GEN SELECTION             _______ _______    _______ _______    _______ _______
Z RTN TO PROG SYS           _______ _______    _______ _______    _______ _______
 COMMAND: QP8                                          MORE, PRESS ENTER
```

PA Option 8 contains the six latest logs created by PA Option 1. If PA Option 3 is run, the results are combined with the PA Option 1 log. The log time stamp shows when PA Option 1 created the log.

To invoke Option 8 from the PA Option screen:

1. Set the CE Mode switch to CE Mode.
2. Key 8 next to QP on the COMMAND line, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

PA Option 9: Display Service Transmission History (CE-Only)

```
                    *SERVICE REQUEST TRANSMISSION HISTORY*

                                                 =========LOGS REC'D======= ==DUMPS=
SYS DATE REC'D PROBLEM# SUPPORT SYS ERRORS       PA RC PW SP PU IC IO EC IF SP ID MS
============== ======== ==================      == == == == == == == == == == == ==
                        NOT REGISTERED
yy/mm/dd-hh:mm INCxxxx  SYS SPACE UNAVAIL.
yy/mm/dd-hh:mm INCxxxx  SYS READ ONLY MODE       Y  Y                        Y  Y  Y
yy/mm/dd-hh:mm INCxxxx  DB NOT ACCESSIBLE        Y     Y     Y     Y
yy/mm/dd-hh:mm INCxxxx  DATA BANK FULL           Y  Y
yy/mm/dd-hh:mm INCxxxx  DATA BANK I/O ERR        Y  Y
yy/mm/dd-hh:mm INCxxxx  TP RECEIVE ERROR         Y  Y
yy/mm/dd-hh:mm INCxxxx  RETRANSMIT ERROR         Y  Y

 PA=PROBLEM ANALYSIS  SP=SUPPORT PROCESSOR  IO=I/O DEVICE TRACE  EC=EVENT COUNT
 RC=REFERENCE CODE    PU=PROCESSING UNIT    ID=DISKETTE MODULE   IF=IFCC LOG
 PW=POWER LOG         IC=INSTRUCTION TRACE  MS=MAIN STORAGE
Q GEN SELECTION
Z RTN TO PGM SYS
 COMMAND: QP9
```

Each time you transfer data to your support structure with PA Option 4, a history of the transmission is saved. Use PA Option 9 to display this history.

To invoke Option 9 from the PA Option screen:

1. Set the CE Mode switch to CE Mode.
2. Key 9 next to QP on the COMMAND line, and press the ENTER key.

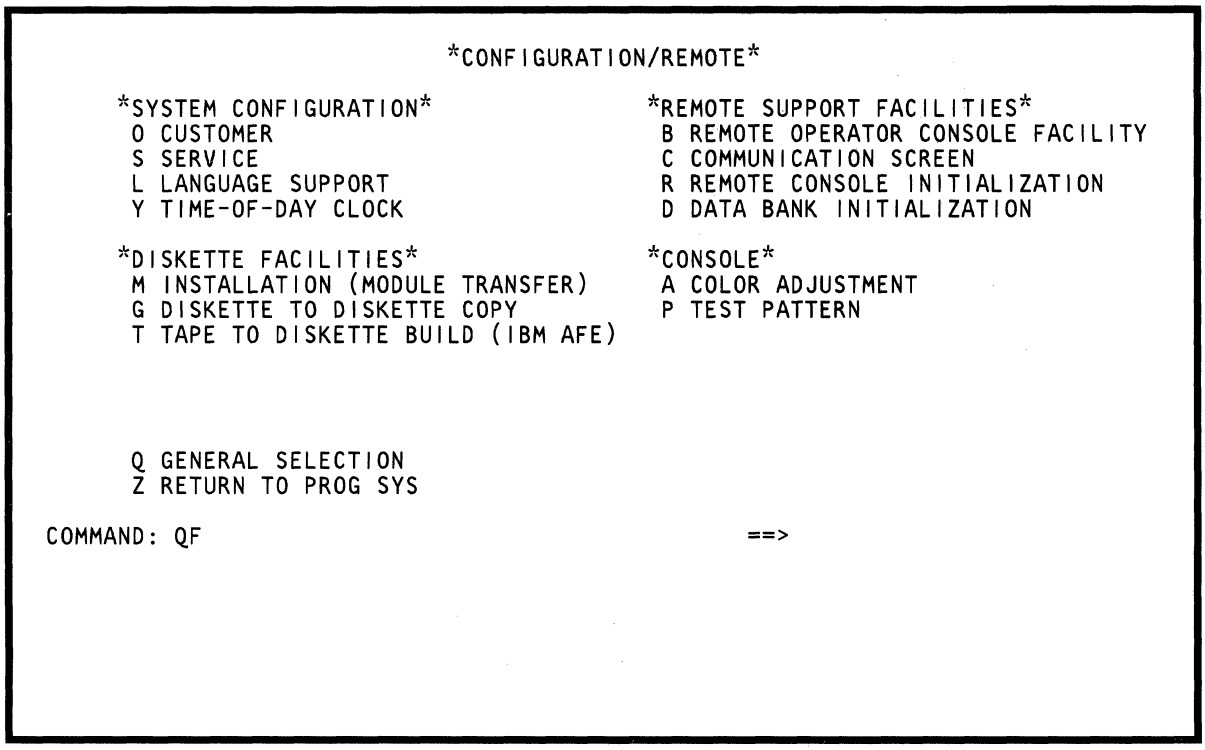
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QF) Configuration/Remote Screens



The Configuration/Remote screen:

- Changes features
- Generates diskettes
- Aligns or checks the color on a color display console
- Performs various telecommunications tasks.

Displaying the QF Screen Options

To display all the options (CE and non-CE) available on the Configuration/Remote screen:

1. Set the CE Mode switch to CE Mode. (If the switch is not in CE Mode, only the non-CE functions are displayed.)
2. Key QF next to COMMAND, and press the ENTER key.

For a description of each option, see the desired screen.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFS) System Configuration-Service

```
                  *SYSTEM CONFIGURATION-SERVICE*
SYSTEM TYPE 4381-x
SERIAL NO.:   000000                  MAIN STORE SIZE     32 MEG
DISKETTE ID  1954285                  MAIN STORE CODE   : 2 2 2 2
         EC  xxxxxx
         REA 0000000                  CONTROL STORE SIZE: 128 KB


                                      ROCF              : N
POWER GROUP:      16
50/60 HZ:         60                  RSF FEATURE CODE  : NONE

                                      CHANNEL TO CHANNEL: Y

L LOCK SERIAL NUMBER                  NUMBER OF CHANNELS: 18
A PU CONFIGURATION                    CHL HARDWARE FAILURES ARE HIGHLIGHTED
Q GENERAL SELECTION                   PU0 CHANNEL NO. 0 1 2 3 4 5 6 7 8
Z RETURN TO PROG SYS                  PU1 CHANNEL NO. 0 1 2 3 4 5 6 7 8

COMMAND: QFS                                    ==>
```

Use this command to display and change the system configuration (if the CE Mode switch is not in CE Mode, no fields can be changed).

To move the cursor from one field to another, use the New Line, Tab, or Back-Tab keys.

Warning: If you change a field, you must store the change; otherwise, the desired change is lost. To store the change, press Power On/IML.

Displaying the System Configuration--Service Screen

To display the QFS screen, key QFS next to COMMAND, and press the ENTER key.

To change the system configuration, set the CE Mode switch to CE Mode. The fields that can be changed are listed below in the order that they appear on the screen.

Determine the correct entries from the Feature BM machine history. For more information about system configuration, see Volume A06 Service Aids, "Configuration Aids."

SERIAL NO.:

The serial number update is a one-time occurrence. When entered, it becomes an unchangeable field; therefore, ensure that the entered serial number is correct.

To enter the serial number:

1. Move the cursor to the value displayed on the screen for SERIAL NO., and key the desired six-digit machine serial number.

2. Key QFSL next to COMMAND, and press the ENTER key. QFSLOCKSERNUM is displayed next to COMMAND.

3. The display screen now prompts you to press the ENTER key to lock in the serial number (at this point you can still change the serial number).

4. Press the ENTER key. The machine serial number can no longer be changed.

Note: The L LOCK SERIAL NUMBER option is only displayed on machines that **do not** have the serial number locked.

POWER GROUP:

Move the cursor to the value displayed on the screen for POWER GROUP code, and key a two-digit code.

Press the ENTER key.

50/60 HZ:

Move the cursor next to 50/60 HZ: and key 50 or 60.

Press the ENTER key.

MAIN STORE SIZE:

This field displays the main storage size and cannot be altered. Use MAIN STORE CODE to change the size of main storage.

MAIN STORE CODE:

Move the cursor to the value displayed on the screen for MAIN STORE CODE, and key the four-digits representing the installed size of main storage.

Press the ENTER key.

- 1 equals a one-megabyte card
- 2 equals a two-megabyte card.

For more information, see Volume A06, Service Aids, "Configuration Aids."

CONTROL STORE SIZE:

Move the cursor to the value displayed on the screen for CONTROL STORE SIZE, and key the three-digit number representing the installed size of control storage.

Press the ENTER key.

ROCF:

Move the cursor next to ROCF, and key a Y when ROCF is installed or an N if it is not installed.

Press the ENTER key.

RSF FEATURE CODE:

Move the cursor next to RSF FEATURE CODE:, and key the four-digit RSF feature code that matches the installed hardware or NONE if no hardware is installed. (For RSF Feature Code information, see "Volume A06, Service Aids.")

Press the ENTER key.

CHANNEL TO CHANNEL:

Move the cursor next to CHANNEL TO CHANNEL, and key a Y to configure the Channel-to-Channel feature or an N if the feature is not to be configured.

Press the ENTER key.

NUMBER OF CHANNELS:

Note: This entry must equal the actual hardware configuration.

Move the cursor next to NUMBER OF CHANNELS:, and key the number of installed channels.

Press the ENTER key.

Note: If a channel is not operational because of a hardware failure, the channel number is highlighted.

From the System Configuration-Service screen, you can go to the:

- PU Configuration screen—Key QFSA next to COMMAND, and press the ENTER key. If you changed a field, see "Warning" before leaving the QFS screen.
- General Selection screen—Key Q next to COMMAND, and press the ENTER key. If you changed a field, see "Warning" before leaving the QFS screen.
- Programming Systems screen—Key Z next to COMMAND, and press the ENTER key. If you changed a field, see "Warning" before leaving the QFS screen.

(QFSA) PU Configuration

```
                        *PROCESSING UNIT CONFIGURATION*

*CONFIGURABLE ITEMS*     *NORMAL*    *ERROR LOCATIONS*
                          (Y/N)      BYTES      :  0/4   1/5   2/6   3/7
CONTROL STORAGE ARRAY       N        ADDRESSES  : 01000 02000 03000 04000
                                     BYTES      :  8/C   9/D   A/E   B/F
                                     ADDRESSES  : 15000 16000 17000 17800
CACHE DATA ARRAY            N        BYTES      : 0 1 2 3 4 5 6 7
CACHE SWAP BUFFER ARRAY     N        EVEN BYTES: 0/1 2/3 4/5 6/7
                                     ODD  BYTES: 8/9 A/B C/D E/F
CHNL DATA BUFFER ARRAY      N        CHANNELS   : 4 8
SYSTEM DEGRADATION MODE     N        CONDITIONS: CHANNEL MEMORY CACHE MULTIPLY KEY
MEMORY (4K BLOCKS BAD)      N        ADDRESSES  : 00003000 00007000 0000B000 (MORE)
KEY (4K ENTRIES BAD)        N                  *WARNING: CHECK CONTROL IN HARDSTOP.*
CACHE (BAD PAGE)            N                  *CONFIGURATION HAS BEEN CHANGED.DATA*
MULTIPLY FUNCTION           N                  *INTEGRITY NOT MAINTAINED. CONTINUED*
                                               *OPERATION UNPREDICTABLE. TO RESUME *
 R  RESET VALUES (DEFAULT)                     *NORMAL OPERATION ENTER: QKN & QNOR.*
 O  OPERATIONAL VALUES (OS TO SAVE)
COMMAND: QFSAO                                    PUx ==>
```

Reconfiguration Description

If a machine check occurs, the retry component analyzes the check to determine if it is in one of the reconfigurable arrays or logic components. If it is, the support processor reconfigures the hardware. That is, the support processor:

- Automatically stops using the defective hardware and instead uses spare hardware.
- Moves, if possible, any data present in the defective hardware to the spare hardware.
- Ensures that later IMLs and system resets recognize that reconfiguration has occurred.

QFSA Command

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Use the QFSA command to:

- Determine if any hardware reconfiguration has occurred (QFSA selection).
- Manually reconfigure the multiply function hardware (QFSAR selection).
- Display active system degradation conditions (QFSAR selection).
- Manually reset (restore to normal) the following hardware (QFSAR selection):

  Warning: Do this only when directed by your support center.

  Memory (4K Blocks Bad)
  Key (4K Entries Bad)
  Cache (Bad Pages)
  Multiply Function.

- Display active system degradation conditions (QFSAO selection).
- Manually reset (restore to normal) or reconfigure the following hardware (QFSAO selection):

  Warning: Do this only when directed by your support center.

  Control Storage Array
  Cache Data Array
  Cache Swap Buffer Array
  Channel Data Buffer Array

- Save the reconfiguration values entered by you (QFSAOS selection).

  Warning: Do this only when directed by your support center.

The QFSA screen example on the previous page shows all possible failure.

Hardware Reconfiguration Explanation

A brief explanation of hardware reconfiguration follows:

- Control Storage Array

  This array has a 2K (800 hex) area reserved for reconfiguration. Reconfiguration is on a two-byte basis (0/4, 1/5, 2/6, etc.). For example, if byte 6 at address 31F6 fails, all addresses between 3000 and 37FF are reconfigured to use bytes 2 and 6 in the reserved area. If additional addresses fail (must not be caused by the same byte pair), they also are reconfigured to use the reserved area.

- Cache Data Array

  The cache data array and the area reserved for reconfiguration are exactly the same size. Therefore, when any byte (0 to 7) in the cache array fails, all bytes with that number are reconfigured to use the reserved area. (That is, if byte 1 fails, all byte 1s are reconfigured.) It is possible to have all of the cache data array (bytes 0 to 7) using the reserved area.

- Cache Swap Buffer Array (PU0 only)

  The cache swap buffer array and the area reserved for reconfiguration are exactly the same size. If a failure occurs in the cache swap buffer, reconfiguration occurs on a two-byte basis (0/1, 2/3, etc.). For example, if byte 1 fails, all buffer bytes 0 and 1 are reconfigured to use bytes 0 and 1 in the reserved area. If additional bytes fail (must not be the same byte pair), they also are reconfigured to use the reserved area.

  Reconfiguration of the cache swap buffer array only occurs in processing unit zero (PU0).

- Channel Data Buffer Array

  This array has four buffers reserved for use if part of the main array fails. Reconfiguration is by buffer size (64 bytes) for each channel (the valid channel ID number range is 0 through 8). For example, if a byte in the buffer for channel 2 fails, the buffer is reconfigured to use one of the reserved buffers. A maximum of two channel data buffers can be reconfigured.

- Memory (4K Blocks Bad)

  Reconfiguration for main storage is different from the other hardware reconfigurations. Instead of using a reserved area after a storage error occurs, the system stops using the 4K block of storage that contains the error. For example, if address 0007E4A2 is bad, future storage operations bypass the 4K block from 0007E000 to 0007EFFF. Up to 8192 4K blocks (32M) of storage can be bypassed. The first 4K block of storage, 00000000 to 00000FFF, cannot be bypassed because this area is necessary for system operation. MEMORY is displayed in the CONDITIONS field of the QFSA screen if the system degradation bit is enabled because of a bad 4K storage block.

- Key (4K Entries Bad)

  When a key array failure is detected by the system, the retry component marks the associated keys as bad. Two keys are marked bad in 2K mode and one key is marked bad in 4K mode. The key array and storage facilities are mutually independent. For example, you may have a 4K storage page marked as bad and have no entry for the associated keys. You may also have the key marked bad but not the memory. KEY is displayed in the CONDITIONS field of the QFSA screen if the system degradation bit is enabled because of a bad 4K key entry.

- Cache (Bad Page)

  When the system detects a failure in a cache byte that is already reconfigured, the retry component marks that page bad in the cache directory. CACHE is displayed in the CONDITIONS field of the QFSA screen if the system degradation bit is enabled because of a bad cache page.

- Multiply Function

  If the Multiply Assist function fails, the microcode starts to use the microcode multiply routines. (This change slows the system operation.) Because the multiply routines reside in control storage, reconfiguration of control storage may prevent the use of these routines. A check is made during IML to determine if reconfiguration of both control storage and the multiply function is possible. MULTIPLY is displayed in the CONDITIONS field of the QFSA screen if the system degradation bit is enabled because the multiply function is reconfigured.

Using the PU Configuration (QFSA) Screen

To use the QFSA screen:

1. Set the CE Mode switch to CE Mode.

   - **For QFSA selection**: Key QFSA next to COMMAND, and press the ENTER key (defaults to QFSAR).

     Do this to determine if any reconfiguration occurred. This displays the IML reset reconfiguration values and active system degradation conditions.

   - **For QFSAR selection**: Key QFSAR next to COMMAND, and press the ENTER key.

     Do this to reset (restore to normal) Memory, Key, and Cache Bad Page, or reset and reconfigure the Multiply function. This displays the IML reset reconfiguration values and active system degradation conditions.

   - **For QFSAO selection**: Key QFSAO next to COMMAND, and press the ENTER key. Key QOM next to COMMAND, and press the ENTER key; this stops the PU clock. When the SELECTION COMPLETE message appears, press the ENTER key.

     Do this to reset (restore to normal) or manually reconfigure the Control Storage array, Cache Data array, Cache Swap Buffer array, and the Channel Data Buffer array. This displays the operational hardware reconfiguration values and active system degradation conditions.

   - **For QFSAOS selection**: Key QFSAOS next to COMMAND, and press the ENTER key. Key QOM next to COMMAND, and press the ENTER key; this stops the PU clock. When the SELECTION COMPLETE message appears, press the ENTER key.

Now respond to the prompting messages to save the values you entered. This permanently saves the current operational hardware reconfiguration values. Future IMLs use these new IML reset reconfiguration values.

- **To exit from the QFSA screen**: Press the MODE SEL key or change the selection parameters on the COMMAND line.

Manually Reconfiguring the Arrays

Warning: Do this only when directed by your support center.

The procedure to reconfigure an array is similar for all of them. The reconfiguration values you enter are different; for information, see "Hardware Reconfiguration Explanation" on page 49. To reconfigure one of the arrays:

1. Use the QFSAO selection (see above) to display the QFSA screen.

2. Move the cursor to the Y/N field and change the Y to an N.

3. Move the cursor to the ERROR LOCATIONS field and key in the reconfiguration data (for aid, see the QFSA screen example or see "Hardware Reconfiguration Explanation" on page 49).

4. Press the ENTER key.

   Do not perform the QKN and QNOR functions at this time. The QKN and QNOR functions restore the hardware to the original setting (IML reset value).

5. Verify that you entered the reconfiguration data correctly by displaying the:

   - QVAC screen - Control Storage array
   - QVAG screen - Cache Data array
   - QVAS screen - Cache Swap buffer array
   - QVAD screen - Channel Data Buffer array.

   You can exit the QFSAO screen to verify reconfiguration data, but you must return to it and restore the changed values to the original setting (IML reset values) or save them permanently (new IML reset values).

   If you entered the data correctly, intensified Vs appear above the data columns that are using spare hardware (except for the QVAD screen) together with the message RECONFIGURATION ACTIVE.

6. If diskette alteration **is** desired (new IML reset values), go to step 8.

   If diskette alteration **is not** desired (temporary change), continue with step 7.

7. Do this step only if diskette alteration **is not** desired.

   Use the MODE SEL key or enter a new command on the COMMAND line to exit the QFSAO screen.

   Warning: Do this only when directed by your support center. A **temporary change** occurs when the hardware configuration values are changed without performing the QKN and QNOR functions or the save (QFSAOS) function. This causes unpredictable machine operation. The hardware configuration values must be restored to the original setting (QKN and QNOR) or permanently saved (QFSAOS) for normal operation.

8. Do this step only if diskette alteration **is** desired.

   Enter QFSAOS on the COMMAND line to save the reconfiguration values.

   Warning: Do this only when directed by your support center. The QFSAOS function permanently alters the diskette reconfiguration values.

9. Continue normal operation by doing the following:

   - Key QKN next to COMMAND.
   - Press the ENTER key.
   - Do a PU-IML.

Restoring the Arrays to Normal

Warning: Do this only when directed by your support center.

The procedure to restore arrays to normal is similar for each of the four arrays. To restore the arrays:

1. Use the QFSAO selection (see above) to display the QFSA screen.

2. To restore all of an array to normal, move the cursor to the Y/N field and change the N to a Y.

   To restore part of an array to normal, move the cursor to the ERROR LOCATIONS field and key asterisks in those positions you want to restore. The support processor restores the associated array hardware to normal.

3. Press the ENTER key.

   Do not perform the QKN and QNOR functions at this time. The QKN and QNOR functions restore the hardware to the original setting (IML reset value).

4. Verify that you entered the reconfiguration data correctly by displaying the:

   - QVAC screen - Control Storage array
   - QVAG screen - Cache Data array
   - QVAS screen - Cache Swap buffer array
   - QVAD screen - Channel Data Buffer array.

   You can exit the QFSAO screen to verify reconfiguration data, but you must return to it and restore the changed values to the original setting (IML reset values) or save them permanently (new IML reset values).

   If you entered the data correctly, intensified Vs appear above the data columns that are using spare hardware (except for the QVAD screen) together with the message RECONFIGURATION ACTIVE.

5. If diskette alteration **is** desired (new IML reset values), go to step 7.

   If diskette alteration **is not** desired (temporary change), continue with step 6.

6. Do this step only if diskette alteration **is not** desired.

   Use the MODE SEL key or enter a new command on the COMMAND line to exit the QFSAO screen.

   Warning: Do this only when directed by your support center. A **temporary change** occurs when the hardware configuration values are changed without performing the QKN and QNOR functions, or the save (QFSAOS) function. This causes unpredictable machine operation. The hardware configuration values must be restored to the original setting (QKN and QNOR) or permanently saved (QFSAOS) for normal operation.

7. Do this step only if diskette alteration **is** desired.

   Enter QFSAOS on the COMMAND line to save the reconfiguration values.

   Warning: Do this only when directed by your support center. The QFSAOS function permanently alters the diskette reconfiguration values.

8. Continue normal operation by doing the following:

   - Key QKN next to COMMAND.
   - Press the ENTER key.
   - Do a PU-IML.

Restoring Logic Components to Normal

Warning: Do this only when directed by your support center. The QFSAR function permanently alters the diskette reconfiguration values.

To restore logic components (Memory, Key, Cache Bad Page, and Multiply Function) to normal:

1. Use the QFSAR selection (see above) to display the QFSA screen.

2. Move the cursor to the Y/N field and change the N to a Y.

   Note: You have the option of changing a Y to an N for the Multiply function but not for Memory, Key Array, or Cache Bad Page.

3. Press the ENTER key.

4. Respond to the prompting messages to save the values you entered.

Label Identification

Error Locations: An asterisk (*) in a field indicates that normal hardware is being used (no reconfiguration has taken place). A hexadecimal value indicates that reconfiguration has occurred.

Normal: Displays either as Y (associated error location is normal) or N (associated error location has been reconfigured).

See the QFSA screen for examples of the following:

- Cache (Bad Page)

  If the Y/N field is N, one or more cache directory pages are bad and not used. If the Y/N field is Y, there are no bad cache pages.

- Cache Data Array

  The entries are either a single digit (0 to 7) or an asterisk (*). The digits must be in increasing order. A digit identifies the failing byte number; an asterisk indicates that reconfiguration has not occurred.

- Cache Swap Buffer Array (PU0 only)

  The entries are either 0/1, 2/3, etc. for the even field or 8/9, A/B, etc. for the odd field. The hexadecimal entry identifies the failing byte number; an asterisk indicates that reconfiguration has not occurred.

- Channel Data Buffer Array

  The entries (up to two) are a single digit between the values of 0 and the maximum number of channels installed. The hexadecimal entry identifies the failing channel; an asterisk indicates that reconfiguration has not occurred.

- Control Storage Array

  The entries must be five digits on 2K boundaries (800 hex). Each entry indicates the control storage address that has been reconfigured for a specific byte pair (it is possible to have all entries the same). Asterisks in a field indicate that reconfiguration has not occurred.

- Key (4K Entries Bad)

  If the Y/N field is N, reconfiguration of the key stack has occurred for two or more keys whose entry is associated with a 4K page of main storage. two keys exist for each 4K page.

- Memory (4K Blocks Bad)

  The entries display (on 4K boundaries) all the main storage addresses that have failed and are no longer being used by the system. The addresses are in no specific order. MORE indicates that four or more 4K blocks have failed (use the paging key to see all the addresses). Asterisks in a field indicate that reconfiguration has not occurred.

- Multiply Function (Not in Model Group 1)

  If the Y/N field is N, the microcode routines are being used for multiply operations; if the Y/N field is Y, the hardware is being used for multiply operations.

- System Degradation Mode

  This is a display only field and cannot be altered.

  If the Y/N field is N, at least one degraded condition is displayed in the error location. If the Y/N field is Y, system degradation mode is not active and the error location contains asterisks (*). The degraded conditions are:

  Channel: At least one channel is offline.
  Memory: At least one 4K memory block is bad.
  Cache: At least one cache page is bad.
  Key: At least one 4K key entry is bad.
  Multiply: Multiply function hardware is reconfigured.

(QFO) System Configuration-Customer

```
                        *SYSTEM CONFIGURATION*
DISKETTE      *DRIVE1* *DRIVE2*
IDENTIFIER     FUNC1    FUNC2

I/O POWER-ON TIME-OUT: 02 MINS        COPY KEY -CONSOLE PRT: Y  PORT: P3
IML AT POWER-ON: N                             -DISKETTE   : N
IML AND IPL AT POWER-ON: N                     -CHANNEL PRT: N  ADDR: 0000

                                                      *PU0* *PU1*
                                      BYTE MODE-CHNL 5:   N     N
                                      PU CONFIGURATION:   Y     Y
CONSOLE MODE -PRT/KYBD: N
             -DISPLAY   Y             CONSOLE PORTS     P0   P1   P2   P3
                                      INSTALLED:        Y    Y    N    Y
                                      OPERATIONAL       Y    Y    N    Y
I I/O CONFIGURATION                   HARDCOPY:              N    N    Y
Q GENERAL SELECTION                   ADDRESS S/370:  0001 0002 DISC 0003
Z RETURN TO PROG SYS

COMMAND: QFO                                    ==>
```

```
                        *SYSTEM CONFIGURATION*
DISKETTE      *DRIVE1* *DRIVE2*
IDENTIFIER     FUNC1    FUNC2

I/O POWER-ON TIME-OUT: 02 MINS        COPY KEY -CONSOLE PRT: Y  PORT: P3
IML AT POWER-ON: N                             -DISKETTE   : N
IML AND IPL AT POWER-ON: N                     -CHANNEL PRT: N  ADDR: 0000

                                                      *PU0* *PU1*
                                      BYTE MODE-CHNL 5:   N     N
                                      PU CONFIGURATION:   Y     Y
CONSOLE MODE -PRT/KYBD: N
             -DISPLAY   Y             CONSOLE PORTS     P0   P1   P2   P3
                                      INSTALLED:        Y    N    Y    Y
                                      OPERATIONAL       Y    N    Y    Y
I I/O CONFIGURATION                   HARDCOPY:              N    N    Y
Q GENERAL SELECTION                   DEVICE NUMBER   00F2 DISC 00F4 00F5
Z RETURN TO PROG SYS                  CONNECTED:        Y    N    Y    Y

COMMAND: QFO                                    ==>
```

Use the QFO command to key or change the system configuration or to go to the I/O Configuration (QFOI) screen.

Only those fields followed by a colon (:) can be keyed or changed. To move the cursor from one field to another, use the New Line, Tab, or Back-Tab keys.

Displaying the System Configuration (Customer) Screen

To display the System Configuration (Customer) screen, key QFO next to COMMAND, and press the ENTER key.

System Configuration Fields

The system configuration fields are listed below in the order they appear on the screen:

DISKETTE IDENTIFIER

This field cannot be changed; it indicates the type of diskette in each diskette drive.

I/O POWER-ON TIME-OUT:

Key the number of minutes (in decimal) that the power code waits for the channel I/O devices attached to the power sequencing relays to power-up. If I/O stepping is not completed in the specified time, a reference code appears.

Press the ENTER key.

IML AT POWER-ON:

Key Y to IML at power-on; N not to IML at power-on.

IML AND IPL AT POWER-ON:

Key Y to IML and IPL at power-on; N not to IML and IPL at power-on.

CONSOLE MODE-PRT/KYBD:

Key Y for printer/keyboard mode; N for display mode.

Note: You can configure a maximum of two addresses in printer/keyboard mode. To each address you can assign a display console or a display console and console printer.

-DISPLAY

Indicates the console mode: Y if in display mode, and N if in printer/keyboard mode. (This field cannot be changed; it is for your information only.)

I/O CONFIGURATION (QFOI)

See "(QFOI) I/O Configuration" on page 60.

COPY KEY -CONSOLE PRT: -DISKETTE: -CHANNEL PRT:

See "Using the COPY Key" on page 57.

BYTE MODE-CHNL 5:

Key Y under the desired processing unit (PU0, PU1, or both) if channel 5 is to be used as a byte multiplexer channel, or an N if it is to be used as a block multiplexer channel.

Note: In 370 XA mode the entry made here must match the mode specified for channel 5 in the IOCDS, if not the results are not predictable.

Press the ENTER key.

Key QLM next to COMMAND. (This does a required re-IML.)

PU CONFIGURATION

Key Y under the processing unit (PU0, PU1, or both) which you want active.

Press the ENTER key.

Press Power On/IML. (This does a required re-IML.)

CONSOLE PORTS (P0 P1 P2 P3)

This is a header on the display screen (see the right-lower side of the screen) for the following fields.

INSTALLED:

Key Y if a console or printer (P1 to P3) is installed; N if not installed. (P0 is always Y.)

OPERATIONAL

This field cannot be changed; it indicates (if Y) that an operational device exists and is powered on.

HARDCOPY:

Key Y to specify a port (P1, P2, or P3) as an output device; N not to specify it. (You must also key Y next to INSTALLED.) Press the ENTER key.

ADDRESS S/370:

Key either DISC (disconnect) or a four-digit console address (0000-00EF) for ports P0 to P3.

Note: You can configure a maximum of two addresses in printer/keyboard mode. To each address, you can assign a display console or a display console and console printer.

DEVICE NUMBER (S/370XA Mode only)

This field cannot be changed; it indicates device number (00F2-00F5) or DISC (disconnect) for ports P0 to P3.

CONNECTED: (S/370XA Mode Only)

Key N to disconnect or Y to connect a console address.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

Using the COPY Key

Pressing the COPY key copies the screen that is presently displayed to:

- A console printer
- The system diskette (see Notes)
- A channel printer (see Notes).

You can copy all screens to a console printer but only Q screens to the system diskette or channel printer.

Notes:

1. Some of the PA and Diagnostic screens cannot be copied.
2. If you press the PAGE key (immediately after copying a screen to the system diskette or channel printer), the paging action may not occur until you press the PAGE key one more time.
3. If you are copying a screen to the system diskette or a channel printer, ensure that:
   - If you made any changes to the screen currently displayed, you first press the ENTER key before you press the COPY key (otherwise, your changes are not made).
   - If you want to make changes to the screen after you copied it, you redisplay it (your changes might not be made unless you redisplay the screen).

Copying a Screen to the Console Printer

Before you can copy a screen to the console printer, first specify (configure) the console printer as the output (hard-copy) device:

1. Display the System Configuration screen (enter QFO next to COMMAND, and press the ENTER key).
2. Select the desired console port (P1 to P3) by entering Y next to INSTALLED and HARDCOPY.
3. Enter Y next to CONSOLE PRT and N next to DISKETTE and CHANNEL PRT.
4. Specify port P1, P2, or P3 (next to PORT).
5. Press the ENTER key.

The console printer is now configured as the output device.

Now, whenever you press the COPY key, the displayed screen is printed on the console printer. [If a field on the display screen is intensified, it appears on the printout with the > (greater than) symbol preceding the field.]

Copying a Screen to the System Diskette

Before you can copy a screen to the system diskette, configure the system diskette as the copy device.

1. Set the CE Mode switch to CE Mode.
2. Enter QFO next to COMMAND, and press the ENTER key. This displays the System Configuration screen.
3. Enter Y next to DISKETTE and N next to CONSOLE PRT and CHANNEL PRT.
4. Press the ENTER key.

The system diskette is now configured as the copy device.

Now, whenever you press the COPY key, the displayed screen (Q screens only) is automatically saved on the diskette unless the save area is full.

If the save area is full, the following message appears:

- ERASE ? xxx

  (xxx is the title of the oldest screen saved with the COPY key). If this message appears, either press the COPY key (this erases the oldest screen and stores the new screen), or enter QEV next to COMMAND (this displays all the saved screens so you can select the screen to be erased).

Copying a Screen to a Channel Printer

Warning: Customer data can be lost with this function.

This explanation assumes that the Forms Control Buffer (FCB) and Universal Character Set Buffer (UCSB) have been loaded and the UCWs (S/370) or subchannel (S/370XA) information have been defined.

Before you copy a screen to a channel printer, ensure that:

- The processor that has the channel printer attached is IMLed but not IPLed (if it has been IPLed, the message CLEAR RESET REQUIRED appears). See Note.
- The channel printer is configured as the copy device. To configure the channel printer:

  1. Enter QFO next to COMMAND, and press the ENTER key. This displays the System Configuration screen.
  2. Enter Y next to CHANNEL PRT and N next to CONSOLE PRT and DISKETTE.
  3. For S/370 mode, enter the processing unit number, the channel number, and printer address next to ADDR.
  4. For S/370XA mode, enter a device number (0000-FFFF) next to ADDR.
  5. Press the ENTER key.

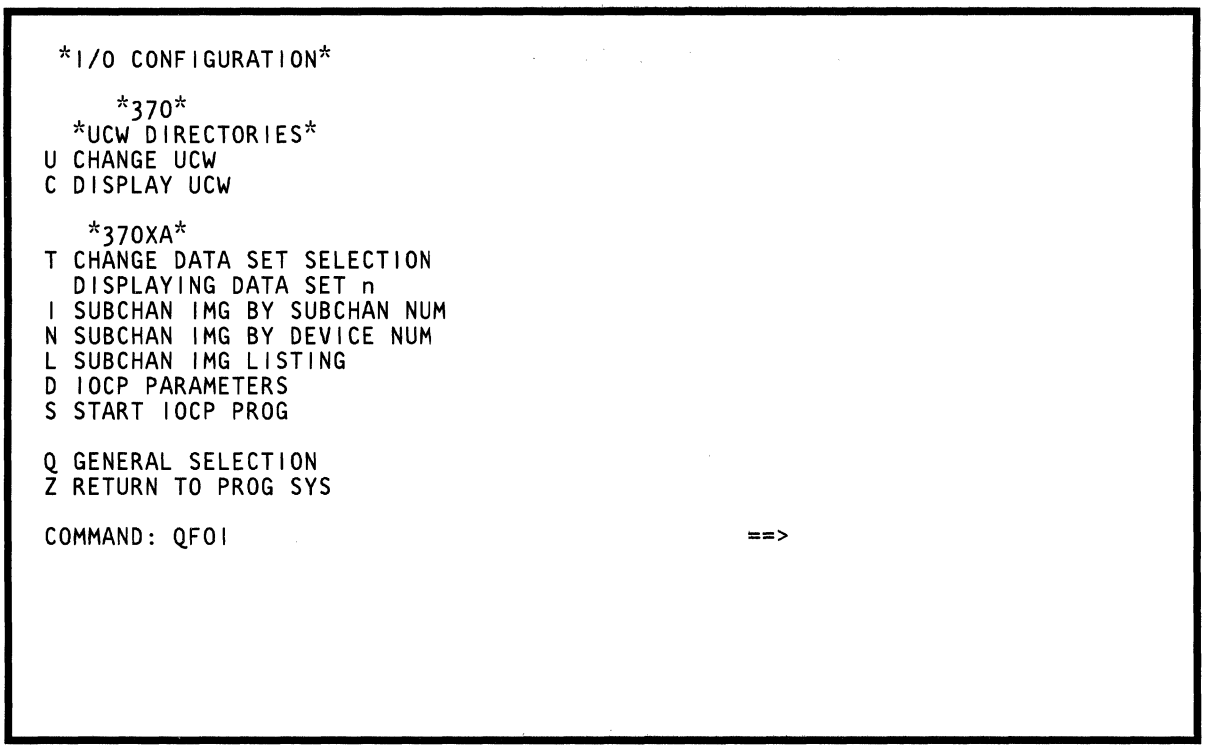
  The channel printer is now configured as the copy device.

Now, whenever you press the COPY key, the displayed screen (Q screens only) is printed on the channel printer. If a field on the display screen is intensified, it appears on the printout with the > symbol preceding the field.

Note: A successful IPL status can be eliminated in two ways.

1. If the screen to be copied **is not** a main storage (QDM) or trace (QA) screen and a storage clear is acceptable, a QCLEAR can be performed.
2. If the screen to be copied is a main storage (QDM) or trace (QA) screen and a storage clear is not desired, the IPL status can be eliminated by IPLing from a device that is not ready. This saves most of the IPL system, main storage, and trace data to be copied to the channel printer. After the screens have been copied, a successful IPL clear reset (QLL) must be performed (IPL device ready).

(QFOI) I/O Configuration



Displaying the QFOI Selections

To display the QFOI selections, key QFOI next to COMMAND, and press the ENTER key.

For a description of each selection, refer to the desired screen.

Note: The QFOIT selection does not generate another screen; its only function is to **alternately choose** data set 0 and data set 1 for display.

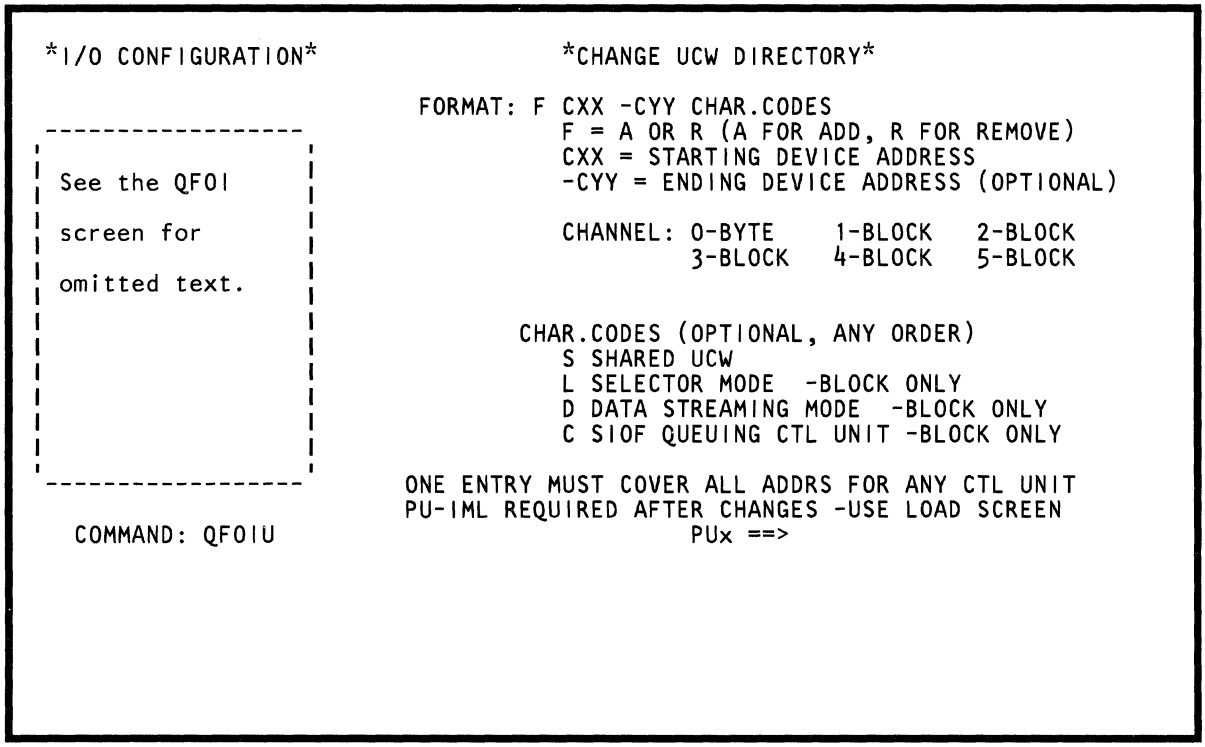
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFOIU) Change UCW Directory



Use the QFOIU screen to change the UCW directory.

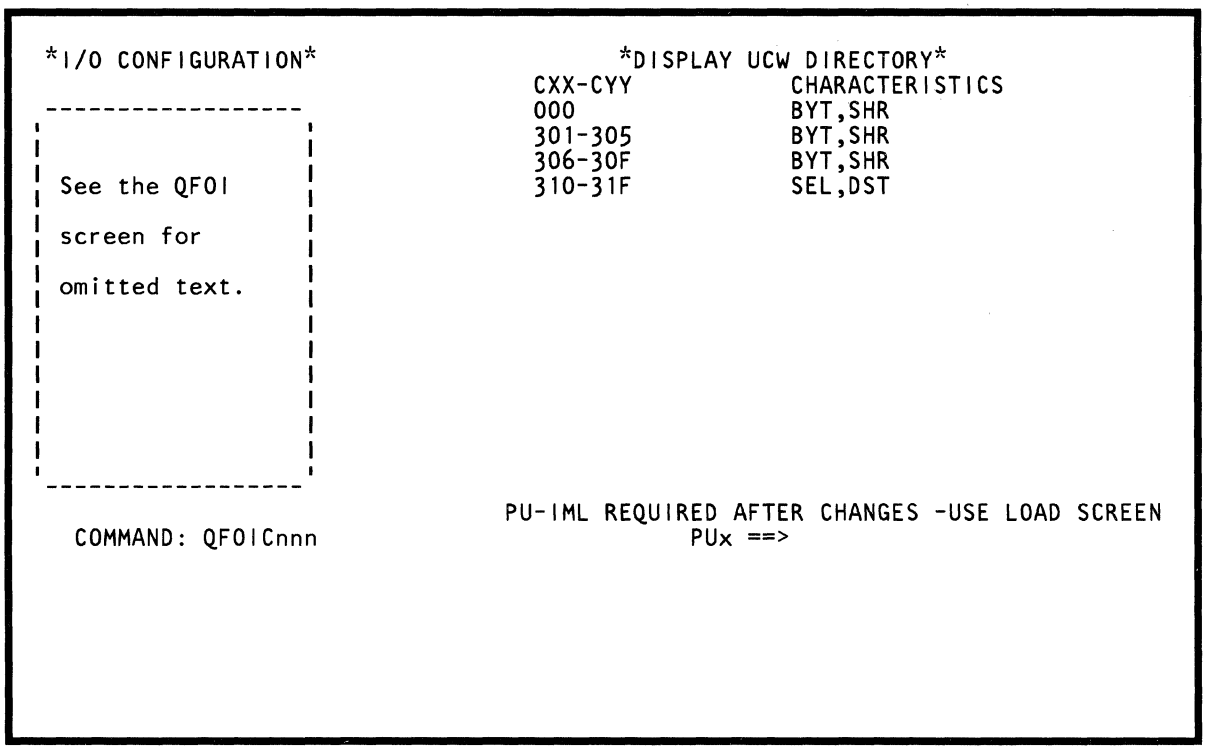
Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying the Change UCW Directory Screen

To display the QFOIU screen, key QFOIU next to COMMAND, and press the ENTER key.

To change the QFOIU screen, see Volume A06, Service Aids, "I/O Configuration (S/370)."

(QFOIC) Display UCW Directory



Use this screen to display UCW directory information.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying the Display UCW Directory Screen

To display the QFOIC screen:

1. Key QFOIC and a three-digit device address (000-8FF) next to COMMAND.

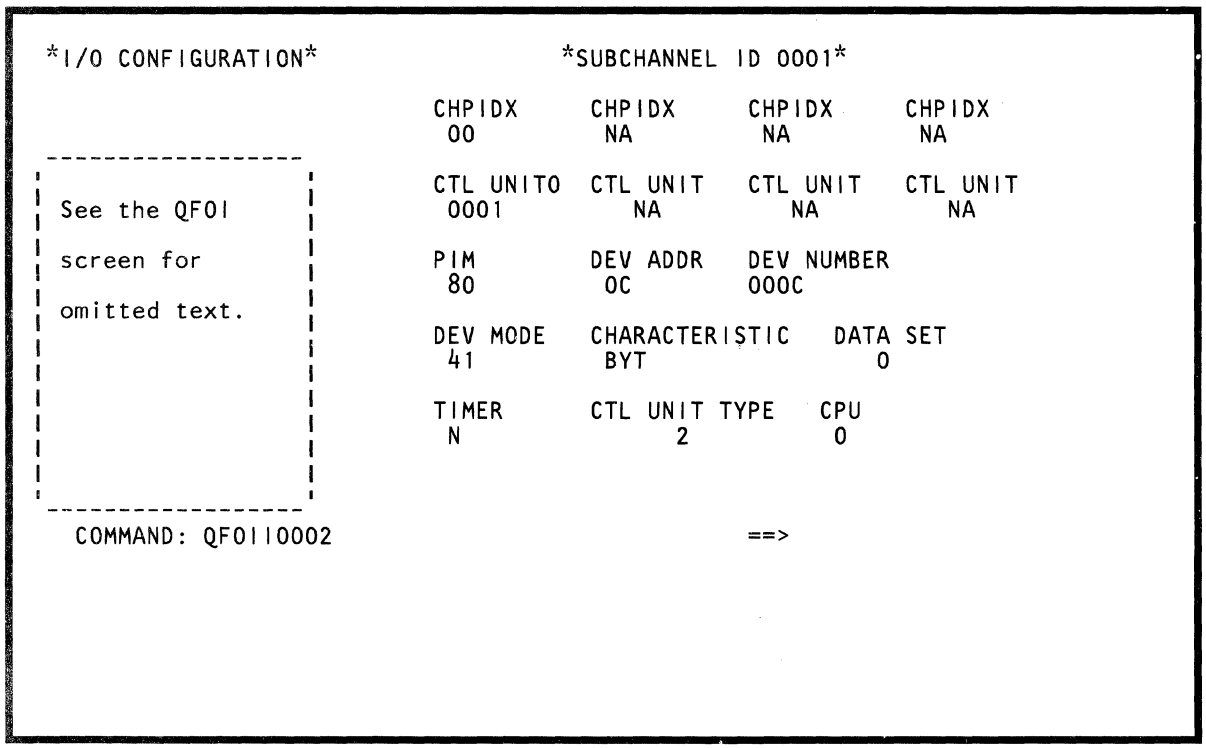
   Using the address you specified as a starting point, the screen displays device addresses and their characteristics. (If you do not specify a device address, all addresses and their characteristics are displayed on the screen.)

2. Press the ENTER key.

Message MORE, PRESS ENTER appears if data is on more than one page.

You cannot change the QFOIC screen. If you need to make a change, use the QFOIU screen.

(QFOII) Display Subchannel Image



Use the QFOII command to display a subchannel image.

Note: You are given the option of displaying a subchannel's image by either specifying a subchannel number (use the QFOII command) or a device number (use the QFOIN command).

Specifying a Subchannel Image

To specify a subchannel image (QFOII):

1. Key QFOII and a subchannel number (1 to 0800) next to COMMAND.

2. Press the ENTER key.

If you do not specify a number, the default number is one.

Note: After the screen is displayed, the number you keyed next to COMMAND is automatically increased by one. This allows you to very easily display the subchannel images in numbered sequence.

Label Identification

CHARACTERISTIC: Indicates the characteristics of the device:

BLK Block multiplexer mode
BYT Byte multiplexer mode
DST Data streaming device
INV Invalid characteristic
NAT Natively attached device
SEL Selector mode

CHPIDX (Channel Path Identifier): Indicates the channel path (0-3) being used. The one-byte field below CHPIDx indicates the physical processing unit and channel for the device.

CPU: Indicates the processing unit that the device is attached to.

CTL UNITx (Control Unit): Indicates the control unit path (0-7) being used. The two-byte field (0000-00FF) below CTL UNITx indicates the number of the control unit. In most cases, this number is not the same as your SYSGEN specification because the microcode takes all your SYSGEN specifications (in sequence from the lowest number to the largest number) and gives them a new number (starting with 0000 and increasing it by one for every control unit).

CTL UNIT TYPE: Indicates the control unit type.

Type 1 - Shared; single request only.
Type 2 - Unshared; multiple requests available.

DATA SET: Indicates the data set (0 or 1) being displayed on the screen.

DEV ADDR (Device Address): Indicates the device address (00-FF) on the physical channel interface.

DEV MODE (Device Mode): Supplies information about the device. The bit meanings are:

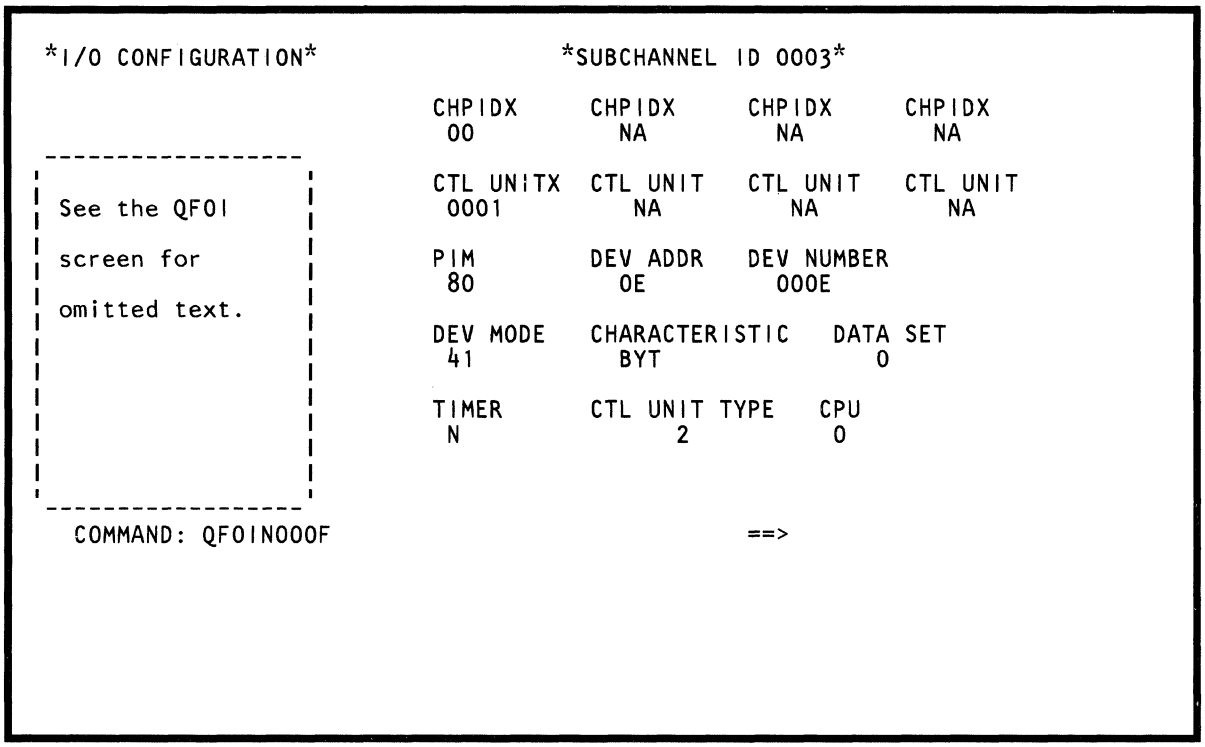
Bit 0 = 0, Bit 1 = 0	Selector mode
Bit 0 = 0, Bit 1 = 1	Byte multiplexer
Bit 0 = 1, Bit 1 = 0	Block multiplexer
Bit 2 = 1	Natively-attached device
Bit 3 = 1	Data streaming device
Bit 6 = 1	Timer installed
Bit 7 = 1	Valid device number

DEV NUMBER (Device Number): Indicates the device number (0000-FFFF).

PIM (Path Installed Mask): A mask that indicates the channel path that is installed. Only the first four bits are used.

TIMER: Indicates that the timer is installed (Y) or not installed (N).

(QFOIN) Display Subchannel Image



Use the QFOIN command to display a subchannel image.

Note: You are given the option of displaying a subchannel's image by either specifying a device number (use the QFOIN command) or a subchannel number (use the QFOII command).

Specifying a Subchannel Image

To specify a subchannel image:

1. Key QFOIN and a device number (four hex digits) next to COMMAND.

2. Press the ENTER key.

   If you do not specify a device number, the default number is 0001.

Note: After the screen is displayed, the number you keyed next to COMMAND is automatically increased by one. This allows you to easily display the subchannel images in numbered sequence.

Label Identification

CHARACTERISTIC: Indicates the characteristics of the device:

BLK	Block multiplexer mode
BYT	Byte multiplexer mode
DST	Data streaming device
INV	Invalid characteristic
NAT	Natively attached device
SEL	Selector mode

CHPIDx (Channel Path Identifier): Indicates the channel path (0-3) being used. The one-byte field below CHPIDx indicates the physical processing unit and channel for the device.

CPU: Indicates the processing unit that the device is attached to.

CTL UNITx (Control Unit): Indicates the control unit path (0-7) being used. The two-byte field (0000-00FF) below CTL UNITx indicates the number of the control unit. In most cases, this number is not the same as your SYSGEN specification because the microcode takes all your SYSGEN specifications (in sequence from the lowest number to the largest number) and gives them a new number (starting with 0000 and increasing it by one for every control unit).

CTL UNIT TYPE: Indicates the control unit type.

Type 1 - Shared; single request only.
Type 2 - Unshared; multiple requests available.

DATA SET: Indicates the data set (0 or 1) being displayed on the screen.

DEV ADDR (Device Address): Indicates the device address (00-FF) on the physical channel interface.

DEV MODE (Device Mode): Supplies information about the device. The bit meanings are:

Bit 0 = 0, Bit 1 = 0	Selector mode
Bit 0 = 0, Bit 1 = 1	Byte multiplexer
Bit 0 = 1, Bit 1 = 0	Block multiplexer
Bit 2 = 1	Natively-attached device
Bit 3 = 1	Data streaming device
Bit 6 = 1	Timer installed
Bit 7 = 1	Valid device number

DEV NUMBER (Device Number): Indicates the device number (0000-FFFF).

PIM (Path Installed Mask): A mask that indicates the channel path that is installed. Only the first four bits are used.

TIMER: Indicates that the timer is installed (Y) or not installed (N).

(QFOIL) Display Subchannel Image List

```
*I/O CONFIGURATION*          *SUBCHANNEL IMAGE LISTING - DATA SET 0*
                               SCHNUM 0001 TO 000C     SCHNUM 000D TO 0018
                            ---DEV---  CU --CHPID---|---DEV---  CU --CHPID---
                            ADR NO MOD TY 0  1  2  3|ADR NO MOD TY 0  1  2  3
 ------------------         04 0004 B  2 00         |FF 00FF B  2 00
|                  |        0E 000E B  2 00         |A0 01A0 CD 2 01 02
| See the QF01     |        1A 001A B  2 00         |A1 01A1 CD 2 01 02
|                  |        20 0020 B  2 00         |A2 01A2 CD 2 01 02
| screen for       |        60 0060 B  2 00         |A3 01A3 CD 2 01 02
|                  |        61 0061 B  2 00         |A4 01A4 CD 2 01 02
| omitted text.    |
|                  |        62 0062 B  2 00         |A5 01A5 CD 2 01 02
|                  |        63 0063 B  2 00         |A6 01A6 CD 2 01 02
|                  |        F2 00F2 B  2 00         |A7 01A7 CD 2 01 02
|                  |        F3 00F3 B  2 00         |A8 01A8 CD 2 01 02
|                  |        F4 00F4 B  2 00         |A9 01A9 CD 2 01 02
|                  |        F5 00F5 B  2 00         |AA 01AA CD 2 01 02
 ------------------         DEVICE MODE KEY: B-BYTE, C-BLOCK, S-SELECTOR
                                             D-DATA STREAMING, N-NATIVE
  COMMAND: QF01L0019                           ==> MORE, PRESS ENTER
```

Use the QFOIL command to display a listing of the subchannel images.

Specifying the Subchannel Image List

To specify the list:

1. Key QFOIL and a subchannel number (up to four hex digits) next to COMMAND.

   If you do not specify a subchannel number, the default is 0001.

2. Press the ENTER key.

   To display the complete list, continue to press the ENTER key.

Label Identification

CHPID (Channel Path Identifier): Indicates the channel path (0-3). The one-byte fields below CHPID indicate the physical processing unit and channel for the device.

CU TY: Indicates control unit type.

1 - Shared; single request only.
2 - Unshared; multiple requests available.
U - Undefined control unit type.

DATA SET: Indicates the data set (0 or 1) being displayed on the screen.

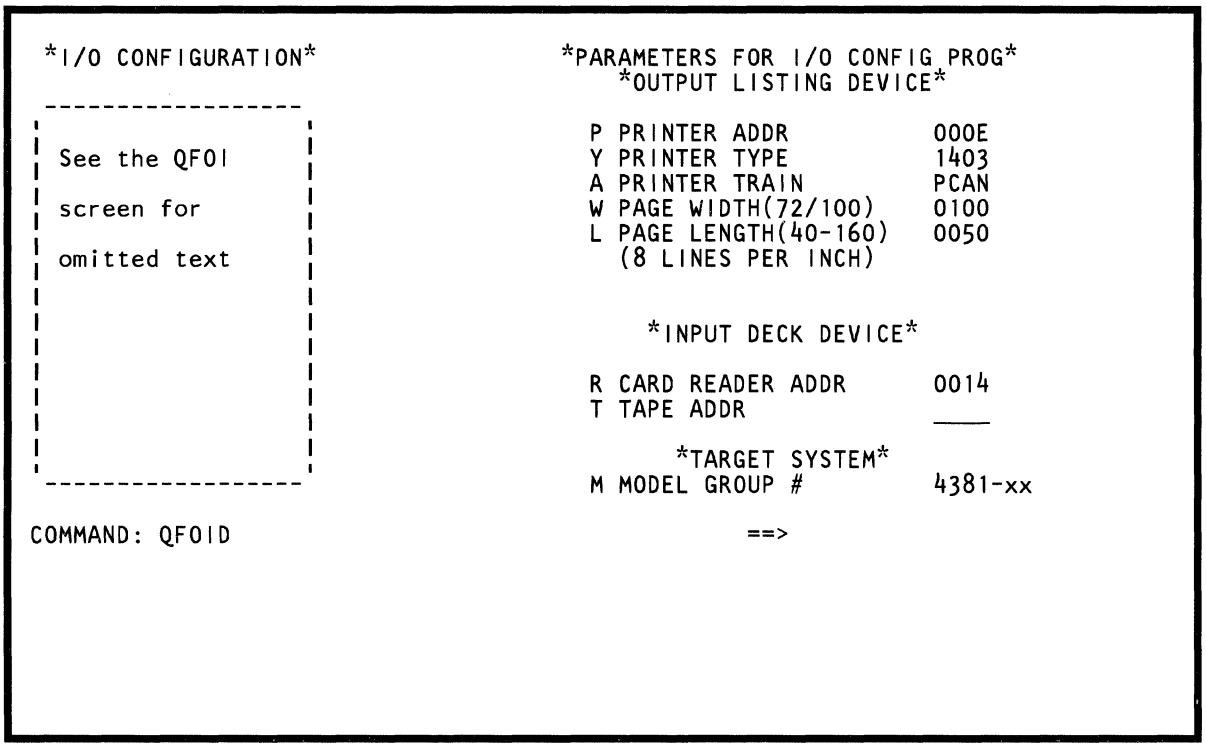
DEV ADR (Device Address): Indicates the device address (00-FF) on the physical channel interface.

DEV MOD (Device Mode): Describes the device characteristics:

B Byte multiplexer
C Block multiplexer
D Data streaming device
N Natively-attached device
S Selector mode

SCHNUM: Indicates the subchannel number (0001-0800).

(QFOID) IOCP Parameters



Use this screen to indicate the input/output devices that are to be used by the I/O configuration program. An input device is required (reads in the system generation information); an output printer is optional.

The device(s) you specify must be defined in the I/O configuration (S/370) processed on the last PU IML and must be available to the processor when running the Input/Output Configuration Program.

Using the IOCP Devices Screen

To use the QFOID screen:

1. Key QFOID next to COMMAND, and press the ENTER key.

   The QFOID screen is displayed (note that the input/output fields on the screen contain default values).

2. If the default address for the input device is correct, omit this step.

   If the input device address is not correct, key a correct device address (either R0xxx for a card reader or T0xxx for a tape drive) on the COMMAND line (next to QFOID). Then press the ENTER key.

   Correct device addresses have this format: R0 (or T0) followed by a channel number (0-8), and two hex digits (00-FF for all channels except channel 0 on PU0, which is 00-EF).

3. If the default information for the output device is correct, omit this step.

   If the output device information is not correct, key the following:

   - For printer address, key P0xxx on the COMMAND line (next to QFOID), and press the ENTER key.

     A correct address has this format: P0 followed by a channel number (0-8), and two hex digits (00-FF for all channels except channel 0 on PU0, which is 00-EF).

   - For printer type, key Y on the COMMAND line (next to QFOID) followed by 1403, 3203, or 3211. Then press the ENTER key.

   - For printer train, key A on the COMMAND line (next to QFOID) followed by one of the trains from the list below. Then press the ENTER key.

Printer	Printer Character Set
1403	A,AN,GN,H,HN,J,PCA,PCAN, PCH,PCHN,PN,QN,QNC,RN SN,TN,XN,YN
3203	A,AN,GN,H,HN,J,PCA,PCAN, PCH,PCHN,PN,QN,QNC,RN SN,TN,XN,YN
3211	A11,G11,H11,P11,T11

   - For printer page width, key W on the COMMAND line (next to QFOID) followed by 072 or 0100. Then press the ENTER key.

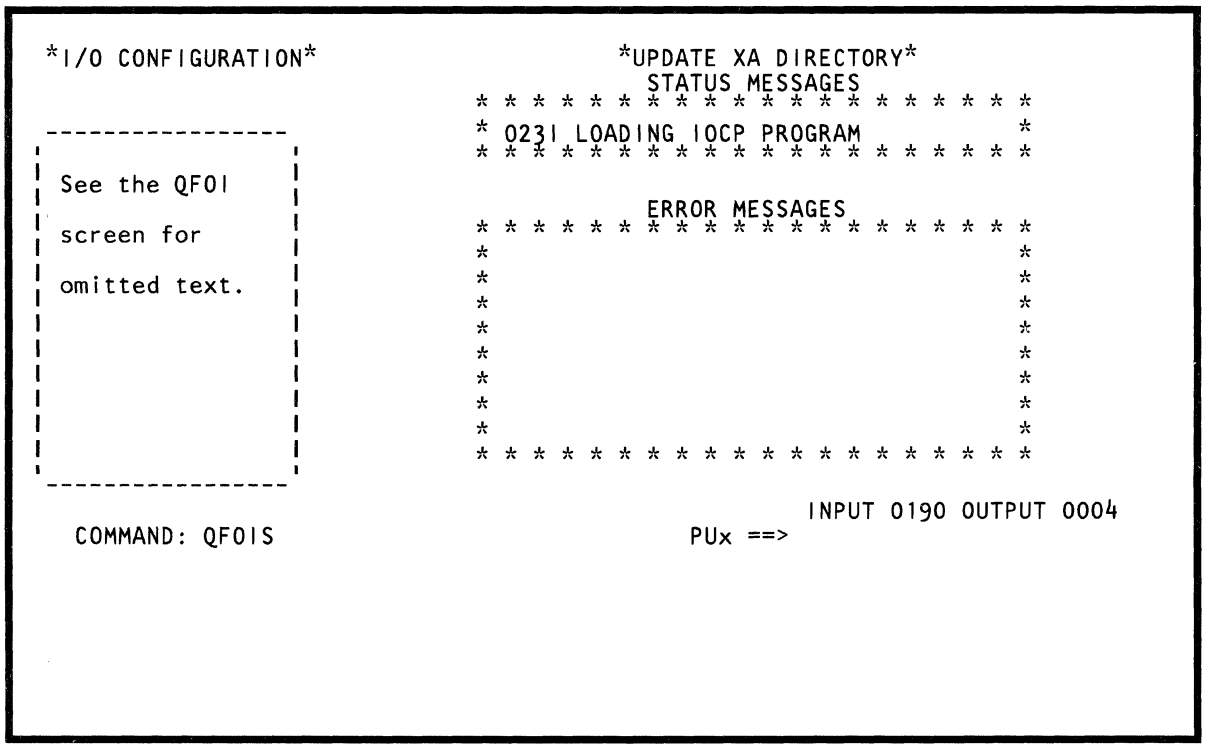
   - For printer page length, key L on the COMMAND line (next to QFOID) followed by 040 to 0160. Then press the ENTER key.

   Note: If an output printer is not available on your system, key P on the COMMAND line (next to QFOID) and press the ENTER key. In this case a printed copy of the system's configuration is not available to you.

4. If the default information for the target system is correct, omit this step.

   If the target system information is not correct, key the correct target system (M03 for Model Group 3) on the COMMAND line (next to QFOID). Then press the ENTER key.

(QFOIS) Start IOCP Program



Use the QFOIS command to configure the system input/output devices for 370XA mode operation.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QFOIS Command

To specify the QFOIS command:

1. Ensure that the processor is in S/370 mode. To set the mode to S/370, key QLIW1 and then IML (QLM) the processor.

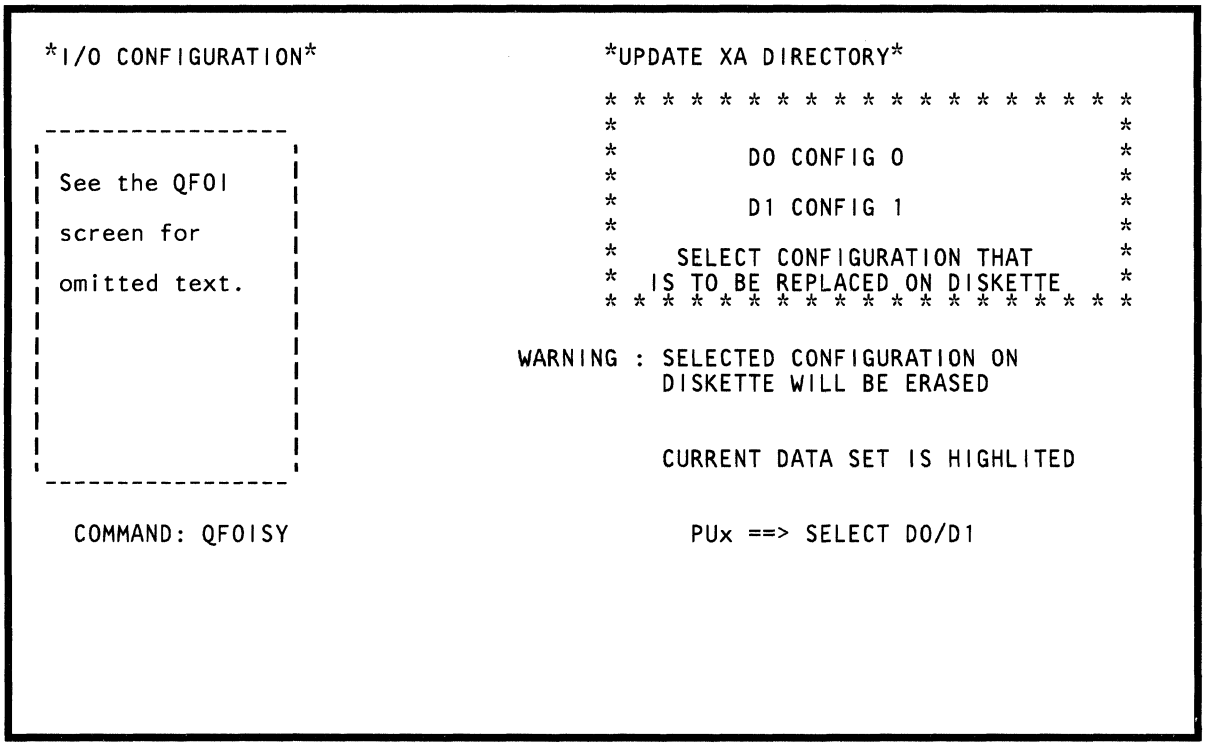
2. Key QFOIS next to COMMAND, and press the ENTER key.

   The QFOIS screen is displayed and the configuration program (IOCP) starts to run. Error and status messages are displayed as needed.

3. After a successful configuration, a status message instructs you to key Y on the COMMAND line if you want to save the IOCDS; key N if you do not want to save the IOCDS. If you responded with a Y, more instructions on how to proceed appear on the screen.

   Note: To use the IOCDS, return to S/370XA (key QLIW2, and press ENTER; then key QLMP, and press ENTER).

(QFOISY) Select IOCDS Configuration



Use the QFOISY screen to save a new IOCDS (as generated by the IOCP) on the diskette.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Saving a new IOCDS

1. Key QFOISY next to COMMAND, and press the ENTER key. This displays the QFOISY screen.

2. Key the desired configuration (D0 or D1) next to QFOISY, and press the ENTER key.

(QFL) Language Support

```
                          *LANGUAGE SUPPORT*

CURRENT CONSOLE KEYBOARD LANGUAGE CODE : 19  ==>  U.S. ENGLISH
01 BELGIAN    06 AUSTRIAN/GERMAN    11 BRAZILIAN/PORTUGUESE     16 FINNISH
02 DANISH     07 FRENCH/AZERTY      12 EBCDIC/WORLD TRADE       17 NORWEGIAN
03 ITALIAN    08 FRENCH/QWERTY      13 ENGLISH/UNITED KINGDOM   18 PORTUGUESE
04 SPANISH    09 INTERNATIONAL      14 JAPANESE/ENGLISH         19 U.S. ENGLISH
05 SWEDISH    10 SPANISH-SPEAKING   15 JAPANESE/KATAKANA


CURRENT PROBLEM ANALYSIS LANGUAGE :07  ==> ENGLISH

01 ITALIAN    03 AUSTRIAN/GERMAN    05 BRAZILIAN/PORTUGUESE     07 ENGLISH
02 SPANISH    04 FRENCH             06 JAPANESE/KATAKANA

ALTERNATE PROBLEM ANALYSIS LANGUAGE ON FUNC1 DISKETTE
 Q GENERAL SELECTION
 Z RETURN TO PROG SYS

 COMMAND: QFL                                        ==>
```

Note: The above screen appears when the display console is a 3278-2A or 3279-2C.

```
                          *LANGUAGE SUPPORT*

CURRENT CONSOLE KEYBOARD LANGUAGE CODE : 13  ==>  U.S. ENGLISH
01 BELGIAN    05 AUSTRIAN/GERMAN    09 JAPANESE/KATAKANA        12 ENGLISH/UNITED
02 ITALIAN    06 FRENCH/AZERTY      10 NORWEGIAN                   KINGDOM
03 SPANISH    07 DANISH             11 PORTUGUESE               13 U.S. ENGLISH
04 SPANISH-   08 FINNISH/SWEDISH
   SPEAKING


CURRENT PROBLEM ANALYSIS LANGUAGE :06  ==> ENGLISH

01 ITALIAN    03 AUSTRIAN/GERMAN    05 JAPANESE/KATAKANA        06 ENGLISH
02 SPANISH    04 FRENCH

ALTERNATE PROBLEM ANALYSIS LANGUAGE ON FUNC1 DISKETTE ==> ITALIAN
 Q GENERAL SELECTION                  >ENTER QFLT TO START TRANSFER
 Z RETURN TO PROG SYS                 >ENTER QFL TO QUIT

 COMMAND: QFL                                        ==>
```

Note: The above screen appears when the display console is a 3205.

Use the QFL command to specify a:

- Console language code.
- Problem Analysis language code.

Note that for Problem Analysis, the FUNC1 diskette always contains English. (You are prompted by the system if you want to use a language other than English.)

Displaying the Language Support Screen

Key QFL next to COMMAND, and press the ENTER key.

To specify a Console Language:

1. Key one of the numeric values from the list for your display console next to CURRENT CONSOLE LANGUAGE CODE.
2. Press the ENTER key and respond to the prompting messages.
3. Press Power On/IML. (This does a required SP-IML.)

Notes:

1. The Japanese/Katakana keyboard allows uppercase entry and display of English characters or uppercase English character entry with Katakana display.
2. Use the number for U.S. English to configure for Canadian/French keyboards. The Canadian/French keyboard has the same character set and keyboard layout as the U.S. English, but with French nomenclature on the keys.

3278-2A or 3279-2C

01 Belgian
02 Danish
03 Italian
04 Spanish
05 Swedish
06 Austrian/German
07 French/Azerty
08 France/Qwerty
09 International
10 Spanish-Speaking
11 Brazilian/Portuguese
12 EBCDIC/World Trade
13 English/United Kingdom
14 Japanese/English
15 Japanese/Katakana (See Note 1)
16 Finnish
17 Norwegian
18 Portuguese
19 U.S. English (Canadian/French) (See Note 2)

3205

01 Belgian
02 Italian
03 Spanish
04 Spanish-Speaking
05 Austrian/German
06 French/Azerty
07 Danish
08 Finnish/Swedish
09 Japanese/Katakana
10 Norwegian
11 Portuguese
12 English/United Kingdom
13 U.S. English (Canadian/French) (See Note 2)

To specify a Problem Analysis Language:

1. Key one of the numeric values from the list for your display console next to CURRENT PROBLEM ANALYSIS LANGUAGE.
2. Press the ENTER key and respond to the prompting messages.

3278-2A or 3279-2C

01 Italian
02 Spanish
03 Austrian/German
04 French
05 Brazilian/Portuguese
06 Japanese/Katakana
07 English

3205

01 Italian
02 Spanish
03 Austrian/German
04 French
05 Japanese/Katakana
06 English

(QFY) Local Time Clock

```
                    *LOCAL TIME CLOCK*

                    YEAR / MONTH / DAY
                     00  /  00   /  00
ENTER DATE:          __  /  __   /  __

                    HOUR : MINUTE : SECOND
                     00  :   00   :   00
ENTER TIME:          __  :   __   :   __

1. ENTER THE LOCAL DATE AND TIME (24 HOUR CLOCK)
2. WHEN THAT TIME OCCURS, PRESS ENTER
   . CLOCK STARTS
   . POWER SEQUENCE CONTINUES

                                        ==>
```

```
                    *LOCAL TIME CLOCK*

                    YEAR / MONTH / DAY
                     00  /  00   /  00
ENTER DATE:          __  /  __   /  __

                    HOUR : MINUTE : SECOND
                     00  :   00   :   00
ENTER TIME:          __  :   __   :   __

1. ENTER THE LOCAL DATE AND TIME (24 HOUR CLOCK)
2. WHEN THAT TIME OCCURS, PRESS ENTER


COMMAND: QFY                            ==>
```

Use the Local Time Clock screen to:

- Initially set the time-of-day clock (do when the Local Time Clock screen appears during power on).
- Change the time-of-day clock.

To change the time-of-day clock:

1. Key QFY next to COMMAND, and press the ENTER key. This displays the present time.
2. Move the cursor to one or more fields, and key the desired change(s).
3. Press the ENTER key again. This changes the time-of-day clock.

(QFM) Module Transfer

```
                              *MODULE TRANSFER SCREEN*
   STATUS   MACHINE SENSITIVE DATA          DISK
          X CONFIG,LOGS (PWR,PU,SP) . . .(FUNC1)
          X UCWS. . . . . . . . . . . . .(FUNC1)
          X SAVED SCREENS . . . . . . . .(FUNC1)
          X REF CODES . . . . . . . . . .(FUNC1)
          X RECONFIGURATION DATA. . . . .(FUNC1)
          X PROBLEM ANALYSIS. . . . . . .(FUNC1)
          _ IOCDS . . . . . . . . . . . .(FUNC2)


ERR MODS:

STATUS INFO:  S=SELECT  R=READ  W=WRITE  T=TRANSFER DONE  INVPT=INVALID INPUT
              DSZ=SIZE DIFFERENT  DLA=LOAD ADDRESS DIFFERENT  D41=NOT FOUND
              D81 READ (CRC) ERROR  DID=WRONG DISK IN DISK DRIVE

 Q  GENERAL SELECTION       ENTER STARTD TO TRANSFER SELECTED MODULES
 Z  RETURN TO PROG SYS
 COMMAND: QFM                                      ==> FUNC1 MODULES SELECTED
```

Use the QFM command to move machine-sensitive data from one diskette to another (patches cannot be transferred by the QFM command).

Invoking the Module Transfer Screen

Note: If you press the COPY key during a Module Transfer, you must respecify the QFM command.

To invoke the Module Transfer screen:

1. Set the CE Mode switch to CE Mode.
2. Key QFM next to COMMAND, and press the ENTER key.
3. Enter an x next to the modules you want transferred.
4. Enter a blank next to the modules you do not want transferred.

   Note: Do not select FUNC1 and FUNC2 modules for transfer at the same time; each diskette transfer must be done separately.
5. Press the ENTER key. The status area displays an S next to the modules that you selected. (If an error occurred, INVPT is displayed instead of S.)
6. Key STARTD next to QFM (on the COMMAND line).
7. Insert into diskette drive 1 the diskette to be copied from. Insert into diskette drive 2 the diskette to be copied to. Press the ENTER key.

   At the end of the transfer, respond to the prompting message(s).
8. Press the ENTER key. You can now either continue with another module transfer operation (respond to the prompting messages) or end the operation.

Note: Always verify the transfer by displaying the System Configuration (QFS), Program Load (QL), and Customer Configuration UCW (QFOI) screens.

Status Area Codes

Note: The STATUS field on the screen displays the last error that occurred.

ID	Incorrect diskette in drive
LA	Module load addresses are different
SZ	Module sizes are different
01	Zero length
0F	Diskette not ready
21	Past end-of-file
31	Address length, memory protect error
41	Module ID not found
4F	Write protect error
81	Read error
82	Adapter machine check
83	UC machine check
8F	Cylinder and master index different
9F	No current seek sent

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFG) Diskette to Diskette Copy

```
                          *DISKETTE TO DISKETTE COPY*

 M  MACHINE SERIAL NUMBER <000000>

 L  DISKETTE LABEL <Y>
 K  LINK DATE <0000000000>
 G  GID <T0000000>
 H  DATE <00/00/00>
 I  ISEQ <01>



 S  START COPY
 Q  GENERAL SELECTION
 Z  RETURN TO PROG SYS



COMMAND: QFG                                    ==>
```

```
                          *DISKETTE TO DISKETTE COPY*

 M  MACHINE SERIAL NUMBER <100123>

 L  DISKETTE LABEL <Y>                  **********************************
 K  LINK DATE <0123456789>              *                              53FD *
 G  GID <T1234567>                      * 4381-xxx      SER NO. 0123456 *
 H  DATE <07/22/82>                     * FUNCT   LOAD VOL       001FU1 *
 I  ISEQ <01>                           * LINK DATE 0123456789  ISEQ 01 *
                                        *                              *
                                        * PN  -      0001234567        *
                                        * EC  -   xxxxxxxxx             *
 S  START COPY                          * REA -                        *
 Q  GENERAL SELECTION                   * GID - T1234567               *
 Z  RETURN TO PROG SYS                  * F.O. NO.           0001234567 *
                                        * DATE 07/20/82 WID-A1  SEQ-  1 *
                                        **********************************


COMMAND: QFGS                                   ==>
```

Use the QFG command to copy a diskette to another diskette.

At the end of a successful copy operation, the screen displays label information for the new (just-copied) diskette. Use the COPY key to obtain a printout of the label (see "Using the COPY Key" on page 57).

Copying a Diskette

To copy a diskette:

1. Set the CE Mode switch to CE Mode.
2. Ensure that the processor is in the clock-stop state.
3. Key QFG next to COMMAND, and press the ENTER key. This displays the QFG screen.
4. Enter the following information on the COMMAND line next to QFG (press the ENTER key after each entry):
   - M and the six-digit serial number of the processor being used—for example, M100123.

     (To make a new diskette for another processor, specify that processor's serial number.)
   - K and the Link Date that appears on the label of the diskette to be copied—for example, K0123456789 (needed only if you specified Y after DISKETTE LABEL).
   - G and the GID number that appears on the label of the diskette to be copied—for example, GT1234567.
   - H and current date (mm/dd/yy)—for example, 07/22/82.
5. You can also change the defaults for:
   - DISKETTE LABEL from Y to N (Y means label information is displayed at the end of a successful copy operation; N means no label information is displayed).
   - ISEQ from 01 to 02 (01 means the new diskette is be the FUNC1 diskette; 02 means the new diskette is the backup FUNC1 diskette).
6. Key QFGS next to COMMAND, and press the ENTER key.
7. Insert into diskette drive 1 the diskette to be copied from and into diskette drive 2 the diskette to be copied to.
8. Press the ENTER key.

   The diskette-to-diskette copy process starts. Status and/or error messages appear on the screen during the copy process.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFT) Tape to Diskette Build

```
                              *TAPE TO DISKETTE BUILD*

 U  TAPE ADDRESS <000>>

 M  MACHINE SERIAL NUMBER <000000>
 P  DISKETTE PART NUMBER <0000000>


 L  DISKETTE LABEL <Y>
 H  DATE <00/00/00>
 I  ISEQ <01>

 S  START BUILD
 Q  GENERAL SELECTION
 Z  RETURN TO PROG SYS



COMMAND: QFT                                    ==>
```

```
                              *TAPE TO DISKETTE BUILD*

 U  TAPE ADDRESS <282>

 M  MACHINE SERIAL NUMBER <100123>          ********************************
 P  DISKETTE PART NUMBER <1234567>          *                          53FD *
                                            * 4381-xxx      SER NO. 0123456 *
                                            * FUNCT   LOAD VOL       001FU1 *
 L  DISKETTE LABEL <Y>                      * LINK DATE xxxxxxxxxx  ISEQ 01 *
 H  DATE <07/22/82>                         *                               *
 I  ISEQ <01>                               * PN  -      0001234567         *
                                            * EC  -   xxxxxxxxx             *
 S  START BUILD                             * REA -                         *
 Q  GENERAL SELECTION                       * GID - T1234567                *
 Z  RETURN TO PROG SYS                      * F.O. NO.           0001234567 *
                                            * DATE 07/20/82 WID-A1  SEQ-  1 *
                                            ********************************


COMMAND: QFTS                                   ==>
```

Use the QFT command to generate a diskette from a tape that is supplied by your support group.

At the end of a successful operation, the screen displays label information for the diskette. Use the COPY key to obtain a printout of the label (see "Using the COPY Key" on page 57).

Generating a Diskette

Warning: Performing this procedure alters storage and requires an IML/IPL; therefore, a loss of customer data results.

To generate a diskette:

1. Ensure that the FUNC1 diskette is in diskette drive 1.
2. Ensure that the processor is IMLed in S/370 mode.
3. Set the CE Mode switch to CE Mode.
4. Key QFT next to COMMAND, and press the ENTER key; this displays the QFT screen.
5. Enter the following information on the COMMAND line next to QFT (press the ENTER key after each entry):
   - U and a four-digit tape address—for example, U0282.
   - M and the six-digit serial number of the processor—for example, M100123.

     (To generate a diskette for another processor, specify the serial number of the other processor.)
   - P and the seven-digit diskette part number that appears on the tape label (do not include the leading zeros)—for example, P1234567.
   - H and current date (mm/dd/yy)—for example, 07/22/82.
6. You can also change the defaults for:
   - DISKETTE LABEL from Y to N: (Y means label information is displayed at the end of a successful generation; N means no label information is displayed.)
   - ISEQ from 01 to 02: (01 means the new diskette is the FUNC1 diskette; 02 means the new diskette is the backup FUNC1 diskette.)
7. Key QFTS next to COMMAND, and press the ENTER key.
8. Respond to the messages displayed on the screen.

   The tape-to-diskette generation process starts. Status and/or error messages appear on the screen as they are needed.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFB) Remote Operator Console Facility

```
*CNFG/REMOTE*    *REMOTE OPERATOR CONSOLE FACILITY*      *STATUS AREA*

   M  ROCF MODE - SWITCH                                 ROCF MODE DISABLED
   T  PROTECTION-SWITCH                                  PASSWORDS NOT REQUIRED
   C  CHANGE PASSWORD

   S  LINE SPEED-SWITCH                                  LINE SPEED 1200BPS
   R  RESET SECURITY COUNT                               SEC COUNT 0

   N  SYSTEM NODE ID                                     SYS NODE ID IBM/nnn
   P  CONSOLE PORT                                       CONSOLE PORT P1

   D  SYSTEM POWER DOWN                                  SYS POWER ON

   Q  GENERAL SELECTION
   Z  RETURN TO PROG SYS


  COMMAND: QFB                                    ==>
```

Use the QFB command to select the options you want for a Distributed Data Processing environment.

Displaying the ROCF Screen

To display the ROCF screen, key QFB next to COMMAND, and press the ENTER key.

ROCF Selections

The ROCF selections are listed below in the order that they appear on the screen.

M ROCF MODE-SWITCH

To alternately set ROCF mode on or off, key QFBM or QFBMODE (key QFBMODE from a remote site) next to COMMAND and press the ENTER key. Then, respond to any messages displayed on the screen.

Whenever ROCF is enabled, ENABLED is intensified on the right side of the screen.

T PROTECTION-SWITCH

To alternately specify that a password is or is not required, key QFBT next to COMMAND and press the ENTER key. Then, respond to any messages displayed on the screen.

C CHANGE PASSWORD

If you want to change the password, key QFBC next to COMMAND and press the ENTER key. Then, respond to the messages displayed on the screen.

Notes:

1. A password must have at least four and not more than eight characters.
2. The date is automatically supplied by the support processor.
3. The initial date when shipped is MM/DD/YY.
4. The initial password when shipped is PASSWORD.

S LINE SPEED-SWITCH

The current line speed (600 bps or 1200 bps) is intensified on the right side of the screen. To change from one line speed to another, key QFBS next to COMMAND and press the ENTER key. Then, respond to any messages displayed on the screen.

R RESET SECURITY COUNT

To set the security count (displayed on the right side of the screen) to zero, key QFBR next to COMMAND and press the ENTER key.

N SYSTEM NODE ID

The current node ID (identification) is intensified on the right side of the screen. To change the node ID, key QFBN and the new node ID (one to eight characters) next to COMMAND and press the ENTER key.

P CONSOLE PORT

Use this option to specify the console port that is to be linked to the host system for ROCF operation. Key QFBPn (n = 0, 1, 2, or 3) next to COMMAND and press the ENTER key.

Notes:

1. If you do not specify a port (0, 1, 2, or 3), the screen displays a list of ports for you to choose from.
2. You must have previously assigned a console to a port with the QFO command.
3. If the console you specified is not ready when you activate the ROCF link, the system selects another console.

D SYSTEM POWER DOWN

To power down a system from a remote or local site, key QFBDOWN next to COMMAND and press the ENTER key. Then, respond to any messages displayed on the screen. QFBD entered twice also powers the system down.

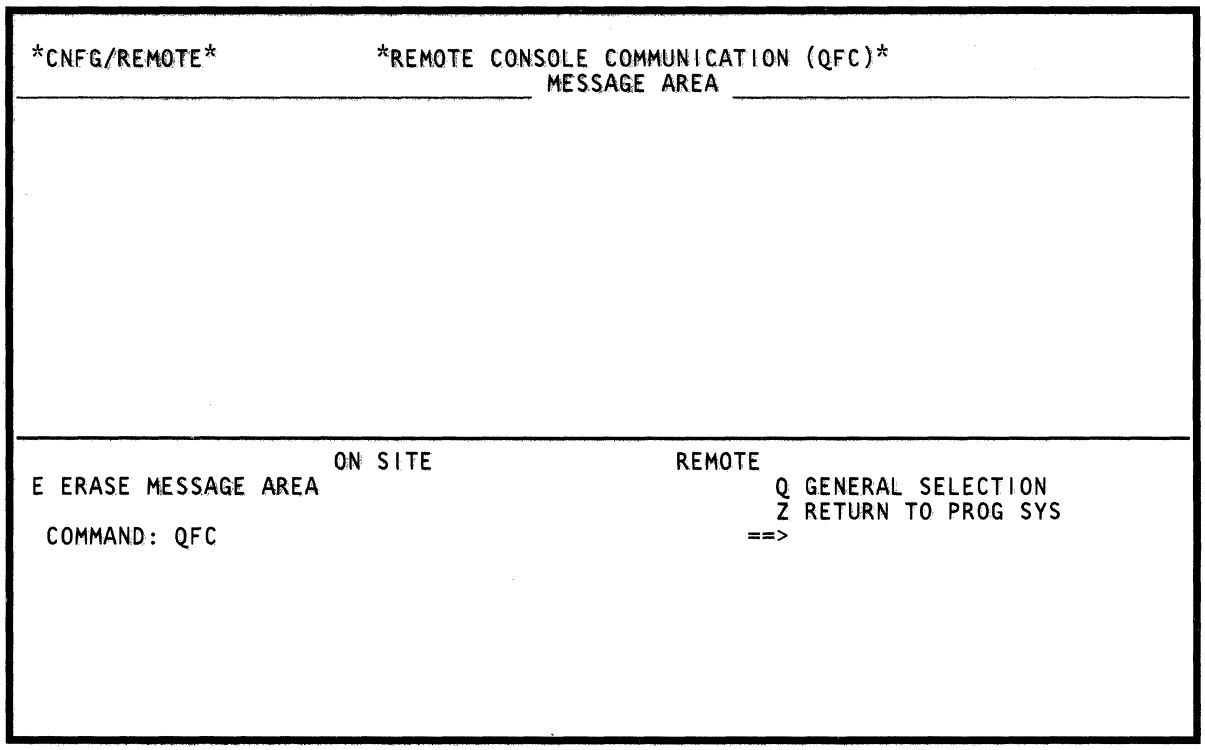
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFC) Remote Console Communications



The QFC command lets a support person at a remote site and an on-site service representative send messages to each other on the display console. The support person controls the communication process.

(QFR) Remote Console Initialization

```
*CNFG/REMOTE*          *REMOTE CONSOLE INITIALIZATION*

MACHINE TYPE.....: 4381                    CE NAME.......: JOHN DOE
MACHINE SERIAL NO: 123456                  CUSTOMER NAME : ABC CORP
BRANCH OFFICE....: xxxxx                   CUSTOMER PHONE: 1-234-567-8901


REMOTE CONSOLE VIA 3275.....(Y/N): N
VOICE/DATA VIA COMM REQ KEY (Y/N): N       Q GENERAL SELECTION
LOW SPEED (600 BPS) WANTED..(Y/N): N       Z RETURN TO PROG SYS
RSC CONNECTION INSTRUCTIONS (Y/N): N


      ACTION: SELECT RCS OPTIONS, THEN PRESS ENTER KEY.


 COMMAND: QFR                                        ==>
```

Use the QFR command to establish a link between the remote console and the on-site console.

Remote Console Initialization Procedure

1. Press the MODE SEL key (if not in manual mode).
2. Key QFR next to COMMAND and press the ENTER key. The Remote Console Initialization screen appears.
3. Follow the instructions on the screen.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFD) Data Bank Initialization

```
*CNFG/REMOTE*                *DATA BANK INITIALIZATION*

MACHINE TYPE.....: 4381
MACHINE SERIAL NO: 123456


LOW SPEED (600 BPS) WANTED (Y/N): N


Q GENERAL SELECTION
Z RETURN TO PROG SYS




COMMAND: QFD                                          ==>
```

Use the QFD command to get additional diagnostic information from a data bank.

Data Bank Initialization Procedure

1. Set the CE Mode switch to CE Mode.
2. Press the MODE SEL key (if not in manual mode).
3. Press the STOP key.
4. Key QOM next to COMMAND, and press the ENTER key. Clock-step state appears on the screen.
5. Key QFD next to COMMAND, and press the ENTER key. The Data Bank Initialization screen appears.
6. Follow the instructions on the screen.
7. On completion of data bank mode, hold the ALT key down and press the LINE DISC key to disconnect the line.
8. Key QON next to COMMAND and press the ENTER key.
9. Press the START key; instruction-stop state appears on the screen. (To start processing again, press the START key one more time.)

Return to General Selection (Q)

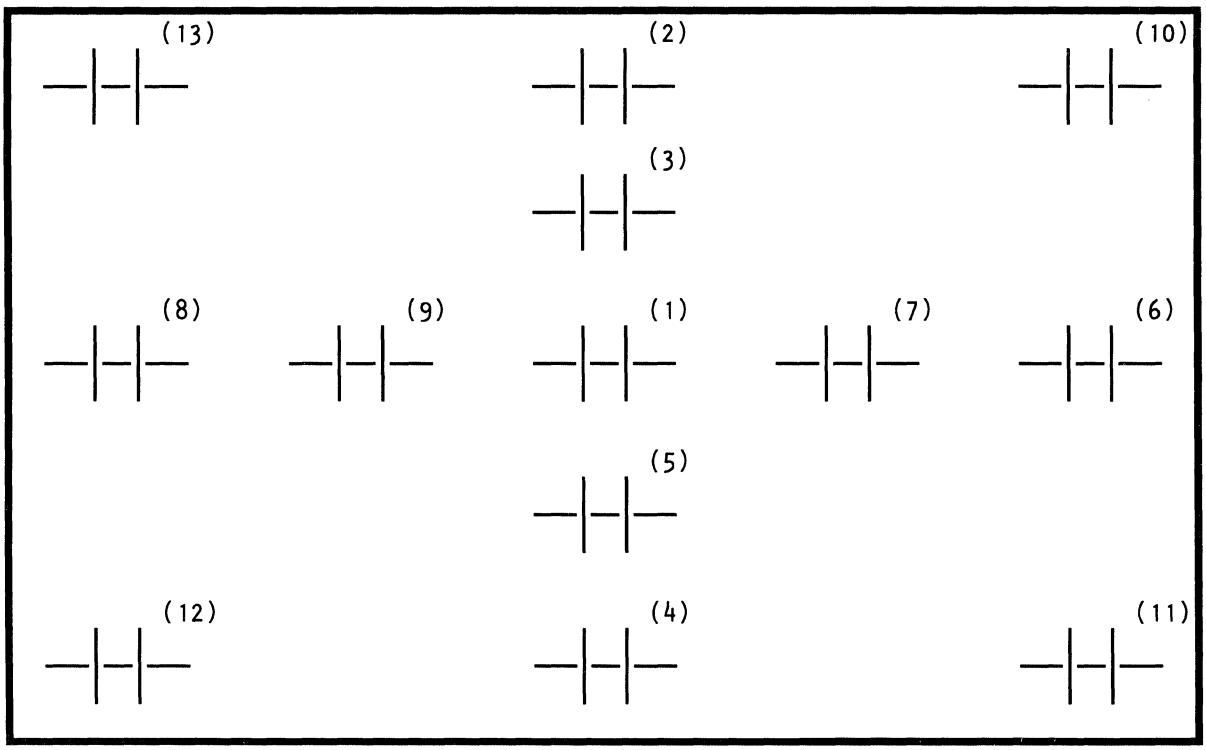
Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QFA) Console Color Convergence

```
CONSOLE COLOR CONVERGENCE ADJUSTMENT UTILITY

THIS UTILITY IS USED TO CONVERGE RED, GREEN, AND BLUE
DISPLAYS INTO CORRECT ALIGNMENT.  PATTERNS ARE SHOWN
TWICE AT 13 POSITIONS ON THE SCREEN, IN RED/GREEN AND
THEN RED/BLUE. THE 4 CURSOR KEYS ARE USED TO MOVE THE
2 COLOR PATTERNS TOGETHER INTO 1 COLOR, THE RED/GREEN
MERGES INTO YELLOW AND RED/BLUE MERGES INTO PINK.

   ENTER INITIALIZES UTILITY (MUST BE PRESSED 1ST)

   CURSOR UP, DOWN, LEFT, OR RIGHT MOVES THE PATTERN

   SPACE BAR SELECTS NEXT POSITION OR COLOR

   R KEY CHANGES PATTERN COLOR (RED/GREEN(-)RED/BLUE)

   MODE SEL KEY EXITS UTILITY
```



Note: Pattern positions are displayed in the order indicated by numbers in parenthesis.

Use the Console Color Convergence screen to align the color on a color display console.

To select the Console Color Convergence screen from the Configuration screen:

1. Key QFA next to COMMAND.

2. Press the ENTER key. This displays an explanation of the convergence procedure.

   If the console does not have the convergence feature, message AUTOMATIC CONVERGING ONLY appears. Return to the General Selection screen by pressing the MODE SEL key.

3. To continue the adjustment procedure, press the ENTER key. The adjustment pattern is displayed.

Convergence Procedure

Use the convergence procedure when:

- Setting up a color console
- The console has been moved to another area
- The battery has been exchanged
- Color definition is in question.

This procedure optimizes the color settings (red, green, and blue) to generate a pure compound color (white). If convergence is incorrect, either traces of each color are displayed at the edges of the white character or two separate patterns are displayed.

Patterns are shown twice at 13 positions on the screen, first in red and green, and then in red and blue. In a correctly converged screen, red and green combine into yellow, and red and blue combine into pink.

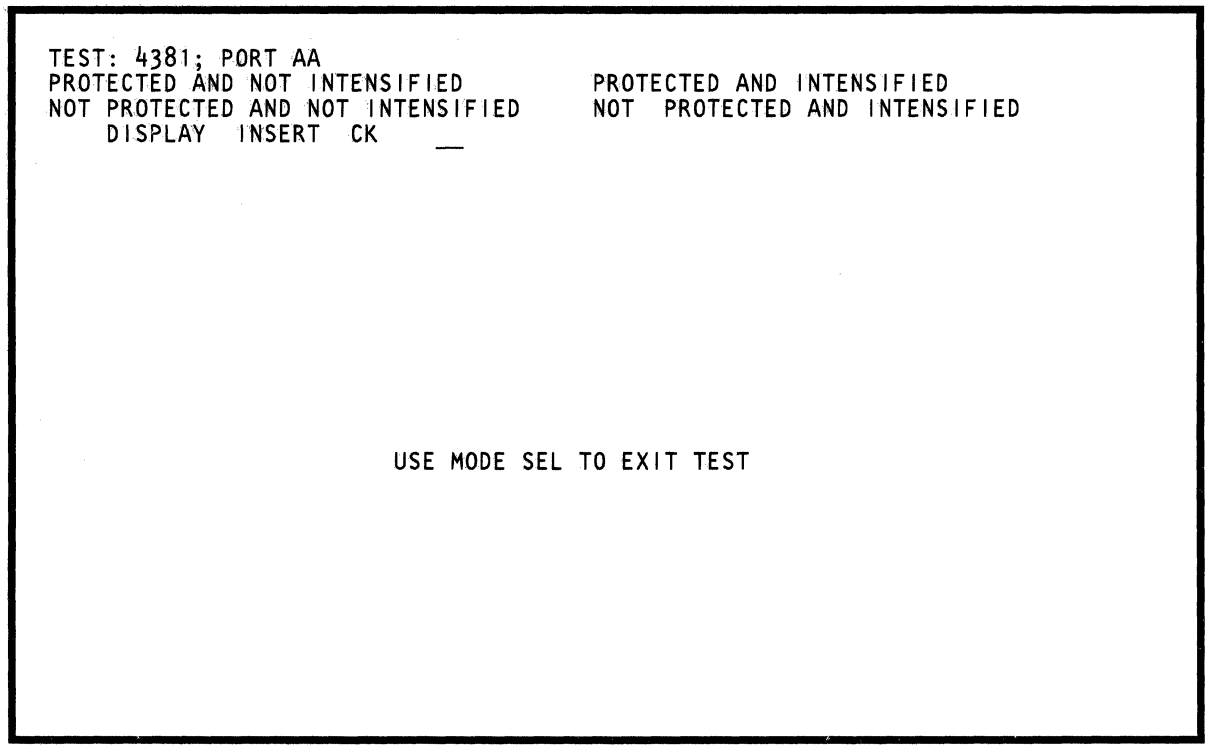
Use the cursor locating keys to move the green (or blue) pattern towards the red until they coincide and a yellow (or pink) pattern is displayed. These keys are typematic and can be held down until the pattern is correctly aligned.

Use the R key to reverse the color setting of the displayed pattern (red/green to or from red/blue). This permits the pattern to be checked and adjusted at one position.

Use the SPACE BAR to advance to the next adjustment position in the convergence procedure. The initial pattern at each position is displayed with the red/green colors. Pressing the SPACE BAR at this time changes the pattern to red/blue (the same as the R key). Pressing the SPACE BAR when the red/blue pattern is displayed advances the procedure to the next adjustment position and displays the pattern in red/green. After the last position has been correctly adjusted, pressing the SPACE BAR displays the pattern in white at all positions. If the SPACE BAR is pressed again, the procedure starts again at position one.

If INHIBITED or any other symbol appears in the operator information area, press the RESET key, and retry the action.

(QFP) Console Test Pattern



Use the QFP screen to check the display console colors, intensity, fields, and characters.

To use the QFP screen:

1. Key QFP next to COMMAND, and press the ENTER key.
2. See "Line Identification," and check that lines 2 to 4 are correctly displayed.
3. Now move the cursor under C (line 4, CK) and press the INSERT key.
4. Press keys A, B, and C. DISPLAY INSERT ABCK appears on line 4 and INHIBITED appears in the operator information area.
5. Press the RESET key.
6. Now enter on lines 5 through 17 the characters you want to check for correct operation (lines 5-17 are not intensified).

To return to the General Selection (Q) screen, press MODE SEL.

Line Identification

Line 1

TEST: 4381; PORT AA: Identifies the controller that a display console is attached to; AA is a port number (00 through 03).

Line 2

PROTECTED AND NOT INTENSIFIED: No data can be entered on line 2; the field is not intensified (blue on a 3279-2C and 3205, green on a 3278-2A).

PROTECTED AND INTENSIFIED: No data can be entered on line 2; the field is intensified (white on a 3279-2C and 3205, high intensity green on a 3278-2A).

Line 3

NOT PROTECTED AND NOT INTENSIFIED: Data can be entered on line 3; the field is not intensified (green on a 3205, 3279-2C, and 3278-2A).

NOT PROTECTED AND INTENSIFIED: Data can be entered on line 3; the field is intensified (red on a 3279-2C and 3205, high intensity green on a 3278-2A).

Line 4

DISPLAY INSERT: Display and Insert fields are protected fields (blue on a 3279-2C and 3205, green on a 3278-2A).

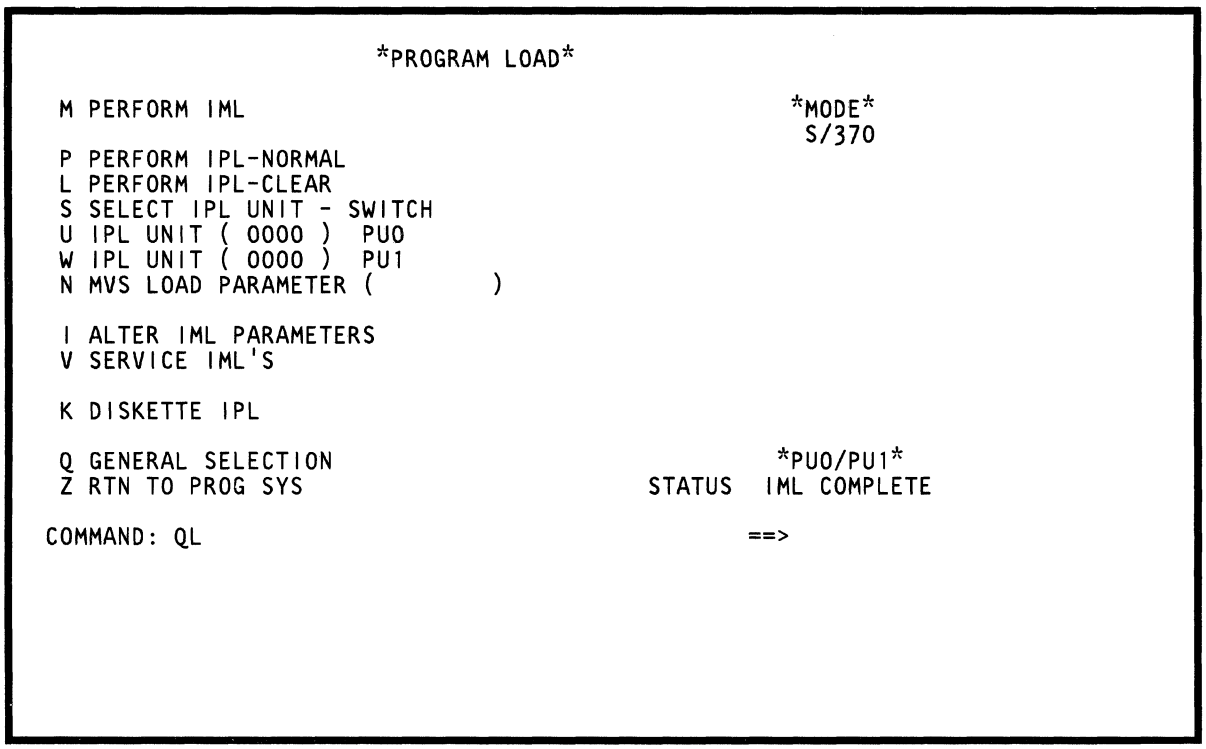
Note: If the blanking circuit fails, NON (nondisplayable field) appears in front of DISPLAY.

CK: CK is an unprotected field (green on a 3205, 3279-2C, and 3278-2A).

Lines 5 to 17

Use lines 5 to 17 to check all keyboard characters for correct operation; these lines are not intensified.

(QL) Program Load Screens



The Program Load screen:

- Controls the processing unit (PU) initial microcode load (IML)
- Controls the system initial program load (IPL)
- Displays the status of the last successful IML (the current options and mode are intensified on the screen).

Selecting the Program Load Screen

To select the Program Load screen, key QL next to COMMAND, and press the ENTER key.

The current mode and options are intensified on the screen. The *MODE* field displays the parameters currently active on the QLI screen.

Program Load Options

The options are described in the order that they appear on the screen.

M PERFORM IML

To IML the processor, key QLM next to COMMAND, and press the ENTER key.

You have the option of automatically invoking IML from a power-off condition. To do this, enter (on the QFO screen) Y next to IML AT POWER-ON.

P PERFORM IPL-NORMAL

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To IPL the system normally (that is, without first clearing main storage):

1. Key QLP next to COMMAND. (If you are changing the IPL unit, key QLUaddrP next to COMMAND. addr is a four-digit device address.)
2. Press the ENTER key.

You have the option of automatically invoking IPL from a power-off condition. To do this, enter (on the QFO screen) Y next to IML AND IPL AT POWER-ON.

MP PERFORM IML and IPL

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To invoke IML and IPL from the QL screen, key QLMP next to COMMAND, and press ENTER.

L PERFORM IPL-CLEAR

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To first clear main storage and then IPL the system:

1. Key QLL next to COMMAND. (If you are changing the IPL unit, key QLUaddrL next to COMMAND. addr is the device address.)
2. Press the ENTER key.

You have the option of automatically invoking IPL from a power-off condition. To do this, enter (on the QFO screen):

- Y next to IML AND IPL AT POWER-ON
- Y next to IML AT POWER-ON

S SELECT IPL UNIT - SWITCH

To specify the processing unit to IPL from, key the following next to the command line:

QLS0 to select PU0
QLS1 to select PU1
QLS to alternate between PU0 and PU1.

The selected processing unit and IPL unit are highlighted.

U IPL UNIT

To specify the IPL device, key QLU and a one- to four-digit device address (S/370 mode) or device number (S/370XA mode) in hex next to COMMAND. If you specify less than four digits, the address is padded to the left with zeros (for example, QLU191 is the same as QLU0191).

W IPL UNIT

To specify the IPL device, key QLW and a one- to four-digit device address (S/370 mode) or device number (S/370XA mode) in hex next to COMMAND. If you specify less than four digits, the address is padded to the left with zeros (for example, QLW191 is the same as QLW0191).

N MVS LOAD PARAMETER

Use this field to specify an alternate nucleus load parameter. This value is stored in SP storage when entered from the QL screen, loaded into AUX storage during IPL, and is delivered to the software control program during an SCP-INFO command.

To change the parameter, key QLNxxxxxxxx next to COMMAND, where xxxxxxxx is one to eight alphanumeric characters. If less than 8 characters are entered, they are aligned left and padded with blanks. The default is all blanks. This parameter will be reset to the default by:

- System-reset-clear (QCLEAR)
- Cold SP-IML (power down/power up)
- Entering blanks from the QL screen.

Note: The QL screen may need to be refreshed after a QCLEAR to see the load parameter blanked out.

Implementation of this parameter on the 4381 is independent of the operating system. See the system programmer or software support for use of this parameter.

I ALTER IML PARAMETERS

See "(QLI) Alter IML Parameters" on page 104.

V SERVICE IMLS

See "(QLV) Service IMLs" on page 106.

K DISKETTE IPL

See "(QLK) Diskette IPL" on page 110.

Return to General Selection (Q)

Key Q next to COMMAND, and press ENTER.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press ENTER.

Blocks at IML

You have the option of automatically invoking a Block at IML. For procedures, see "Automatically Running a Block at IML (QBM)" on page 312.

(QLI) Alter IML Parameters

```
 *PROGRAM LOAD*              *IML PARAMETERS*

  *SYSTEM MODE*
   W1 S/370
   W2 S/370XA




  *I/O CONFIGURATION* (S/370XA MODE)
   D0 DATA SET 0
   D1 DATA SET 1

   L PROGRAM LOAD MENU
   M PERFORM IML

   Q GENERAL SELECTION
   Z RETURN TO PROG SYS
COMMAND: QLI                                        ==>
```

Note: The above screen appears when the system has 16 megabytes or less of storage.

```
 *PROGRAM LOAD*              *IML PARAMETERS*

  *SYSTEM MODE*
   W1 S/370
   W2 S/370XA

  *STORAGE-KEY 4K-BYTE BLOCK FACILITY* (S/370 MODE)
   S1 SINGLE-KEY 4K-BYTE BLOCK
   S2 DOUBLE-KEY 4K-BYTE BLOCK (WARNING ONLY UTILIZES 16 MEG STORAGE)

  *I/O CONFIGURATION* (S/370XA MODE)
   D0 DATA SET 0
   D1 DATA SET 1

   L PROGRAM LOAD MENU
   M PERFORM IML

   Q GENERAL SELECTION
   Z RETURN TO PROG SYS
COMMAND: QLI                                        ==>
```

Note: The above screen appears when the system has more than 16 megabytes of storage.

Use this screen to change the IML parameters described below.

Parameter Descriptions

W1/W2 SYSTEM MODE

The current system mode (either S/370 or S/370XA) is intensified on the screen.

To change the mode:

1. Key the desired code (W1 or W2) after QLI on the COMMAND line, and then press the ENTER key.
2. Key QLM next to COMMAND, and press the ENTER key (this loads the change).
3. Ensure that the system configuration is correct (see the QFO screen) for the desired mode.

S1/S2 STORAGE KEY 4K-BYTE FACILITY

Applies to S/370 only. Indicates which storage key block is to be used (the current setting is intensified on the screen). S1 does not support 2K-key instructions. S2 supports both 2K- and 4K-key instructions, but limits storage access to 16 megabytes.

Note: This selection is operating system dependent. See the system programmer for the correct selection for your system.

To change to the other block:

1. Key the desired code (S1 or S2) after QLI on the COMMAND line, and then press the ENTER key.
2. Key QLM next to COMMAND, and press the ENTER key (this loads the change).

D0/D1 I/O CONFIGURATION

Applies to S/370XA only. Indicates which IOC data set is to be used (the current IOC data set is intensified on the screen).

To change to the other data set:

1. Key the desired code (D0 or D1) after QLI on the COMMAND line, and then press the ENTER key.
2. Key QLM next to COMMAND, and press the ENTER key (this loads the change).

L PROGRAM LOAD MENU

To return to the Program Load screen, key L after QLI on the COMMAND line, and then press the ENTER key.

M PERFORM IML

To IML and then return to the Program Load (QL) screen, key M after QLI on the COMMAND line, and then press the ENTER key.

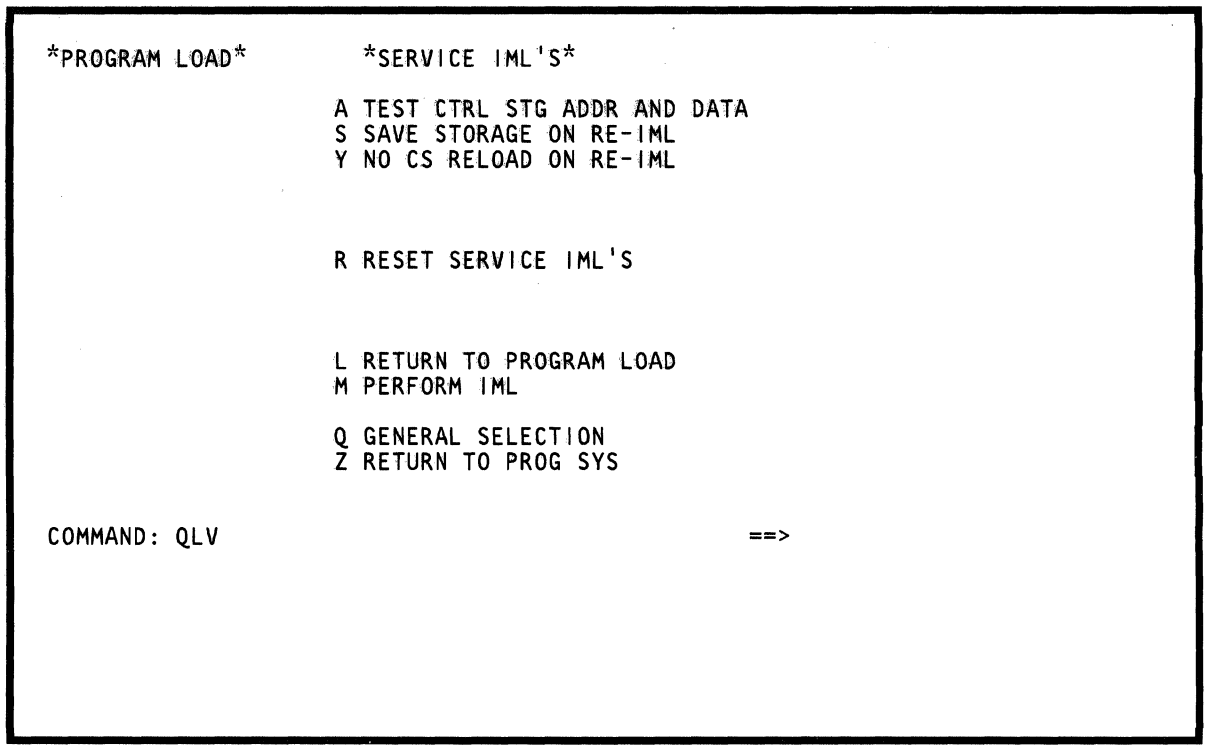
Return to General Selection (Q)

Key Q after QLI on the COMMAND line, and then press the ENTER key.

Return to Prog Sys (QZ)

Key QZ after QLI on the COMMAND line, and then press the ENTER key.

(QLV) Service IMLs



Use the QLV command to run CE tests under the direction of your support center. These tests are run at IML-time.

Displaying the Service IMLs Screen

To display the Service IMLs screen:

1. Set the CE Mode switch to CE Mode.
2. Key QLV nextZto COMMAND, and press the ENTER key.

Test Selections

A TEST CTRL STG ADDR AND DATA

This selection tests control storage addresses and data. To leave this selection, press CNCL.

S SAVE STORAGE ON RE-IML

This selection decreases the resets done during a re-IML if the program load has not changed. Some of the arrays are not reset and main storage is not cleared.

Save storage on re-IML does the following:

PSW	C
PU Timer	C
Clock Comparator	C
Control Registers	I
General Registers	C
Floating-Point Registers	C
Storage Keys	C
Main Storage	U
TOD Clock	U
Channel DLAT	C
Retry Local Store	C
Trap/BAL	C
Local Storage	I
Channel Data Buffer	C
Channel Control	C
Trace	C
Control Storage	I
Swap Buffer	U
Cache Retry	U
PU DLAT	U
Key Reset	U
Directories	U
Cache	U

U not changed
C cleared
I set to initial values

Y NO CS RELOAD ON RE-IML

This command causes the IML routine to omit the actual loading of control storage and it also does the following:

PSW	C
PU Timer	C
Clock Comparator	C
Control Registers	I
General Registers	C
Floating-Point Registers	C
Storage Keys	C
Main Storage	C
TOD Clock	U
Channel DLAT	C
Retry Local Storage	C
Trap/BAL	C
Local Store	I
Channel Data Buffer	C
Channel Control	C
Trace	C
Control Storage	U
Swap Buffer	C
Cache Retry	C
PU DLAT	C
Key Reset	I
Directories	I
Cache	C

U not changed
C cleared
I set to initial values

R RESET SERVICE IML'S

Entering QLVR next to COMMAND resets Service IML selections A, S, and Y.

L RETURN TO PROGRAM LOAD SCREEN

Entering QLVL next to COMMAND returns you to the Program Load screen.

M PERFORM IML

Entering QLVM next to COMMAND returns the display to the Program Load screen and starts the test or IML that was last specified.

Return to General Selection (Q)

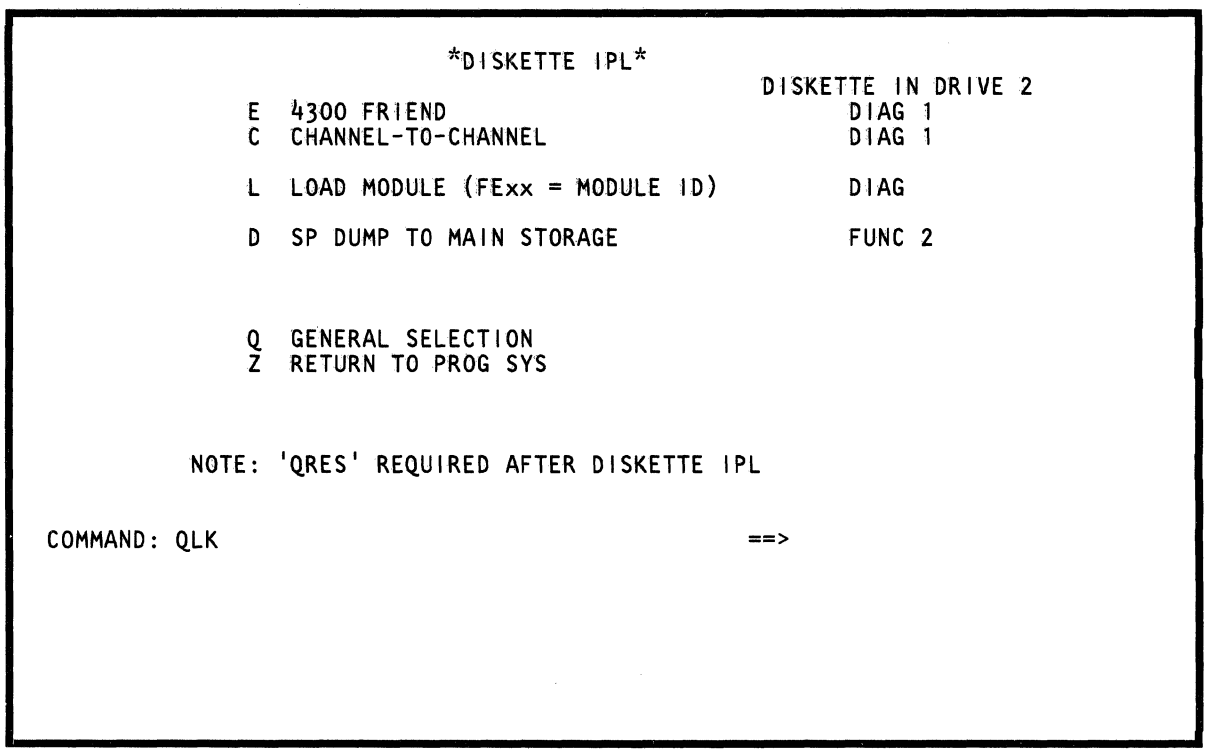
Key Q next to COMMAND, and press ENTER.

Warning: If you changed an IML parameter with the QLV screen, you must first load the change before returning to the General Selection screen. (Load the change by specifying QLVM.) Otherwise, the desired change(s) is lost.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press ENTER.

(QLK) Diskette IPL



Use the QLK screen to select various diagnostic options.

Displaying the Diskette IPL Screen

To display the QLK screen:

1. Set the CE Mode switch to CE Mode.
2. Key QLK next to COMMAND, and press the ENTER key.

Diagnostic Options

E 4300-FRIEND

For information about 4300-FRIEND, see Volume A07, "System Test."

C CHANNEL-TO-CHANNEL

For information about Channel-to-Channel, see Volume A06, "Service Aids."

L LOAD MODULE

Use this option to load a module from a diskette into main storage:

1. Key QLKFEnn (nn=module ID number) next to COMMAND.
2. Press the ENTER key.
3. When the message MOUNT PROPER DISK ENTER appears, install the diskette, and press the ENTER key.
4. When the message REMOUNT FUNCTIONAL DISK appears, install the functional diskette.
5. Key QRES next to COMMAND, and press the ENTER key.

D SP DUMP TO MAIN STORAGE

Use this option to dump SP storage from the diskette to PU storage.

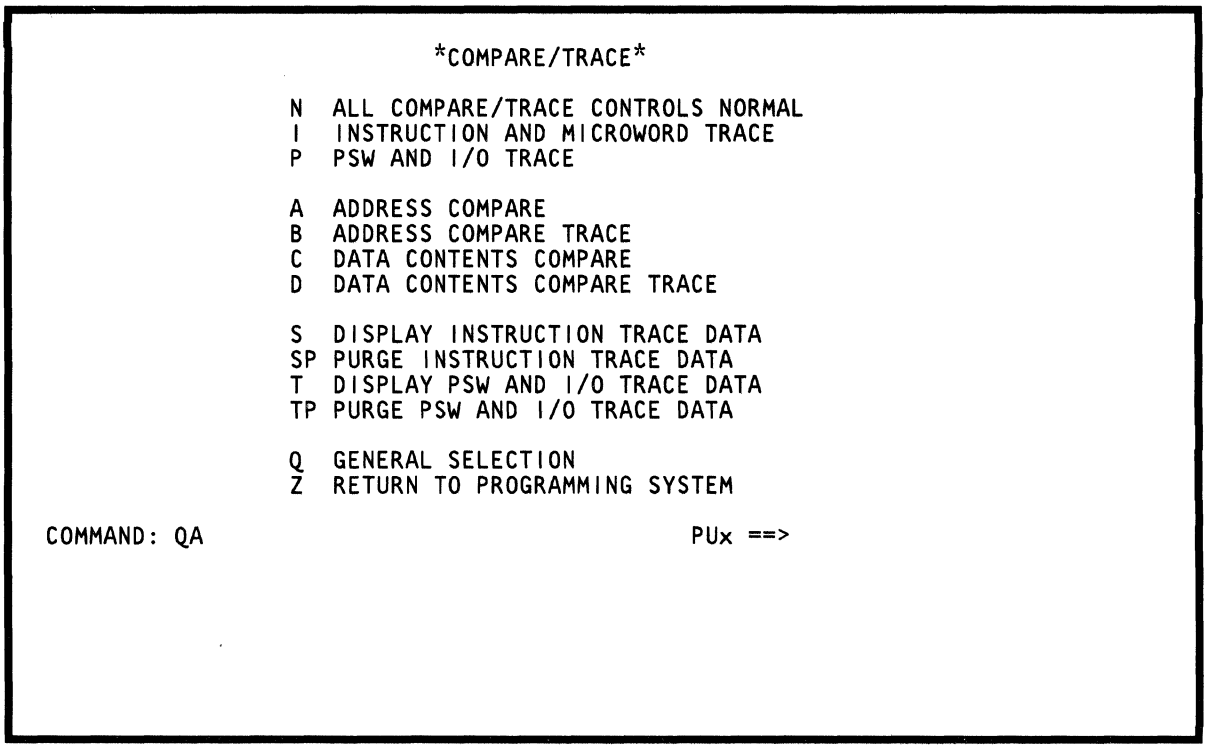
Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

(QA) Compare/Trace Screens



Use the Compare/Trace screens to:

- Stop processing when specific conditions occur.
- Trace and save addresses and I/O operations when specific conditions occur.
- Obtain a sync pulse when specific conditions occur (engineering use only).
- Display or purge (clear) trace data.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying the Compare/Trace Options

To display the compare/trace options:

1. Press the STOP key.
2. Key QA next to COMMAND, and press the ENTER key.

If you select an option on a compare/trace screen that conflicts with a preceding selection (on another compare/trace screen), a message appears to inform you of the conflict. (See the indicated screen to clear the conflicting option.)

An intensified compare/trace option means that it is active.

Resetting Compare/Trace Functions

To reset all preceding compare/trace functions, key QAN and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press ENTER.

Absolute Address

When two processors share the same storage, both must have access to its own low storage. This is done with a method called prefixing.

Prefixing relocates low storage (real addresses 0-4095) for each processing unit so that each has its own low storage.

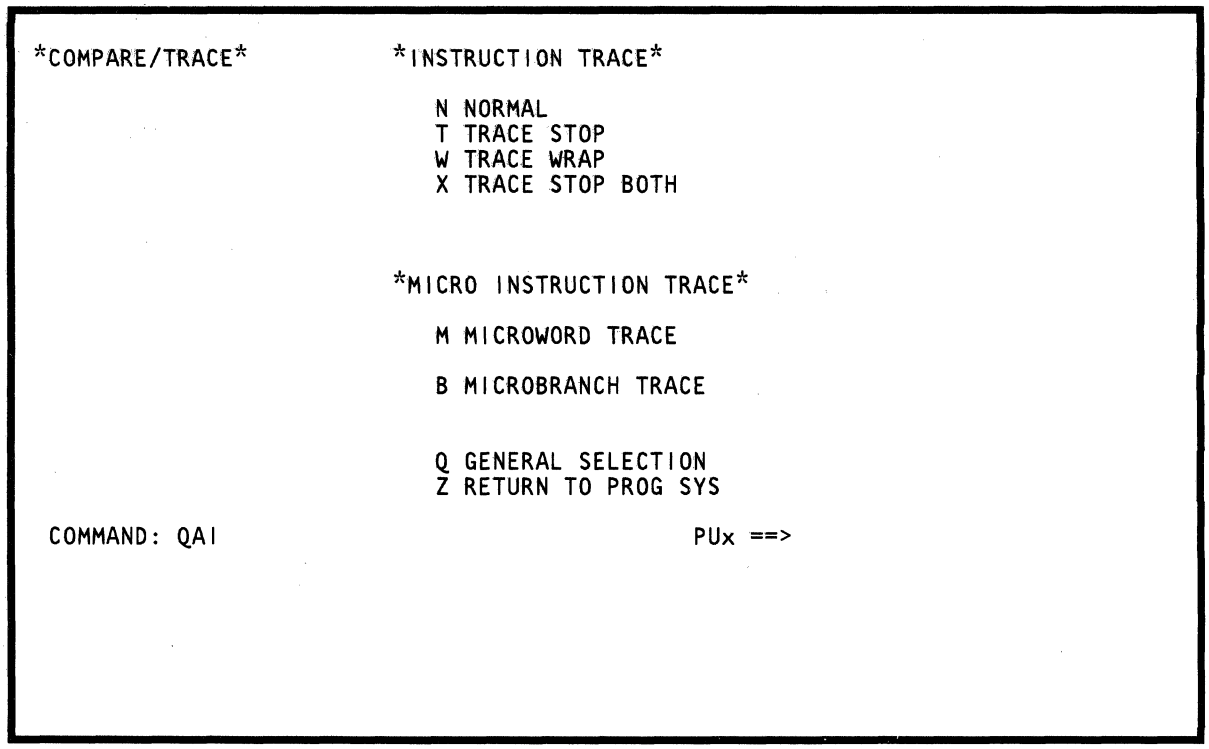
When prefixing is used, the real address is changed into an absolute address by using one of the following rules.

If real address bits 1-19 are:

- all zeros, they are exchanged with prefix register bits 1-19.
- equal to prefix register bits 1-19, they are changed to zeros.
- not all zeros and not equal to prefix register bits 1-19, they are not changed.

The prefix register is loaded with zeros when a 4381 dual processor is operating as a single processor.

(QAI) Instruction and Microword Trace



Use the QAI screen to save:

- Instruction counter values
- Microword addresses
- Microbranch addresses.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To display or clear the instruction counter data, see "(QAS) Display Instruction Trace Data" on page 138.

To display the microword or microbranch data, see "(QVAB) CSAR Trace" on page 264.

An intensified compare/trace option means that it is active.

Note: For another way of displaying the last 32 instruction addresses, see "(QVAI) I-Counter Trace" on page 258. (This function operates at machine speed and is always active.)

Specifying the QAI Command

The following conditions pertain to instruction traces (QAIT, QAIW, and QAIX) in S/370XA mode:

- The SIE instruction address displays in the QAS instruction trace data instead of the first SIE guest instruction address in a SIE/SIE guest instruction trace.
- When a stop condition occurs during a SIE/SIE guest instruction trace, the SIE instruction address displays in the QAS instruction trace data instead of the first SIE guest instruction address after the interrupt.
- SIE guest instruction address(s) only display in the QAS instruction trace data, never in the ADDR: field of the status line(s).

To specify the QAI command:

1. Press the STOP key.
2. Key QAI and the desired option (see below) next to COMMAND, and press the ENTER key.

Options

The options that you can select are:

- NORMAL (QAIN)

  Resets all instruction trace actions for the QAI command. This is the normal setting.

- TRACE STOP (QAIT)

  Saves all instruction addresses in the I-Counter Trace area. The processor stops after 470 addresses are saved. Press the START key to save the next 470 addresses. The QAIT command causes the system to run slowly.

- TRACE WRAP (QAIW)

  Saves up to 470 instruction addresses in the I-Counter Trace area. After 470 addresses are saved, each new address overlays the oldest address in the trace area. The QAIW command causes the system to run slowly.

- TRACE STOP BOTH (QAIX)

  Saves all instruction addresses in the I-Counter Trace area of the targeted processor. Both processors stop after 470 addresses are saved. Press the START key to save the next 470 addresses. The QAIX command causes the system to run slowly.

- MICROWORD TRACE (QAIM) (CE-mode only)

  Saves (in the QVAB array) the addresses of the last 32 microwords that ran. This is the normal setting.

- MICROBRANCH TRACE (QAIB) (CE-mode only)

  Saves (in the QVAB array) the addresses of the last 32 targets of microwords that caused a branch.

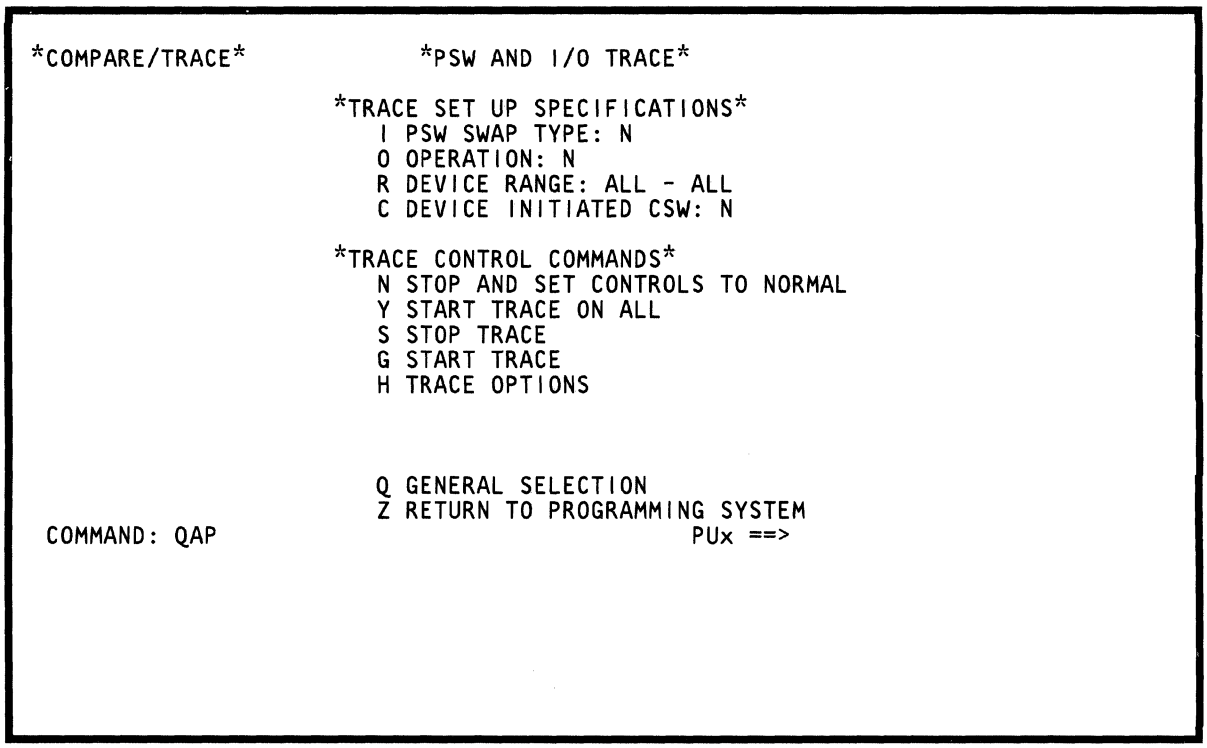
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press ENTER.

(QAP) PSW and I/O Trace (S/370 Mode)



Use the QAP command to trace PSW or I/O operations. (To display the trace results, use the QAT command.)

An intensified compare/trace option means that it is active.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QAP Command (S/370 mode)

To specify the QAP command:

1. Press the STOP key.
2. Key QAP next to COMMAND, and press the ENTER key.
3. Move the cursor to the I, O, R, or C field and key a trace option (see "Trace Options" below).

   HELP OPTION: If you want help, key QAPHx (x can be I, O, R, or C) next to COMMAND; this lists the correct formats.
4. Key the desired trace control command (N, Y, S, or G) next to QAP on the COMMAND line, and press the ENTER key. The desired trace action is performed.

Trace Options

- I PSW SWAP TYPE

  Next to I PSW SWAP TYPE, you can specify:

ALL	Trace all PSW swaps
EXT	External interrupt
I/O	I/O interrupt
LOAD	Load PSW instruction
MCHK	Machine check interrupt
N	Trace no PSWs
PROG	Program interrupt
SVC	Supervisor call interrupt
VM	VM-assisted.

- O OPERATION

  Next to OPERATION, you can specify:

ALL	All operations
CLRCH	Clear channel
CLRIO	Clear I/O
HDV	Halt device
HIO	Halt I/O
N	No operation
SIO	Start I/O (also for SIOF)
TCH	Test channel
TIO	Test I/O.

- R DEVICE RANGE

  Next to DEVICE RANGE, you can specify:

  -ALL
  -A range (cuu-cuu) of three-digit device addresses.

- C DEVICE INITIATED CSW

  To trace DEVICE INITIATED CSW, specify Y (yes) or N (no).

Trace Control Commands

- STOP AND SET CONTROLS TO NORMAL (QAPN)

  This stops the present trace and sets the:

  PSW SWAP TYPE to N
  TARGET OPERATION to N
  TARGET DEVICE RANGE to ALL
  DEVICE INITIATED CSW to N.

- START TRACE ON ALL (QAPY)

  This starts the trace action with no other specification (same as specifying ALL or Y in the I, O, R, and C fields).

- STOP TRACE (QAPS)

  This stops the trace.

- START TRACE (QAPG)

  This starts the trace.

- TRACE OPTIONS (QAPHn)

  This is the help option; it lists the valid formats for I, O, R, or C (for example, QAPHO displays all the valid operations you can specify).

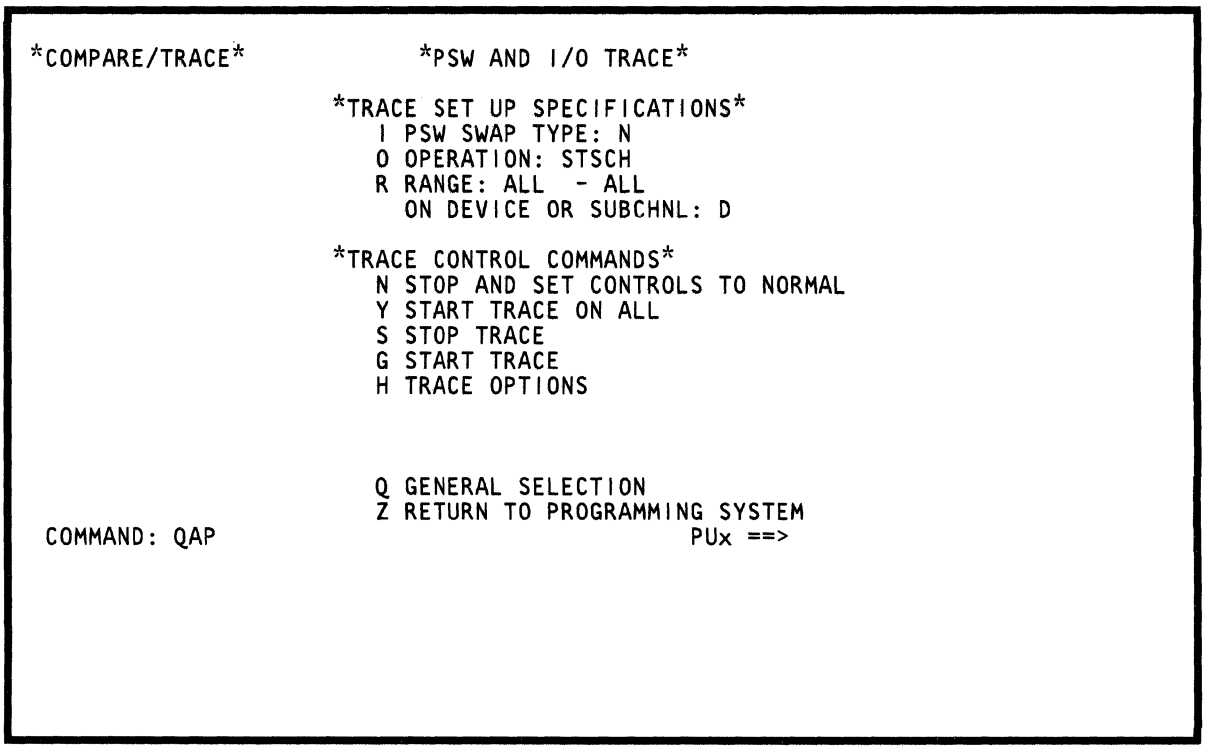
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QAP) PSW and I/O Trace (S/370XA Mode)



Use the QAP command to trace PSW or I/O operations. (To display the trace results, use the QAT command.)

An intensified compare/trace option means that it is active.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QAP Command (S/370XA mode)

To specify the QAP command:

1. Press the STOP key.
2. Key QAP next to COMMAND, and press the ENTER key.
3. Move the cursor to the I, O, or R field and key a trace option (see 'Trace Options' below).

   HELP OPTION If you want help, key QAPHx (x can be I, O, or R) next to COMMAND; this lists the correct formats.
4. Key the desired trace control command (N, Y, S, or G) next to QAP on the COMMAND line, and press the ENTER key. The desired trace action is performed.

Trace Options

- I PSW SWAP TYPE

  Next to PSW SWAP TYPE, you can specify:

ALL	Trace all PSW swaps
EXT	External interrupt
I/O	I/O interrupt
LOAD	Load PSW instruction
MCHK	Machine check interrupt
N	Trace no PSWs
PROG	Program interrupt
SIE	Start interpretive execution PSW
SVC	Supervisor call interrupt

- O OPERATION

  Next to OPERATION, you can specify:

ALL	All operations
ALLSCH	All subchannel operations (CSCH, HSCH, etc.)
CSCH	Clear subchannel
HSCH	Halt subchannel
MSCH	Modify subchannel
N	No operation
RCHP	Reset channel path
RSCH	Resume subchannel
SAL	Set address limit
SCHM	Set channel monitor
SSCH	Start subchannel
STCPS	Store channel path status
STCRW	Store CRW
STSCH	Store subchannel
TPI	Test pending interruption
TSCH	Test subchannel

- R RANGE

  Next to RANGE, you can specify:

  -ALL
  -A range of four-digit device addresses and D (for device)
  -A range of four-digit subchannel IDs and S (for subchannel)

Trace Control Commands

- STOP AND SET CONTROLS TO NORMAL (QAPN)

  This stops the present trace and sets the:

  PSW SWAP TYPE to N
  TARGET OPERATION to N
  TARGET DEVICE RANGE to ALL

- START TRACE ON ALL (QAPY)

  This starts the trace action with no other specification (same as specifying ALL in the I, O, and R fields).

- STOP TRACE (QAPS)

  This stops the trace.

- START TRACE (QAPG)

  This starts the trace.

- TRACE OPTIONS (QAPHn)

  This is the help option; it lists the valid formats for I, O, or R (for example, QAPHO displays all the valid operations you can specify).

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QAA) Address Compare

```
*COMPARE/TRACE*          *ADDRESS COMPARE*

 *ACTION*                 *TYPE*                *ADDR*      *ADDR TYPE*

 N NORMAL                 A ANY REFERENCE
 S INSTR STOP             D DATA STORE                      V VIRTUAL
 X INSTR STOP BOTH        I I/O REFERENCE       00045200    R REAL
                          C INSTR COUNTER
 H CLOCK STOP
 Y SYNC PULSE             M MICROWORD           00F60
 L CHANNEL SYNC
 F INSTR STOP-FREEZE      L LOCAL STORE-DST     12
                          S LOCAL STORE-SRC

                          H CHANNEL-SEQ CNT
                          X CHANNEL-DATA
                          Z CHANNEL-ID

   Q GENERAL SELECT
   Z RETURN PROG SYS


 COMMAND: QAAS145200                              PUx ==>
```

Use the QAA command to set an address compare.

An intensified compare/trace option means that it is active.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QAA Command

The following restrictions pertain to instruction stops (QAAS and QAAX) in S/370XA mode:

- For an instruction in guest virtual mode, use the guest virtual address.
- For an instruction in guest real mode, use the host absolute address.

To specify the QAA command:

1. Press the STOP key.
2. Key QAA and the desired parameters (see below) next to COMMAND, and press the ENTER key.

The parameters you can specify give:

- The action (ACTION) to take

  NORMAL
  INSTR STOP
  INSTR STOP BOTH
  CLOCK STOP (CE-mode only)
  SYNC PULSE (CE-mode only)
  CHANNEL SYNC (CE-mode only)
  INSTR STOP-FREEZE (CE-mode only)

- The hardware (TYPE)

  ANY REFERENCE
  DATA STORE
  I/O REFERENCE
  INSTR COUNTER
  MICROWORD (CE-mode only)
  LOCAL STORE-DST (CE-mode only)
  LOCAL STORE-SRC (CE-mode only)
  CHANNEL-SEQ CNT (CE-mode only)
  CHANNEL-DATA (CE-mode only)
  CHANNEL-ID (CE-mode only)

- The address (ADDR)
- The address type (ADDR TYPE)

  VIRTUAL
  REAL.

ACTION

The following describes the compare actions you can select:

- NORMAL (QAAN)

  Resets all compare actions for the QAA command.

- INSTR STOP (QAAS + options)

  Causes an instruction-stop if an address match occurs. Before the instruction-stop occurs, the microcode processes the present instruction and receives the waiting interrupts.

- INSTR STOP BOTH (QAAX + options)

  Causes an instruction-stop on both processors if an address match occurs. Before the instruction-stop occurs, the microcode processes the present instruction and receives the waiting interrupts.

- CLOCK STOP (QAAH + options) (CE-mode only)

  Causes a clock-stop if an address match occurs. Before the clock-stop occurs, the microcode processes the present microword with this exception: for an instruction counter match, the processor halts before running the present instruction.

  The microword that caused the match is at the control storage address last entered into the trace array (QVAB). This address is the one logically preceding the address displayed on line 21.

  Note: A machine check may occur when using the CLOCK STOP (QAAH) action on channel (TYPE) hardware. To recover, IML/IPL the system.

- SYNC PULSE (QAAY + options) (Engineering use only)

  Causes a sync pulse at MJD517 when an address match occurs.

- CHANNEL SYNC (QAAL + options) (Engineering use only)

  Causes a sync pulse at 01A-A3N2G02 for the channel selected.

- INSTR STOP-FREEZE (QAAF + options) (Engineering use only)

  Causes the CSAR trace array to stop at the time an address match occurs.

Warning: If customer data is lost, the message STORAGE ERR - REIPL NEEDED is displayed when the system is started.

TYPE

You can specify the following types with the QAA command:

- ANY REFERENCE (A)

  This compares (during any storage operation) the address you specified with the addresses in storage. If the addresses match, a clock-stop, instruction-stop, or sync pulse occurs.

  Key QAAHA, QAASA, QAALA, or QAAYA and a one- to eight-digit hex address, and V for Virtual or R for Real next to COMMAND.

  Example: QAAHA4FF0

  Notes:

  1. The address specified by you is rounded down to the doubleword (8-byte) boundary (the address compare still occurs on the specified address).

  2. Specify V or R only if the existing address type is incorrect.

- DATA STORE (D)

  This compares (during a write operation) the address you specified to the addresses in storage. If the addresses match, a clock-stop, instruction-stop, or sync pulse occurs.

  Key QAAHD, QAASD, QAALD, or QAAYD and a one- to eight-digit hex address, and V for Virtual or R for Real next to COMMAND.

  Example: QAAHD4FF0

  Notes:

  1. The address specified by you is rounded down to the doubleword (8-byte) boundary (the address compare still occurs on the specified address).

  2. Specify V or R only if the existing address type is incorrect.

- I/O REFERENCE (I)

  Use I/O Reference only during a data transfer operation. This compares the address of transferred data that you specify to the addresses in storage. (The address type is always Real.) If the addresses match, a clock-stop, instruction-stop, or sync pulse occurs.

  Key QAAHI, QAASI, QAALI, or QAAYI and a one- to eight-digit hex address next to COMMAND.

  Example: QAAHI4FF0

  Note: The address specified by you is rounded down to the doubleword (8-byte) boundary (the address compare still occurs on the specified address).

- INSTR COUNTER (C)

  This compares the address you specified to the instruction counter addresses. If the addresses match, a clock-stop, instruction-stop, or sync pulse occurs.

  Key QAAHC, QAASC, QAALC, or QAAYC and a one- to eight-digit hex address, and V for Virtual or R for Real next to COMMAND.

  Example: QAASC4FF2

  Notes:

  1. The address specified by you is rounded down to the halfword (2-byte) boundary (the address compare still occurs on the specified address).

  2. Specify V or R only if the existing address type is incorrect.

- MICROWORD (M) (CE-mode only)

  This loads the address you specified into the CS address match register and compares it to the CSARBU register (the CSARBU register contains the address of the microword now being run). If the addresses match, a clock-stop, instruction-stop, or sync pulse occurs.

  Key QAAHM, QAASM, QAALM, or QAAYM and a one- to five-digit hex address next to COMMAND.

  Example: QAAHM4FF4

  Note: The address specified by you is rounded down to the computer word (4-byte) boundary (the address compare still occurs on the specified address).

- LOCAL STORE-DST (L) (CE-mode only)

  This loads an address into the LS address match register and compares it to the LS address register when data is written in that LS element. If an address match occurs, an LS destination (write) address match is signaled.

Key QAAHL, QAASL, QAALL, or QAAYL and the two-digit number (in hex) of a doubleword in local storage next to COMMAND.

Example: QAASL12

- LOCAL STORE-SRC (S) (CE-mode only)

  This loads an address into the LS address match register and compares it to the LS address register when data is read in that LS element. If an address match occurs, an LS source (read) address match is signaled.

  Key QAAHS, QAASS, QAALS, or QAAYS and the two-digit number (in hex) of a doubleword in local storage next to COMMAND.

  Example: QAAYS1F

- CHANNEL-SEQ CNT (H) (CE-mode only)

  This causes a clock-stop or sync pulse when the sequence count of a channel matches the sequence count you specified.

  Key QAALH, QAAHH, or QAAYH, a one-digit channel number, and a two-digit sequence number next to COMMAND.

  Example: QAAHH320

- CHANNEL-DATA (X) (CE-mode only)

  This causes a clock-stop or sync pulse when a byte of channel data matches the data byte you specified.

  Key QAALX, QAAHX, or QAAYX, a one-digit channel number, and one byte of data next to COMMAND.

  Example: QAAHX1F2

- CHANNEL-ID (Z) (CE-mode only)

  This causes a sync pulse on the channel number specified. Only valid for action L. Key QAALZ, a one-digit channel number, next to COMMAND:

  Example: QAALZ1

ADDR

The ADDR options are: (For more information on the ADDR options, see "TYPE.")

- One- to eight-digit address (in hex) on a doubleword boundary. Applies to:

  A ANY REFERENCE
  D DATA STORE
  I I/O REFERENCE

- One- to eight-digit address (in hex) on a halfword (2-byte) boundary. Applies to:

  C INSTR COUNTER

- One- to five-digit address (in hex) on a computer word (4-byte) boundary. Applies to:

  M MICROWORD

- One- to two-digit number (in hex) of a doubleword (8-byte) in local storage. Applies to:

  L LOCAL STORE-DST
  S LOCAL STORE-SRC

- Three-digit number (in hex). The first digit is a channel number; the next two digits are a sequence count number. Applies to:

  H CHANNEL-SEQ CNT

- Three-digit number (in hex). The first digit is a channel number; the next two digits are a data byte. Applies to:

  X CHANNEL-DATA

ADDR TYPE

Use this option to indicate whether the storage address (specified by you) is a virtual or real address.

Specify V or R only if the present address type is incorrect.

Note: When a real address in the **target processor's** prefix register range (4K) is entered the match occurs in the associated absolute address 0 range. When a real address in the **target processor's** address 0 range (4K) is entered, the match occurs on the absolute address specified by the prefix register. In all other cases the real address and associated absolute address have the same value. For more information, see "Absolute Address" on page 113.

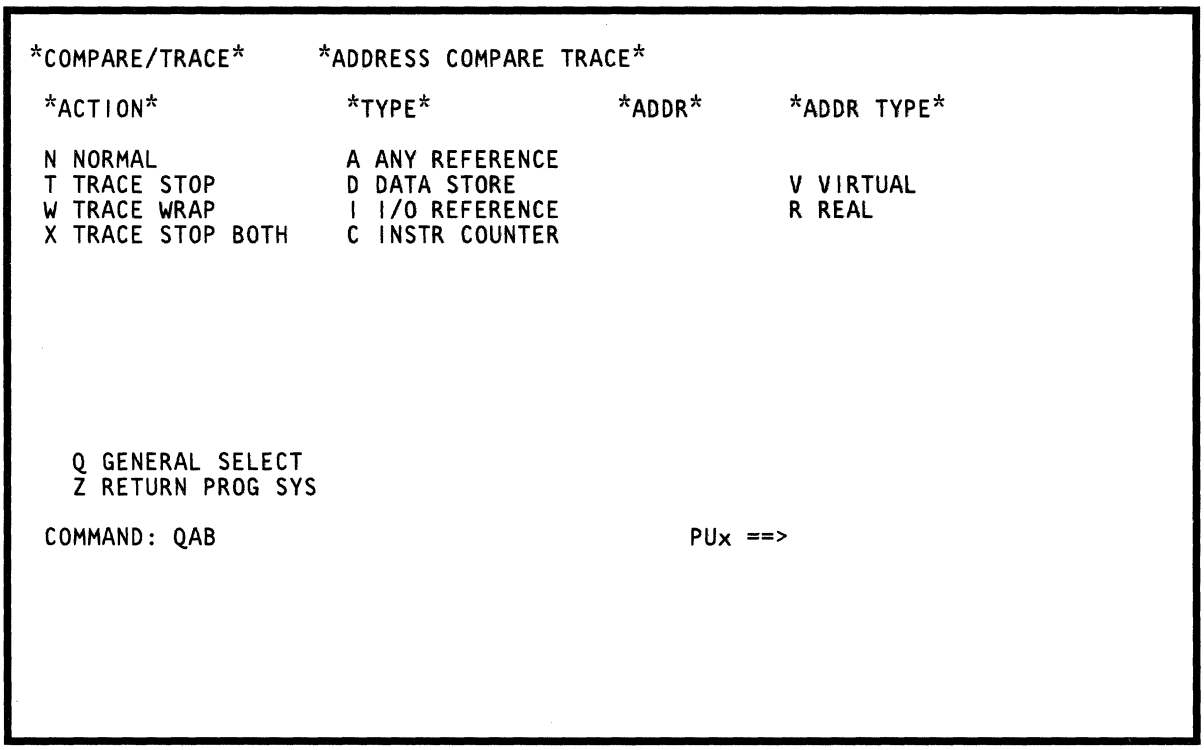
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QAB) Address Compare Trace



Use the QAB command to save the instruction counter value after a successful address compare (up to 470 values can be saved). An intensified compare/trace option means that it is active.

To display or clear the instruction counter data, see "(QAS) Display Instruction Trace Data" on page 138.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QAB Command

To specify the QAB command:

1. Press the STOP key.
2. Key QAB and the desired parameters (see below) next to COMMAND, and press the ENTER key.

The parameters you can specify give:

- The action (ACTION) to take

  NORMAL
  TRACE STOP (CE-mode only)
  TRACE WRAP (CE-mode only)
  TRACE STOP BOTH (CE-mode only)

- The hardware (TYPE)

  ANY REFERENCE
  DATA STORE
  I/O REFERENCE
  INSTR COUNTER

- The address (ADDR)
- The address type (ADDR TYPE)

  VIRTUAL
  REAL

ACTION

The following describes the trace actions you can select:

- NORMAL (QABN)

  Resets all trace actions for the QAB command.

- TRACE STOP (QABT + options)

  Saves the instruction counter value in a trace area when an address compare occurs. The processor stops after the trace area is full (contains 470 entries). Press the START key to continue processing.

- TRACE WRAP (QABW + options)

  Saves the instruction counter value in a trace area when an address compare occurs. After the trace area is full (contains 470 entries), each new address compare writes over the oldest instruction counter value.

- TRACE STOP BOTH (QABX + options)

  Saves the instruction counter value of the targeted processor in a trace area when an address compare occurs. Both processors stop after the trace area is full (contains 470 entries). Press the START key to continue processing.

TYPE

You can specify the following types with the QAB command:

- ANY REFERENCE (A)

  This compares (during any storage operation) the address you specified to the addresses in storage. If the addresses match, the instruction counter value (up to 470 values) is saved in a trace area.

  Key QABTA or QABWA, a one- to eight-digit hex address, and V for Virtual or R for Real next to COMMAND.

  Example: QABTA4FF0

  Notes:

  1. The address specified by you is rounded down to the doubleword (8-byte) boundary (the address compare still occurs on the specified address).
  2. Specify V or R only if the present address type is incorrect.

- DATA STORE (D)

  This compares (during a write operation) the address you specified to the addresses in storage. If the addresses match, the instruction counter value (up to 470 values) is saved in a trace area.

  Key QABTD or QABWD, a one- to eight-digit hex address, and V for Virtual or R for Real next to COMMAND.

  Example: QABTD4FF0

Notes:

1. The address specified by you is rounded down to the doubleword (8-byte) boundary (the address compare still occurs on the specified address).

2. Specify V or R only if the present address type is incorrect.

- I/O REFERENCE (I)

  Use I/O Reference only during a data transfer operation. This compares the address of transferred data that you specify to the addresses in storage. (The address type is always Real.) If the addresses match, the instruction counter value (up to 470 values) is saved in a trace area.

  Key QABTI or QABWI and a one- to eight-digit hex address next to COMMAND.

  Example: QABWI4FF0

  Note: The address specified by you is rounded down to the doubleword (8-byte) boundary (the address compare still occurs on the specified address).

- INSTR COUNTER (C)

  This compares the address you specified to the instruction counter addresses. If the addresses match, the instruction counter value (up to 470 values) is saved in a trace area.

  Key QABTC or QABWC, a one- to eight-digit hex address, and V for Virtual or R for Real next to COMMAND.

  Example: QABTC4FF2

  Notes:

  1. The address specified by you is rounded down to the halfword (2-byte) boundary (the address compare still occurs on the specified address).

  2. Specify V or R only if the present address type is incorrect.

ADDR

The ADDR options are: (For more information on the ADDR options, see "TYPE.")

- One- to eight-digit address (in hex) on a doubleword boundary. Applies to:

  A ANY REFERENCE
  D DATA STORE
  I I/O REFERENCE

- One- to eight-digit address (in hex) on a halfword boundary. Applies to:

  C INSTR COUNTER

ADDR TYPE

Use this option to indicate whether the storage address (specified by you) is a virtual or real address.

Specify V or R only if the present address type is incorrect.

Note: When a real address in the **target processor's** prefix register range (4K) is entered the match occurs in the associated absolute address 0 range. When a real address in the **target processor's** address 0 range (4K) is entered, the match occurs on the absolute address specified by the prefix register. In all other cases the real address and associated absolute address have the same value. For more information, see "Absolute Address" on page 113.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QAC) Data Contents Compare

```
*COMPARE/TRACE*        *DATA CONTENTS COMPARE*

 *ACTION*              *TYPE*              *ADDR*     *OP* *MASK*    *ADDR TYPE*

 N NORMAL              A ANY REFERENCE
 S INSTR STOP          D DATA STORE                                    V VIRTUAL
 X INSTR STOP BOTH     I I/O REFERENCE     00004300     =    F..E      R REAL
                       C INSTR COUNTER


                                        *OP DEFINITION*
                                        = DATA EQUAL TO MASK
                                        / DATA NOT EQUAL TO MASK
                                        & DATA BITS UNDER MASK ALL ONES
                                        % DATA BITS UNDER MASK ZERO OR MIXED

   Q GENERAL SELECT
   Z RETURN PROG SYS

 COMMAND: QAC                                    PUx ==>
```

Use the QAC command to determine if the data at a specific storage address matches the compare conditions specified by you. If a match does occur, an instruction-stop occurs.

An intensified compare/trace option means that it is active.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QAC Command

The following restrictions pertain to instruction stops (QACS and QACX) in S/370XA mode:

- For an instruction in guest virtual mode, use the guest virtual address.
- For an instruction in guest real mode, use the host absolute address.

To specify the QAC command:

1. Press the STOP key.
2. Key QAC and the desired parameters (see below) next to COMMAND, and press the ENTER key.

The parameters you can specify give:

- The action (ACTION) to take

  NORMAL
  INSTR STOP
  INSTR STOP BOTH

- The hardware (TYPE)

  ANY REFERENCE
  DATA STORE
  I/O REFERENCE
  INSTR COUNTER

- The address (ADDR)
- The conditions (OP and MASK)

  = DATA EQUAL TO MASK
  / DATA NOT EQUAL TO MASK
  & DATA BITS UNDER MASK ALL ONES
  % DATA BITS UNDER MASK ZERO OR MIXED

- The address type (ADDR TYPE)

  VIRTUAL
  REAL

ACTION

The following describes the actions you can select:

- NORMAL (QACN)

  Resets all compare actions for the QAC command.

- INSTR STOP (QACS + options)

  Stops the processor if data at a specific storage location matches the compare conditions specified by you. Before the instruction-stop occurs, the microcode processes the present instruction and receives the waiting interrupts.

- INSTR STOP BOTH (QACX + options)

  Stops both processors if data at a specific storage location matches the compare conditions specified by you. Before the instruction-stop occurs, the microcode processes the present instruction and receives the waiting interrupts.

TYPE

You can specify the following types with the QAC command:

- ANY REFERENCE (A)

  This checks the data at a specific storage address (during any storage operation) to see if the conditions you specified are met. If yes, an instruction-stop occurs.

  Key QACSA, a one- to eight-digit hex address (not ending in 7 or F), the conditions (OP and MASK), and V for Virtual or R for Real next to COMMAND.

  Example: QACSA4FF0=F..E (the periods are used as "do not care" characters).

  Note: Specify V or R only if the present address type is incorrect.

- DATA STORE (D)

  This checks the data at a specific storage address (during a write operation) to see if the conditions you specified are met. If yes, an instruction-stop occurs.

  Key QACSD, a one- to eight-digit hex address (not ending in 7 or F), the conditions (OP and MASK), and V for Virtual or R for Real next to COMMAND.

  Example: QACSD4FF0=F..E (the periods are used as "do not care" characters).

Note: Specify V or R only if the present address type is incorrect.

- I/O REFERENCE (I)

  Use I/O Reference only during a data transfer operation. This checks the data at a specific storage address to see if the conditions you specified are met. The address that you specify must be the address of transferred data. If yes, an instruction-stop occurs. (The address type is always Real.)

  Key QACSI, a one- to eight-digit hex address (not ending in 7 or F), and the conditions (OP and MASK) next to COMMAND.

  Example: QACSI4FF0=F..E (the periods are used as "do not care" characters).

- INSTR COUNTER (C)

  This checks the data at a specific instruction counter address to see if the conditions you specified are met. If yes, an instruction-stop occurs.

  Key QACSC, a one- to eight-digit hex address (not ending in 7 or F), the conditions (OP and MASK), and V for Virtual or R for Real next to COMMAND.

  Example: QACSC4FF0=F..E (the periods are used as "do not care" characters).

  Note: Specify V or R only if the present address type is incorrect.

ADDR

The ADDR options are:

- One- to eight-digit address (in hex) on a doubleword boundary. Applies to:

  A ANY REFERENCE
  D DATA STORE
  I I/O REFERENCE

- One- to eight-digit address (in hex) on a halfword boundary. Applies to:

  C INSTR COUNTER

OP and MASK

Use OP and MASK to set the condition that causes a data match at address ADDR. You can specify one of four codes together with two bytes of data.

The OP and MASK options are:

- OP = causes a match if the data at address ADDR is the same as the data in the MASK field.
- OP / causes a match if the data at address ADDR is not the same as the data in the MASK field.
- OP & causes a match if each bit that is a one (on) at address ADDR is also a one in the MASK field.
- OP % causes a match if at least one of the bits at address ADDR is the same as a bit in the MASK field.

ADDR TYPE

Use this option to indicate whether the storage address (specified by you) is a virtual or real address.

Specify V or R only if the present address type is incorrect.

Note: When a real address in the **target processor's** prefix register range (4K) is entered the match occurs in the associated absolute address 0 range. When a real address in the **target processor's** address 0 range (4K) is entered, the match occurs on the absolute address specified by the prefix register. In all other cases the real address and associated absolute address have the same value. For more information, see "Absolute Address" on page 113.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QAD) Data Contents Compare Trace

```
*COMPARE/TRACE*       *DATA CONTENTS COMPARE TRACE*

 *ACTION*           *TYPE*              *ADDR*    *OP* *MASK*   *ADDR TYPE*

 N NORMAL            A ANY REFERENCE    00004300    =   FEFE
 T TRACE STOP        D DATA STORE                                 V VIRTUAL
 W TRACE WRAP        I I/O REFERENCE                              R REAL
 X TRACE STOP BOTH

                                      *OP DEFINITION*
                                      = DATA EQUAL TO MASK
                                      / DATA NOT EQUAL TO MASK
                                      & DATA BITS UNDER MASK ALL ONES
                                      % DATA BITS UNDER MASK ZERO OR MIXED

   Q GENERAL SELECT
   Z RETURN PROG SYS

 COMMAND: QAD                                  PUx ==>
```

Use the QAD command to save the instruction counter value after a successful data compare (up to 470 values can be saved). An intensified compare/trace option means that it is active.

To display or clear the instruction counter data, see "(QAS) Display Instruction Trace Data" on page 138.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying the QAD Command

To specify the QAD command:

1. Press the STOP key.
2. Key QAD and the desired parameters (see below) next to COMMAND, and press the ENTER key.

The parameters you can specify give:

- The action (ACTION) to take

  NORMAL
  TRACE STOP (CE-mode only)
  TRACE WRAP (CE-mode only)
  TRACE STOP BOTH (CE-mode only)

- The hardware (TYPE)

  ANY REFERENCE
  DATA STORE
  I/O REFERENCE

- The address (ADDR)
- The conditions (OP and MASK)

  = DATA EQUAL TO MASK
  / DATA NOT EQUAL TO MASK
  & DATA BITS UNDER MASK ALL ONES
  % DATA BITS UNDER MASK ZERO OR MIXED

- The address type (ADDR TYPE)

  VIRTUAL
  REAL

ACTION

The following describes the trace actions you can select:

- NORMAL (QADN)

  Resets all trace actions for the QAD command.

- TRACE STOP (QADT + options)

  Saves the instruction counter value in a trace area if the data at a specific storage location matches the compare conditions specified by you. The processor stops after the trace area is full (contains 470 entries). Press the START key to continue processing.

- TRACE WRAP (QADW + options)

  Saves the instruction counter value in a trace area if the data at a specific storage location matches the compare conditions specified by you. After the trace area is full (contains 470 values), each new address compare writes over the oldest instruction counter value.

- TRACE STOP BOTH (QADX + options)

  Saves the instruction counter value of the targeted processor in a trace area if the data at a specific storage location matches the compare conditions specified by you. Both processors stop after the trace area is full (contains 470 entries). Press the START key to continue processing.

TYPE

You can specify the following types with the QAD command:

- ANY REFERENCE (A)

  This checks the data at a specific storage address (during any storage operation) to see if the conditions you specify are met. If yes, the instruction counter value (up to 470 values) is saved in a trace area.

  Key QADTA, a one- to eight-digit hex address (not ending in 7 or F), the conditions (OP and MASK), and V for Virtual or R for Real next to COMMAND.

  Example: QADTA4FF0=F..E (the periods are used as "do not care" characters).

  Note: Specify V or R only if the present address type is incorrect.

- DATA STORE (D)

  This checks the data at a specific storage address (during a write operation) to see if the conditions you specify are met. If yes, the instruction counter value (up to 470 values) is saved in a trace area.

  Key QADTD, a one- to eight-digit hex address (not ending in 7 or F), the conditions (OP and MASK), and V for Virtual or R for Real next to COMMAND.

  Example: QADTD4FF0=F..E (the periods are used as "do not care" characters).

  Note: Specify V or R only if the present address type is incorrect.

- I/O REFERENCE (I)

  Use I/O Reference only during a data transfer operation. This checks the data at a specific storage address to see if the conditions you specify are met. The address that you specify must be the address of transferred data. If yes, the instruction counter value (up to 470 values) is saved in a trace area. (The address type is always Real.)

  Key QADTI, a one- to eight-digit hex address (not ending in 7 or F), and the conditions (OP and MASK) next to COMMAND.

  Example: QADTI4FF0=F..E (the periods are used as "do not care" characters).

ADDR

The ADDR options are: (For more information on the ADDR options, see "TYPE.")

- One- to eight-digit address (in hex) on a doubleword boundary. Applies to:

  A ANY REFERENCE
  D DATA STORE
  I I/O REFERENCE

OP and MASK

Use OP and MASK to set the condition that causes a data match at address ADDR. You can specify one of four codes together with two bytes of data.

The OP and MASK options are:

- OP = causes a match if the data at address ADDR is the same as the data in the MASK field.
- OP / causes a match if the data at address ADDR is not the same as the data in the MASK field.
- OP & causes a match if each bit that is a one (on) at address ADDR is also a one in the MASK field.
- OP % causes a match if at least one of the bits at address ADDR is the same as a bit in the MASK field.

ADDR TYPE

Use this option to indicate whether the storage address (specified by you) is a virtual or real address.

Specify V or R only if the present address type is incorrect.

Note: When a real address in the **target processor's** prefix register range (4K) is entered the match occurs in the associated absolute address 0 range. When a real address in the **target processor's** address 0 range (4K) is entered, the match occurs on the absolute address specified by the prefix register. In all other cases the real address and associated absolute address have the same value. For more information, see "Absolute Address" on page 113.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QAS) Display Instruction Trace Data

```
*COMPARE/TRACE*            I-COUNTER TRACE DISPLAY                PAGE 0
   CURRENT INSTRUCTION ADDRESS HIGHLIGHTED
   00000001  00000002  00000003  00000004  00000005  00000006  00000007
   00000008  00000009  00000010  00000011  00000012  00000013  00000014
   00000015  00000016  00000017  00000018  00000019  00000020  00000021
   00000022  00000023  00000024  00000025  00000026  00000027  00000028
   00000029  00000030  00000031  00000032  00000033  00000034  00000035

   00000036  00000037  00000038  00000039  00000040  00000041  00000042
   00000043  00000044  00000045  00000046  00000047  00000048  00000049
   00000050  00000051  00000052  00000053  00000054  00000055  00000056
   00000057  00000058  00000059  00000060  00000061  00000062  00000063
   00000064  00000065  00000066  00000067  00000068  00000069  00000070

   00000071  00000072  00000073  00000074  00000075  00000076  00000077
   00000078  00000079  00000080  00000081  00000082  00000083  00000084
   00000085  00000086  00000087  00000088  00000089  00000090  00000091
   00000092  00000093  00000094  00000095  00000096  00000097  00000098
   00000099  00000100  00000101  00000102  00000103  00000104  00000105
COMMAND: QASO                                PUx ==>
```

Use the QAS command to display the I-Counter Trace area. Up to 470 instruction addresses (resulting from the QABT, QABW, QADT, QADW, QAIT or QAIW command) can be displayed on five 105-address pages.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

The instruction trace buffer is updated every time the STOP key is pressed. Addresses are arranged from left to right, top to bottom. The newest address is displayed at the start of page 0 with the oldest at the end of page 4. When the list becomes full, the oldest address is removed from the end of page 4. You can use the PAGE key to go from page to page.

Note: For another way of displaying the last 32 instruction addresses, see "(QVAI) I-Counter Trace" on page 258. (This function operates at machine speed and is always active.)

Selecting the QAS Screen

To select the QAS screen:

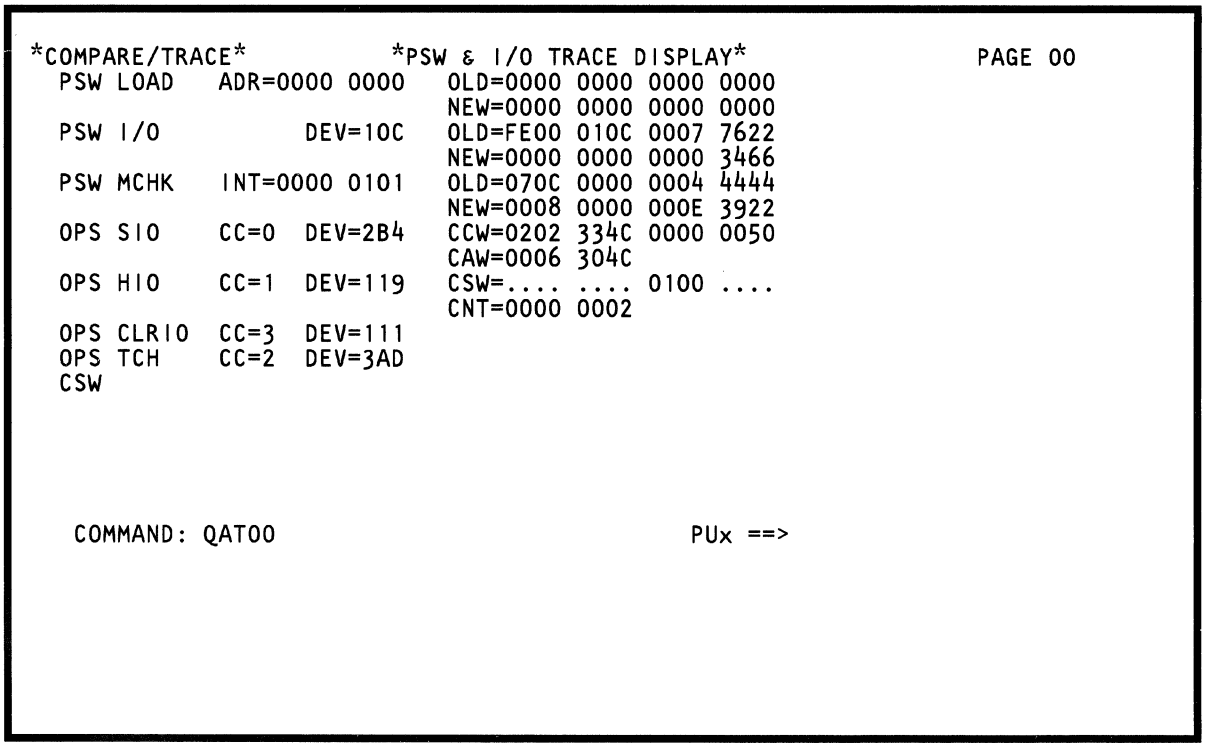
1. Key QAS and a page number (0-4) next to COMMAND (0 is the default).
2. Press the ENTER key.

Clearing the QAS Screen

To clear the QAS screen:

1. Key QASP next to COMMAND.
2. Press the ENTER key.
3. Key P again, and press the ENTER key.

(QAT) Display PSW and I/O Trace Data (S/370 Mode)



The QAT screen displays the traces made with the selections on the QAP screen. You can use the PAGE key with this screen to go from page to page.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Selecting the QAT Screen

To select the QAT screen:

1. Press the STOP key.
2. Key QAT next to COMMAND.
3. Press the ENTER key.

Clearing the QAT Screen

To clear the QAT screen:

1. Key QATP next to COMMAND.
2. Press the ENTER key.
3. Key P again, and press the ENTER key.

Label Identification

ADR: Address of the load PSW instruction.

CAW: Channel address word.

CC: I/O instruction condition code.

CCW: Channel command word.

CLRCH: Clear channel instruction.

CLRIO: Clear I/O instruction.

CNT: Number of times this entry has been repeated consecutively (no other entries occurred).

CSW: Channel status word.

DEV: I/O device address.

EXT: External interrupt.

HDEV: Halt device instruction.

HIO: Halt I/O instruction.

I/O: Input/output.

INT: Interruption code.

MCHK: Machine check.

NEW: PSW after the PSW swap.

OLD: PSW before the PSW swap.

PROG: Program check.

PSW: Program status word.

SIO: Start I/O instruction.

SIOF: Start I/O fast instruction.

TCH: Test channel instruction.

TIO: Test I/O instruction.

VM: VM assist.

(QAT) Display PSW and I/O Trace Data (S/370XA Mode)

```
*COMPARE/TRACE*   RAW TOD  *PSW & I/O TRACE DISPLAY *  YY/MM/DD HH:MM:SS   P. 00
OPS SSCH  CC=2 xxxxxx-yyyy-zzz  SCHID=0007  DEVN=0190  DEVA=90 CNT=0000 0001
OPS MSCH  CC=2 xxxxxx-yyyy-zzz  SCHID=0007  DEVN=0190  DEVA=90 CNT=0000 0001
OPS STSCH CC=0 xxxxxx-yyyy-zzz  SCHID=0007  DEVN=0190  DEVA=90 CNT=0000 0001
                                ISC  =08    LPM =80    POM =FF ELM=80
                                PNOM =00    LPUM=00    PIM =C0 PAM=C0
                                MBI  =0000  INT =FFFF FFFF
                                SCSW =0000 4400 0000 0138 0000 0000
OPS TPI   CC=0 xxxxxx-yyyy-zzz  CNT=0000 0001
                          ESW   =0080 0000 SCSW=0000 4400 0000 0138 0000 0000
PSW LOAD       xxxxxx-yyyy-zzz  LPSW =1111 AAAA OLD =5555 5555 2344 2344
                                                NEW =FFFF FFFF 2342 2342
PSW EXT        xxxxxx-yyyy-zzz  INT  =1111 AAAA OLD =5555 5555 2344 2344
                                                NEW =FFFF FFFF 2342 2342
PSW SVC        xxxxxx-yyyy-zzz  INT  =1111 AAAA OLD =5555 5555 2344 2344
                                                NEW =FFFF FFFF 2342 2342
PSW PROG       xxxxxx-yyyy-zzz  INT  =1111 AAAA OLD =5555 5555 2344 2344
                                                NEW =FFFF FFFF 2342 2342
PSW MCHK       xxxxxx-yyyy-zzz  INT  =1111 AAAA OLD =5555 5555 2344 2344
                                                NEW =FFFF FFFF 2342 2342
 COMMAND: QAT00                                  PUx ==>
```

The QAT screen displays the traces made with the selections on the QAP screen. You can use the PAGE key with this screen to go from page to page.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Selecting the QAT Screen

To select the QAT screen:

1. Press the STOP key.
2. Key QAT next to COMMAND.
3. Press the ENTER key.

Clearing the QAT Screen

To clear the QAT screen:

1. Key QATP next to COMMAND.
2. Press the ENTER key.
3. Key P again, and press the ENTER key.

Label Identification

ADR: Address of the load PSW instruction.

CC: I/O instruction condition code.

CNT: Number of times this entry has been repeated consecutively (no other entries occurred).

CSCH: Clear subchannel instruction.

DEVA: Device address.

DEVN: Device number.

ELM: Abbreviation for ELMMMDTV

E Enable (bit 0)
LM Limited mode (bit 1-2)
MM Measurement mode (bit 3-4)
D Multiple-path mode (bit 5)
T Timer installed (bit 6)
V Valid subchannel (bit 7).

ESW: Extended status word.

EXT: External interrupt instruction.

GPI: Guest program interrupt instruction.

HSCH: Halt subchannel instruction.

I/O: I/O swap instruction.

IN: SIE entry PSW swap instruction.

INT: Interruption code.

ISC: Interruption subclass.

LOAD: Load PSW instruction.

LPM: Logical path mask.

LPUM: Last path used mask.

LPSW: Load PSW instruction.

MBI: Measurement block index.

MCHK: Machine check interrupt instruction.

MSCH: Modify subchannel instruction.

OPS: Operation.

OUT: SIE exit PSW swap instruction.

PAM: Path available mask.

PIM: Path installed mask.

PNOM: Path not operational mask.

POM: Path operational mask.

PROG: Program interrupt instruction.

PSW: Program status word.

RAW TOD: Displays the RAW TOD of the operation (OPS) or program status word (PSW).

Where:

xxxxxx equals bytes 0-2
yyyy equals bytes 3 and 4
zzz equals byte 5 and byte 6, bits 0-3.

RCHP: Reset channel path instruction.

RSCH: Resume subchannel instruction.

SAL: Set address limit instruction.

SCHID: Subchannel ID.

SCHM: Set channel monitor instruction.

SCSW: Subchannel status word.

SSCH: Start subchannel instruction.

STCPS: Store channel path status instruction.

STCRW: Store CRW instruction.

STSCH: Store subchannel instruction.

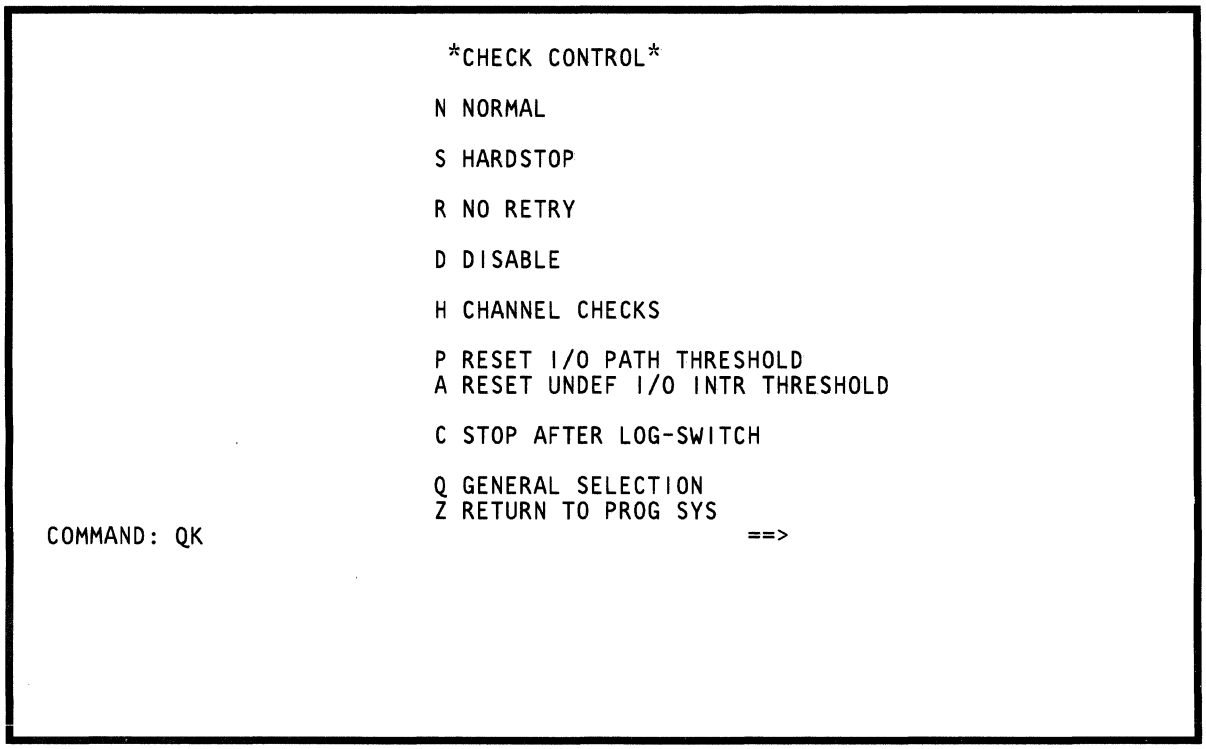
SVC: Supervisor call instruction.

TPI: Test pending interruption instruction.

TSCH: Test subchannel instruction.

YY/MM/DD HH:MM:SS: Shows the year (YY), month (MM), day (DD), hour (HH), minutes (MM), and seconds (SS) of the first operation (OPS) or program status word (PSW) displayed on each screen.

(QK) Check Control Screen



Use this screen to specify the action to be taken by the PU if a machine check occurs. Options D, N, R, and S are mutually exclusive.

Selecting the Check Control Screen

Note: Before selecting a check control option, press the STOP key and then wait approximately 30 seconds before selecting an option (this prevents an I/O error from occurring).

To select the Check Control screen, key QK next to COMMAND, and press the ENTER key.

Selecting a Check Control Option

To select a check control option, key the desired option next to QK, and press the ENTER key (for example, QKS causes a hardstop if a machine check occurs).

Check Control Options

N NORMAL

The processor controls machine check action. This option does not change the H (Channel Checks) or the C (Stop After Log-Switch) settings.

S HARDSTOP

The processor enters the check-stop condition as soon as an error latch is set. No retry is permitted, and no reference code is generated. To start normal operation after a hard stop, key QKN next to COMMAND and press the ENTER key. The processor logs the machine-check condition.

R NO RETRY

PU retry is not permitted when a machine check appears. Logging occurs normally.

D DISABLE

This option prevents the system from entering the check-stop condition by inhibiting the error handling function. It also inhibits clock stop. The PU ignores all conditions that normally cause machine checks and attempts to continue processing without a retry. The clock/timer checks are not set because they affect the TOD clock.

Note: For a stop caused by an irrecoverable error, the processor appears as though it had a QKS hard stop.

H CHANNEL CHECKS

This option causes a machine check (hard stop) if a channel hardware error occurs. Based on the retry setting, a machine check is posted. This option is alternately set and reset each time that you key H next to QK and press the ENTER key.

The following conditions cause a machine check if QKH is active.

- A program check that is detected by the hardware while the hardware is processing data after the CCW has been determined to be correct.
- A protect check that is detected by the hardware while the hardware is processing data after the CCW has been determined to be correct.
- A chaining check that is detected when the hardware gets more data than has been requested during data chaining.
- Bad parity during output that is detected in the 8-byte channel data register after the move from storage.
- Bad parity during output that is detected in the 2-byte channel-out register after the move from the channel data buffer.
- Bad parity during output that is put on the data-out lines after the move from the channel-out register.

P RESET I/O PATH THRESHOLD

This option resets the channel path temporary error threshold. A channel path temporary error occurs when the channel subsystem attempts to service a request from an unidentified device.

A RESET UNDEF I/O INTR THRESHOLD

This option resets the configuration alert temporary error threshold. A configuration alert temporary error occurs when the channel subsystem attempts to service a request from a device that is not assigned to a subchannel.

C STOP AFTER LOG-SWITCH

If programs written for the System/360 are used on the 4381, an error log can overlay either instructions or data. This switch prevents this by stopping the system after logging takes place.

The Stop After Log switch is alternately set and reset each time that you key C next to QK and press the ENTER key.

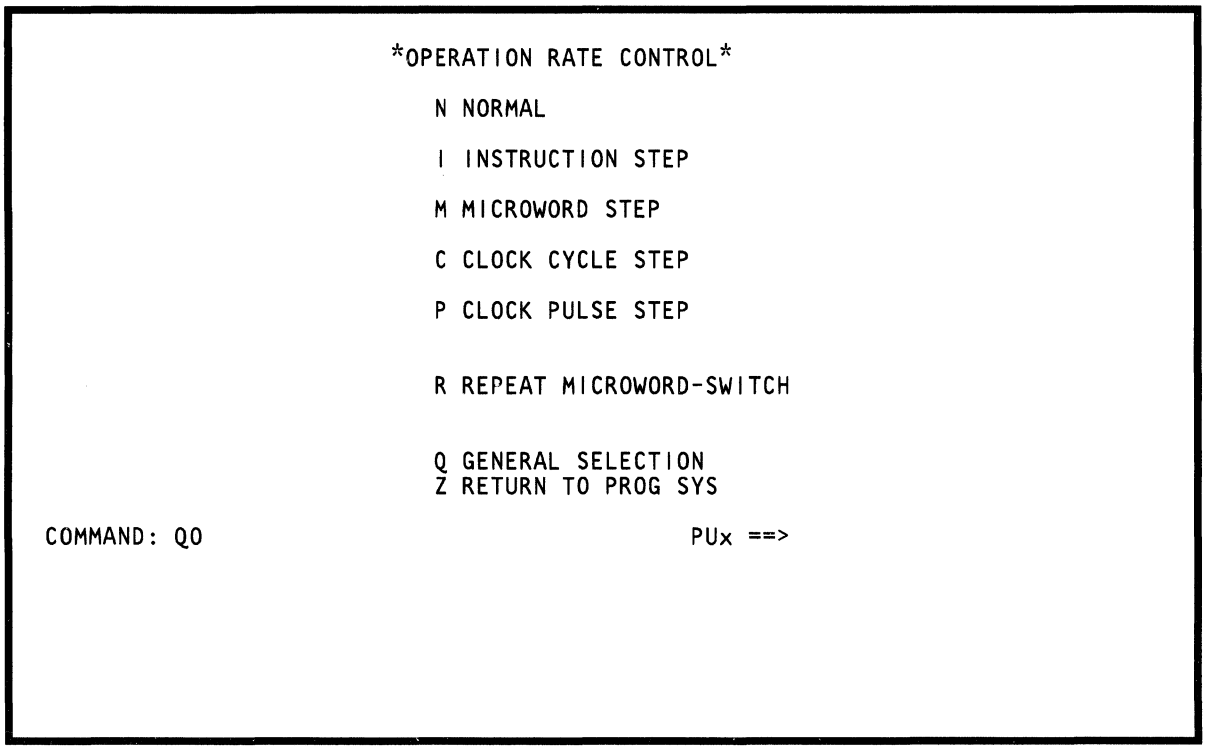
Return to General Selection (Q)

Key Q next to COMMAND, and press ENTER.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press ENTER.

(QO) Operation Rate Control Screen



Use the Operation Rate screen to set the operating rate of the PU.

Note: This function allows both processing units to be selected (see "T TARGET PU-SWITCH" on page 9).

Displaying the Operation Rate Control Screen

To select the QO screen from the General Selection screen, key QO next to COMMAND, and press the ENTER key.

Selecting an Option from the Operation Rate Screen

To select an option from the Operation Rate screen:

1. Key the desired option after QO.
2. Press the ENTER key. Instructions are now run at the selected rate each time the START key is pressed.

Selecting an Option from Any Q Screen:

Key QO and the desired option next to COMMAND, and press the ENTER key (the present screen remains displayed and not changed). For example, QON sets the operation rate to normal for all later processing.

Operation Rate Options

N NORMAL

If you specify N, the PU runs instructions at the normal machine speed.

Note: If one processing unit is selected and the processing units are in microword step (M), clock cycle step (C), or clock pulse step (P); both processing units go to normal (N).

I INSTRUCTION STEP

If you specify I, the PU runs one instruction each time the START key is pressed. The processor gets the waiting interrupts, and then returns to the stopped condition. The STOP key and the I-function instruction stop the processor (no I-step, but the PU clock continues to run). If another function is selected, such as display/alter, it is received, and instruction step remains in effect.

Note: If one processing unit is selected and the processing units are in microword step (M), clock cycle step (C), or clock pulse step (P); the selected processing unit goes to instruction step (I) and the unselected processing unit goes to normal (N).

Changes in data can be seen on the display console as each instruction step is completed.

M MICROWORD STEP

The CE Mode switch must be set to CE Mode to perform this function.

Warning: System operation after QOM is not predictable. Customer data can be lost with this selection.

The PU runs one microword each time the START key is pressed, and then enters the hard-stop condition. If the microword function is selected while the processor is operating at normal speed, the processor completes the present microword (PU clock stopped), and then goes into the hard-stop condition.

Note: The M option affects both processing units. If QOM does not stop the clocks of both processing units, use QOC. If customer data is lost, the message STORAGE ERR - REIPL NEEDED is displayed when the system is started.

You can verify this process with the Insert/Extract function.

Restriction: The microword step function does not operate on a storage word.

C CLOCK CYCLE STEP

The CE Mode switch must be set to CE Mode to perform this function.

Warning: Customer data can be lost with this selection.

The PU runs one clock cycle each time the START key is pressed then enters the hard-stop condition. If the function is selected while the processor is operating at normal speed, the processor completes the present clock cycle, and then goes into the hard-stop condition.

Note: The C option always affects both processing units.

You can verify this process with the Insert/Extract function.

Restriction: The clock-cycle step function does not operate on a storage word.

P CLOCK PULSE STEP

The CE Mode switch must be set to CE Mode to perform this function.

Warning: Customer data can be lost with this selection.

The PU runs one clock pulse each time the START key is pressed, and then enters the hard-stop condition. If the function is selected while the processor is operating at normal speed, the processor clock-cycle stops and then goes into clock pulse step.

Note: The P option always affects both processing units.

You can verify this process with the Insert/Extract function.

Restriction: The clock-pulse step function does not operate on a storage word.

R REPEAT MICROWORD-SWITCH

The CE Mode switch must be set to CE Mode to perform this function.

Warning: Customer data can be lost with this selection.

The PU must be placed in a hard-stop condition before invoking this function.

The PU runs the selected microword repeatedly after the START key is pressed.

A desired microword loop can be selected two ways:

1. Hard-stop on the word before the desired loop word by keying QOR. Set the desired operation rate and continue.

2. Key QVGxxxxx with the address of the desired loop word, and then key QOR. Set the desired operation rate and continue.

You can verify this process with the Insert/Extract function.

Restriction: The repeat microword-switch function does not operate on a storage word.

To reset the R option, key R and press the ENTER key.

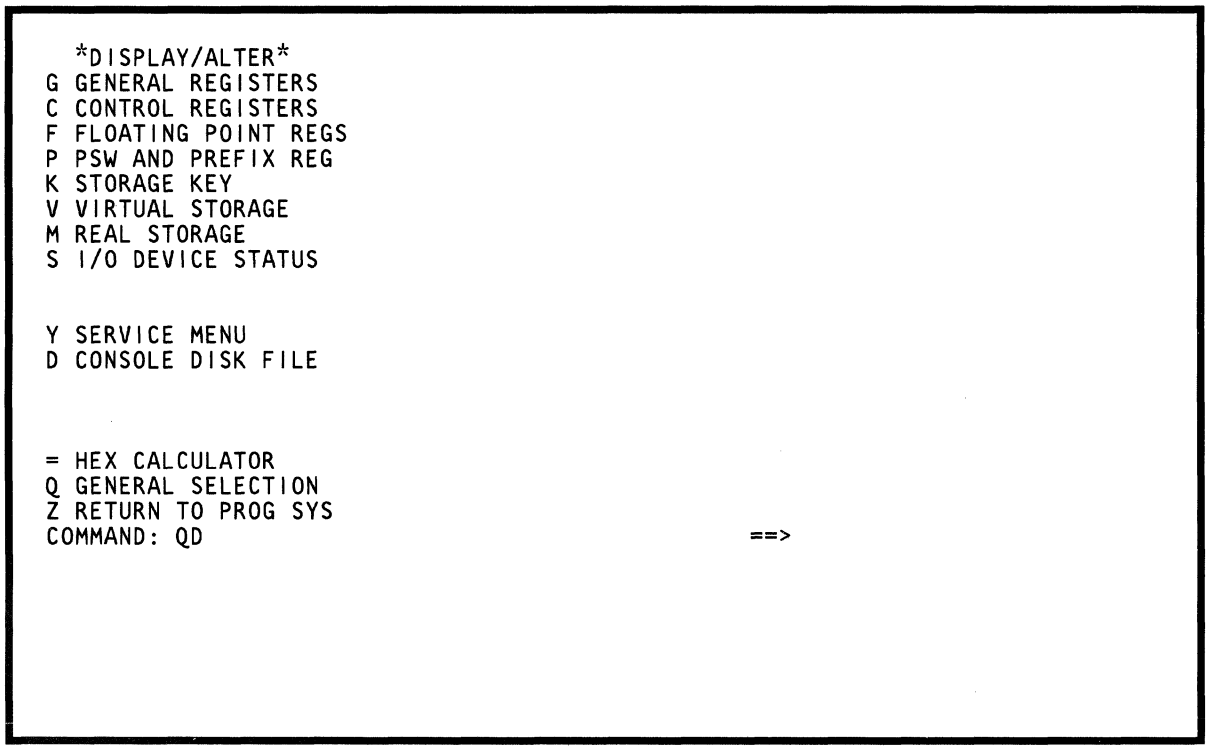
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QD) Display/Alter Screens



Use the Display/Alter screens (QD/QDY) to display, save, and change data.

To display the list of non-CE Display/Alter screens, key QD next to COMMAND, and press the ENTER key.

To display the list of all (CE and non-CE) Display/Alter screens, see "(QDY) Service Menu" on page 176.

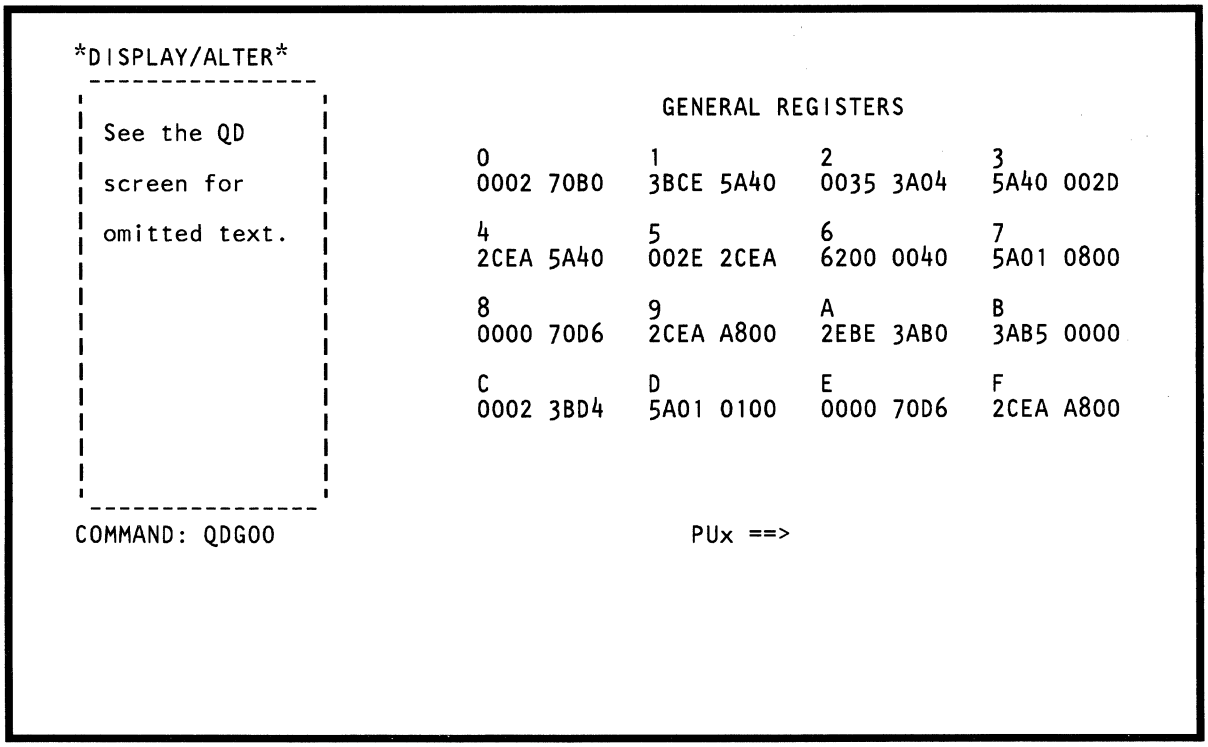
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QDG) General Registers



Use the QDG command to display, change, or save general register data. The data is in hex (to display the data in both hex and EBCDIC format, key QDGT).

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying General Registers

To display the general registers:

1. Key QDG (or QDGT) next to COMMAND.
2. Press the ENTER key. Sixteen general registers of four bytes each are displayed.

Changing General Register Data

To change general register data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC format.

1. Display the general registers (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDG next to COMMAND followed by:
   a. The register number (0 to F)
   b. The byte number (0 to 3)
   c. An op code (=, &, /).
   d. One byte of data (in hex).

      The = (MOVE) op code, moves the data to the specified register location.

      The & (AND) op code, 'ands' the data with the data at the specified register location.

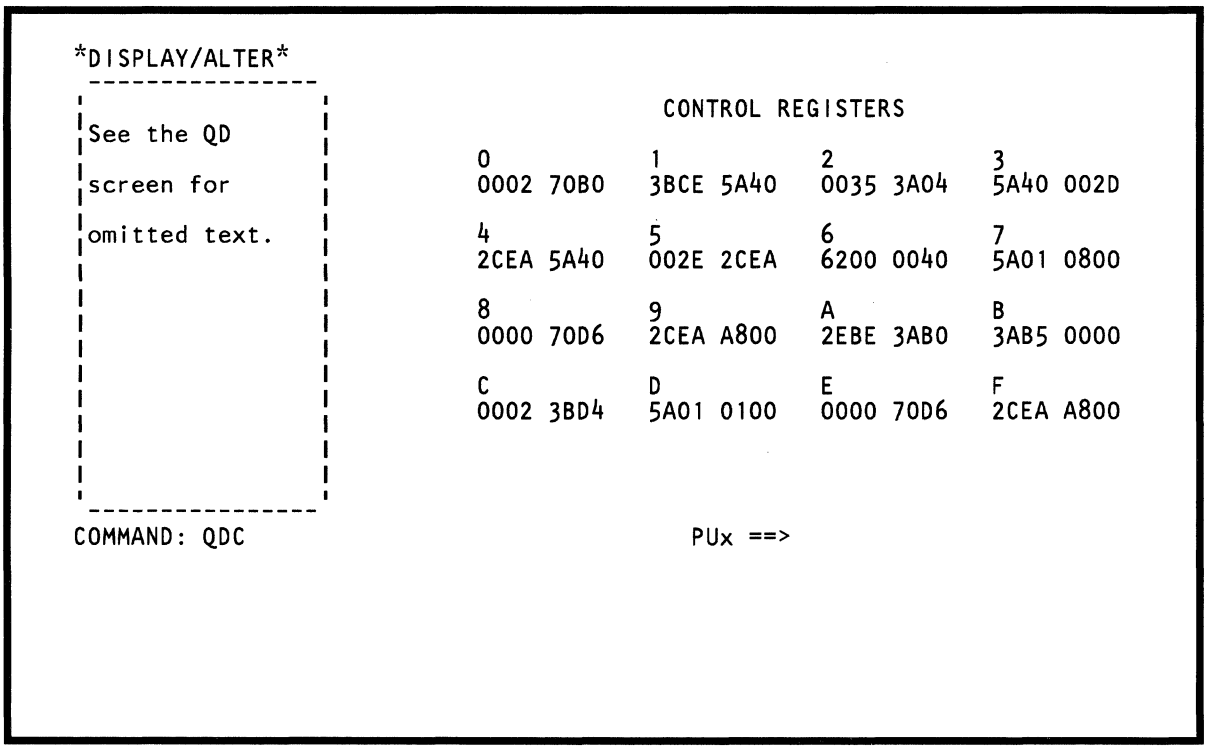
      The / (OR) op code, 'ors' the data with the data at the specified register location.
2. Press the ENTER key.

Using the QDG screen on the preceding page as an example, QDG41=00 changes the second byte of data in register 4 from EA to 00.

Saving General Register Data

To save general register data, key QDGx? in a block (see "Saving Data" on page 313). All four bytes of data in general register x are saved. x represents a Register number (0 to F). The question mark (?) indicates that this is a save operation.

(QDC) Control Registers



Use the QDC command to display, change, or save control register data. The data is in hex (to display the data in both hex and EBCDIC format, key QDCT).

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Control Register Data

To display control register data:

1. Key QDC (or QDCT) next to COMMAND.
2. Press the ENTER key. The data in control registers 0 to F is displayed.

Changing Control Register Data

To change control register data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC format.

1. Display the control registers (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDC next to COMMAND followed by:
   a. The register number (0 to F)
   b. The byte number (0 to 3)
   c. An op code (=, &, /).
   d. One byte of data (in hex).

   The = (MOVE) op code, moves the data to the specified register location.

   The & (AND) op code, 'ands' the data with the data at the specified register location.

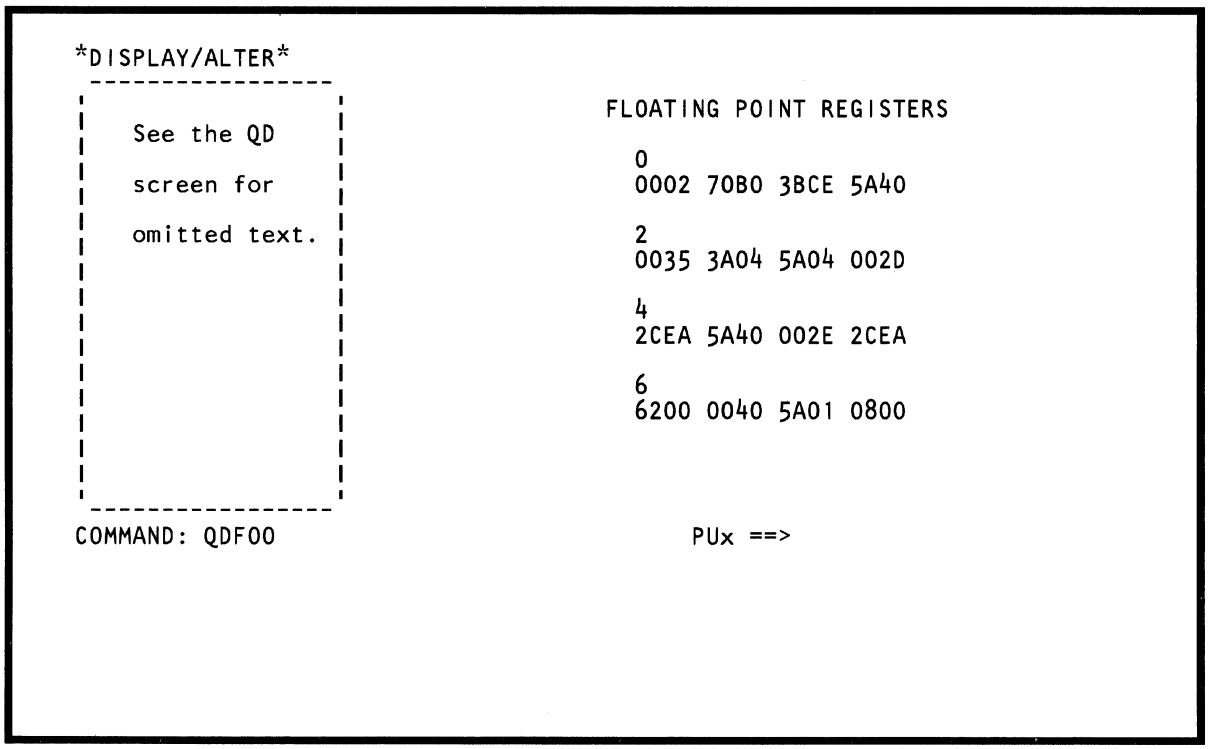
   The / (OR) op code, 'ors' the data with the data at the specified register location.
2. Press the ENTER key.

Using the QDC screen on the preceding page as an example, QDC41=00 changes the second byte of data in register 4 from EA to 00.

Saving Control Register Data

To save control register data, key QDCx? in a block (see "Saving Data" on page 313). All four bytes of data in control register x are saved. x represents a register number (0 to F). The question mark (?) indicates that this is a save operation.

(QDF) Floating-Point Registers



Use the QDF command to display, change, and save floating-point register data. The data is in hex (to display the data in both hex and EBCDIC format, key QDFT).

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Floating-Point Register Data

To display floating-point register data:

1. Key QDF (or QDFT) next to COMMAND.
2. Press the ENTER key. Four floating-point registers of eight bytes each are displayed.

Changing Floating-Point Register Data

To change floating-point register data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC format.

1. Display the floating-point registers (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDF next to COMMAND followed by:
   a. The register number (0, 2, 4, or 6)
   b. The byte number (0 to 7)
   c. An op code (=, &, /).
   d. One byte of data (in hex).

   The = (MOVE) op code, moves the data to the specified register location.

   The & (AND) op code, 'ands' the data with the data at the specified register location.

   The / (OR) op code, 'ors' the data with the data at the specified register location.
2. Press the ENTER key.

Using the QDF screen on the preceding page as an example, QDF41=00 changes the second byte of data in register 4 from EA to 00.

Saving Floating-Point Register Data

To save floating-point register data, key QDFx? in a block (see "Saving Data" on page 313). All eight bytes of data in floating point register x are saved. x represents a register number (0, 2, 4, or 6). The question mark (?) indicates that this is a save operation.

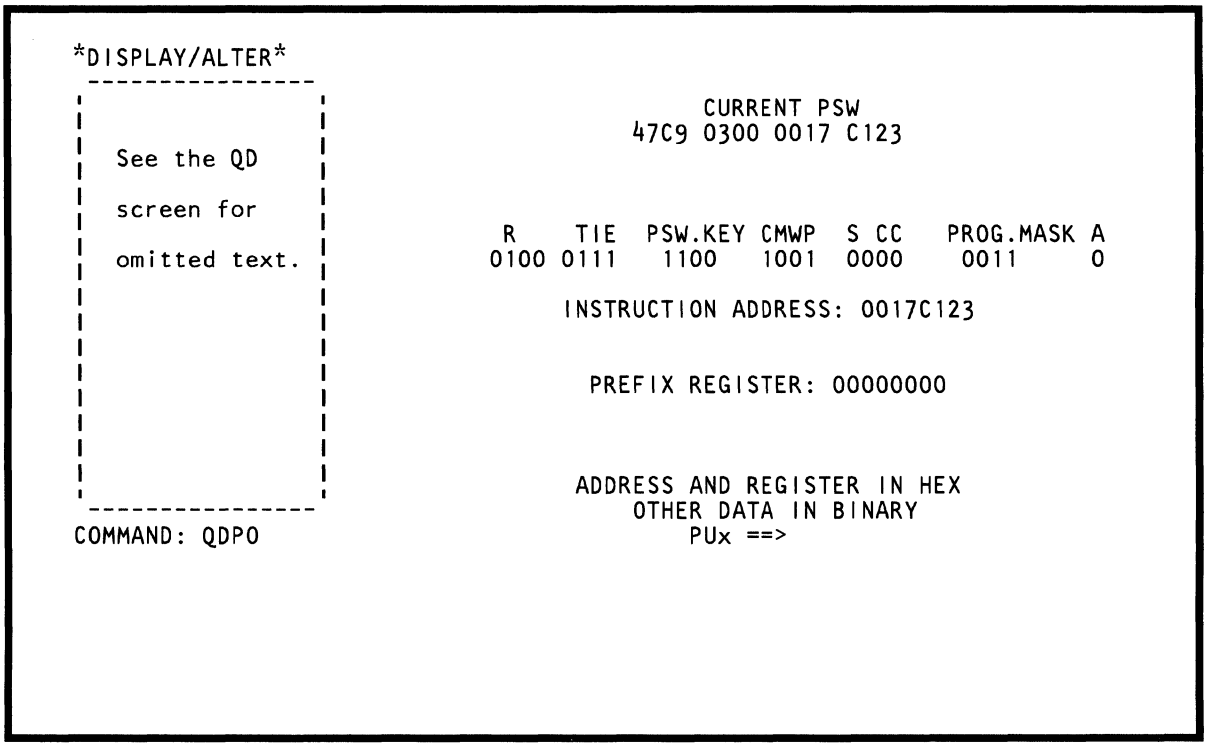
(QDP) Current PSW

```
*DISPLAY/ALTER*
 ----------------
|                |
|  See the QD    |
|                |
|  screen for    |
|                |
|  omitted text. |
|                |
|                |
|                |
|                |
|                |
|                |
|                |
 ----------------
COMMAND: QDPO
```

```
                        CURRENT PSW
                    D7C1 0000 2317 C123

BC: CHNLMSK.E
EC:  R    TIE  PSW.KEY CMWP  ILC CC   PROG.MASK
    1101 0111   1100   0001  00  10    0011


          INSTRUCTION ADDRESS: 0017C123


            PREFIX REGISTER: 00000000


          ADDRESS AND REGISTER IN HEX
              OTHER DATA IN BINARY
                  PUx ==>
```

```
*DISPLAY/ALTER*
 ----------------
|                |
|  See the QD    |
|                |
|  screen for    |
|                |
|  omitted text. |
|                |
|                |
|                |
|                |
|                |
|                |
|                |
 ----------------
COMMAND: QDPO
```

```
                        CURRENT PSW
                    47C9 0300 0017 C123

BC: CHNLMSK.E
EC:  R    TIE  PSW.KEY CMWP  S CC   PROG.MASK
    0100 0111   1100   1001  0000    0011


          INSTRUCTION ADDRESS: 0017C123


            PREFIX REGISTER: 00000000


          ADDRESS AND REGISTER IN HEX
              OTHER DATA IN BINARY
                  PUx ==>
```


DISPLAY/ALTER
See the QD
screen for
omitted text.
COMMAND: QDPO
CURRENT PSW
47C9 0300 0017 C123
R TIE PSW.KEY CMWP S CC PROG.MASK A
0100 0111 1100 1001 0000 0011 0
INSTRUCTION ADDRESS: 0017C123
PREFIX REGISTER: 00000000
ADDRESS AND REGISTER IN HEX
OTHER DATA IN BINARY
PUx ==>

Use the QDP command to display, change, and save current PSW and prefix register data.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying the Current PSW and Prefix Register

To display the current PSW and prefix register:

1. Key QDP next to COMMAND.
2. Press the ENTER key.

   The eight byte current PSW and prefix register are displayed. Note that the first three bytes of the PSW are displayed in binary and the instruction address and prefix register are displayed in hex.

Changing Current PSW Data

To change current PSW data, use either of the following methods:

Method 1:

Note: Do not use this method to change the "A" field (applies to 370XA mode); instead, use Method 2 below.

1. Display the current PSW (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (the instruction address is in hex; the other data is in binary).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDP next to COMMAND followed by:

   a. The PSW byte number (0 to 7). (The default is 0.)

   b. An op code (=, &, /).

   c. Up to eight bytes of data in hex (the length depends on the value of the PSW byte number you specified).

      The = (MOVE) op code, moves the data to the specified PSW byte number.

      The & (AND) op code, 'ands' the data with the data at the specified PSW byte number.

      The / (OR) op code, 'ors' the data with the data at the specified PSW byte number.

2. Press the ENTER key.

Using the QDP screen on the preceding page as an example, QDP6=8A00 changes the sixth and seventh PSW bytes (zero origin) from C123 to 8A00.

Changing Prefix Register Data

Use method 1 under "Changing Current PSW Data" or do the following:

1. Key QDPX next to COMMAND followed by:

   a. An op code (=, &, /).

   b. A one to four-byte address in hex (the value must be less that the ACB value). If you specify less than four bytes, the address is padded to the left with zeros.

      The = (MOVE) op code, moves the data to the specified Prefix Register byte number.

      The & (AND) op code, 'ands' the data with the data at the specified Prefix Register byte number.

      The / (OR) op code, 'ors' the data with the data at the specified Prefix Register byte number.

2. Press the ENTER key.

Saving Current PSW Data

To save the current PSW data, key QDP? in a block (see "Saving Data" on page 313). The question mark (?) indicates that this is a save operation.

Saving Prefix Register Data

To save the prefix register data, key QDPX? in a block (see "Saving Data" on page 313). The question mark (?) indicates that this is a save operation.

Label Identification

A: Addressing mode bit.

C: EC/BC mode. EC mode if 1; BC mode if 0.

CC: Condition code.

CHNLMSK: Channel mask.

E: External mask.

I: I/O mask.

ILC: Instruction length code.

M: Machine check mask.

P: Problem/supervisor state. Problem state if 1; supervisor state if 0.

PROG.MASK: Program mask.

PSW.KEY: Protect key.

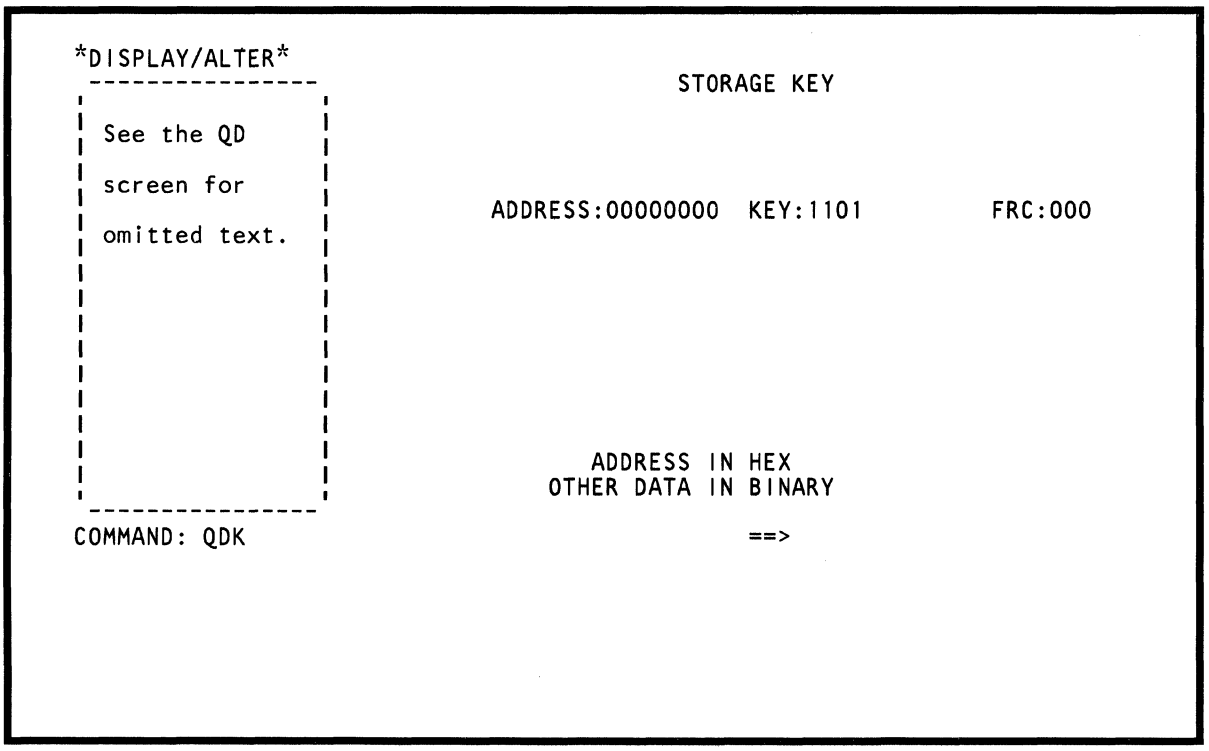
R: PER mask.

S: Address space control.

T: Translation mode.

W: Wait/running state. Wait state if 1; supervisor state if 0.

(QDK) Storage Key



Use the QDK command to display, change, and save storage key data. The storage key data is in binary format; the address is in hex.

Note: The QDK function stops both processing units regardless of targeting.

Displaying the Storage Key

To display the storage key:

1. Key QDK and up to an eight-digit address next to COMMAND. The address value can be from 0 to one less than the Address Check Boundary (ACB). The default is 0.
2. Press the ENTER key.

   Use the PAGE key to display key data for the other storage addresses (on a 2K boundary for S/370 mode and a 4K boundary for S/370XA mode).

Changing Storage Key Data

To change storage key data, use either of the following methods:

Method 1:

1. Display the storage key (as described on this page).
2. Place the cursor under the location(s) to be changed, and key the new key data (in binary).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDK next to COMMAND followed by:

   a. A valid address value. The default is 0.

   b. An op code (=, &, /).

   c. Up to seven bits of key data.

      Bits 0-3 = Key field
      Bit 4 = Fetch protect bit
      Bit 5 = Reference bit
      Bit 6 = Change bit

      The = (MOVE) op code, moves the bit data to the specified storage location.

      The & (AND) op code, 'ands' the bit data with the data at the specified storage location.

      The / (OR) op code, 'ors' the bit data with the data at the specified storage location.

2. Press the ENTER key.

Using the QDK screen on the preceding page as an example, QDK=1100 changes the key field in address 0 from 1101 to 1100.

Saving Storage Key Data

To save storage key data, key QDKxxxxxxxx? in a block (see "Saving Data" on page 313). xxxxxxxx represents the storage address value. The question mark (?) indicates that this is a save operation.

Label Identification

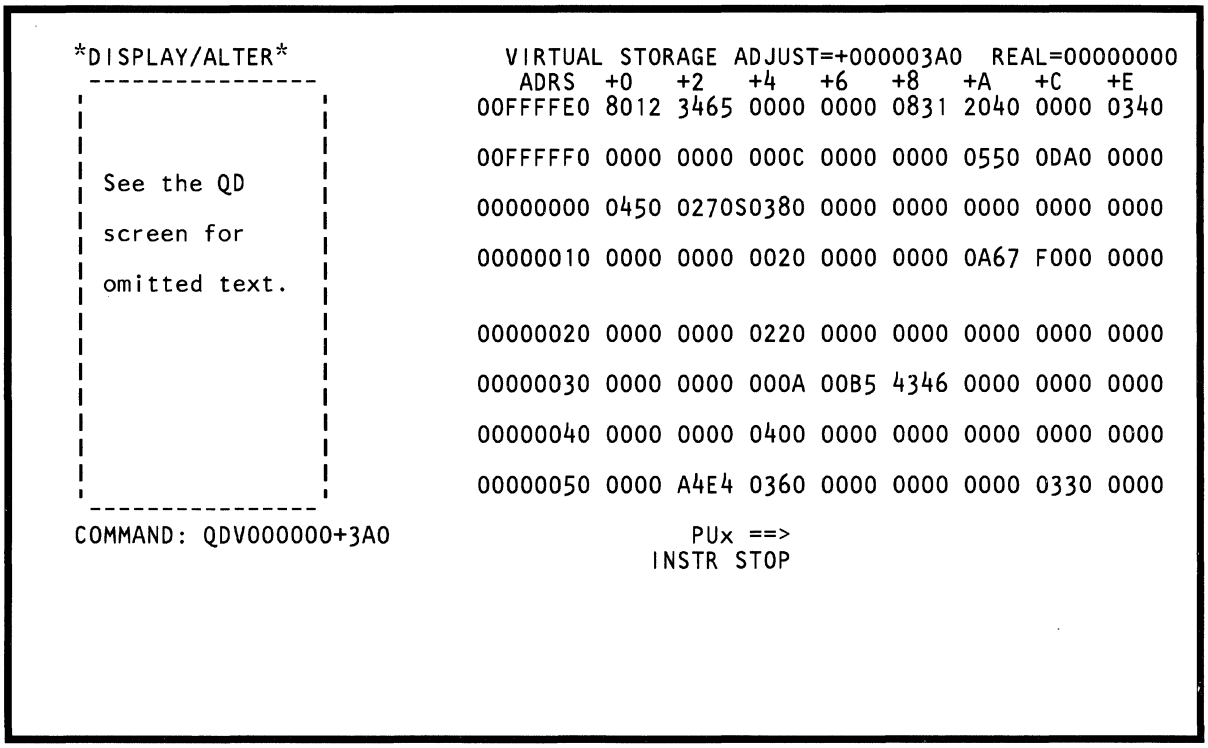
C: Change bit.

F: Fetch protect bit.

KEY: Key field bits.

R: Reference bit.

(QDV) Virtual Storage



Use the QDV command to display, change, and save virtual storage data (this function requires valid translation tables in storage). The data is in hex.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Virtual Storage

To display virtual storage:

1. Key QDV and up to an eight-digit address next to COMMAND (the selected virtual page must be in real storage). The address value is 0 to 7FFFFFFF. (The default is 0.)

2. Press the ENTER key. This displays a 128-byte block of hex data. To display the data in both hex and EBCDIC, add T to the end of the command (for example, QDV900T).

   Two intensified dots are under the address you specified (only one dot appears with the translate option).

   Use the PAGE key to display the next 128-bytes of data.

Note: You have the option of using a hex constant (ADJUST= value) to calculate an address value. This adjust value remains available to you until you change it or you leave the display/alter screen. See "(QDM) Real Storage" on page 170 for a screen example.

You can specify an adjust value by keying a:

- + (plus) and an adjust value after the QDV command. This adds the adjust value to the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).

- - (minus) and an adjust value after the QDV command. This subtracts the adjust value from the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).

Note that it is possible to get twos-complement negative numbers in the ADRS column because the ADRS column is changed to match the data and the given address.

Changing Virtual Storage Data

To change virtual storage data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC.

1. Display virtual storage (see above).

2. Place the cursor under the location(s) to be changed, and key the new data (in hex).

3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDV next to COMMAND followed by:

   a. An address (0 to 7FFFFFFF). (The default is 0.)
   b. An op code (=, &, /).
   c. Up to eight bytes of data (in hex).: The = (MOVE) op code, moves the data to the specified address location.

      The & (AND) op code, 'ands' the data with the data at the specified address location.

      The / (OR) op code, 'ors' the data with the data at the specified address location.

2. Press the ENTER key.

Using the QDV screen on the preceding page as an example, QDV000050=F1F2F3F4 changes data at address 000050 from 0000A4E4 to F1F2F3F4.

Saving Virtual Storage Data

To save virtual storage data, key QDVxxxxxxxx? in a block (see "Saving Data" on page 313). Eight bytes of data starting at address xxxxxxxx are saved. xxxxxxxx represents the address number (0 to 7FFFFFFF). The question mark (?) indicates that this is a save operation.

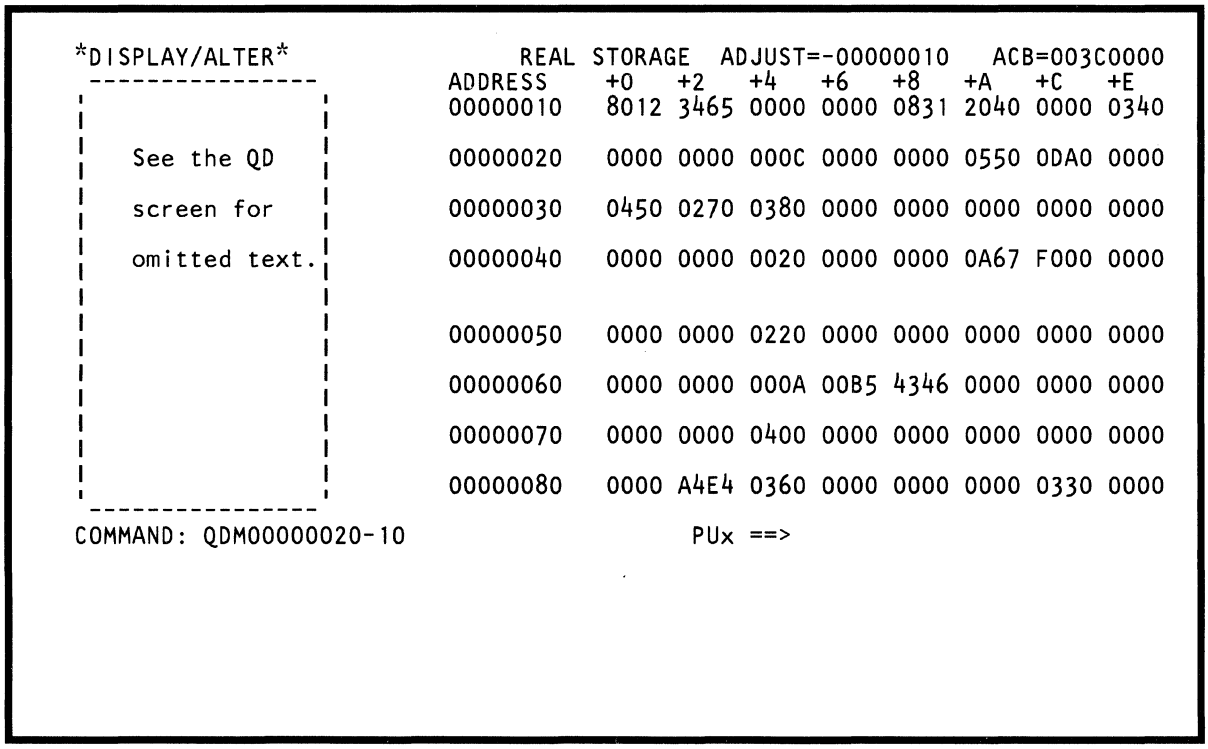
Label Identification

ADJUST: Address adjust value.

ADRS: Storage address.

REAL: Real address equivalent of the virtual address.

(QDM) Real Storage



Use the QDM command to display, change, and save real storage data. The data is in hex.

Note: The QDM function stops both processing units regardless of targeting.

Displaying Real Storage

To display real storage:

1. Key QDM and up to an eight-digit address next to COMMAND. The address value is 0 to one less than the size of real storage. The default is 0.

   When a real address in the **target processor's** prefix register range (4K) is entered, the associated absolute address 0 range is displayed. When a real address in the **target processor's** address 0 range (4K) is entered, the absolute address specified by the prefix register is displayed. In all other cases the real address and associated absolute address have the same value. For more information, see "Absolute Address" on page 113.

2. Press the ENTER key. This displays a 128-byte block of hex data. To display the data in both hex and EBCDIC, add T to the end of the command (for example, QDM900T).

   Two intensified dots are under the address you specified. (Only one dot appears with the translate option.)

   Use the PAGE key to display the next 128-bytes of data.

Note: You have the option of using a hex constant (ADJUST= value) to calculate an address value. This adjust value remains available to you until you change it or you leave the Display/Alter screen. See "(QDM) Real Storage" on page 170 for a screen example.

You can specify an adjust value by keying a:

- + (plus) and an adjust value after the QDM command. This adds the adjust value to the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).
- - (minus) and an adjust value after the QDM command. This subtracts the adjust value from the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).

Note that it is possible to get twos-complement negative numbers in the ADDRESS column because the ADDRESS column is changed to match the data and the given address.

Changing Real Storage Data

To change real storage data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC.

1. Display real storage (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDM next to COMMAND followed by:

   a. A valid address. The default is 0.
   b. An op code (=, &, /).
   c. Up to eight bytes of data (in hex).: The = (MOVE) op code, moves the data to the specified address location.

      The & (AND) op code, 'ands' the data with the data at the specified address location.

      The / (OR) op code, 'ors' the data with the data at the specified address location.

2. Press the ENTER key.

Using the QDM screen on the preceding page as an example, QDM000080=F1F2F3F4 changes data at address 000080 from 0000A4E4 to F1F2F3F4.

Saving Real Storage Data

To save real storage data, key QDMxxxxxxxx? in a block (see "Saving Data" on page 313). Eight bytes of data starting at address xxxxxxxx are saved. xxxxxxxx represents the address value. The question mark (?) indicates that this is a save operation.

Label Identification

ADJUST: Address adjust value.

ACB: Address check boundary.

ADDRESS: Storage address.

(QDS) I/O Device Status

```
*DISPLAY/ALTER*                *I/O DEVICE STATUS*                    SAMPLES=03
 ----------------              CUU STATUS  CUU STATUS  CUU STATUS  CUU STATUS
|                |             033 CE/DE   150    DE   18E CE/DE   230 CE/DE
|                |             33C    DE   344 CE/DE   4E1 CE/DE
|  See the QD    |
|                |
|  screen for    |
|                |
|  omitted text. |
|                |
|                |
|                
```

Use the QDS command if you suspect that a device(s) is hung, that is, channel end (CE) or device end (DE) was never indicated for the device(s).

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Each time you press the ENTER key, the QDS screen displays an updated CE/DE status for all devices now operating. If a device's status does not change (from the first display of the QDS screen), that device is intensified on the screen.

If you identify a problem device(s) with the QDS command, do a full I/O trace on it to diagnose the problem more reliably. See "(QAP) PSW and I/O Trace (S/370 Mode)" on page 116.

Notes:

1. For command-chained operations, channel end (CE) is displayed on the screen until CE is received for the last command in the chain.
2. Device end (DE) status for devices with shared subchannels cannot be determined.
3. CE and DE indications are not predictable during HIO and CLRIO instructions.
4. A maximum of 60 devices is displayed.

Displaying the I/O Device Status Screen

To display the I/O Device Status screen:

1. Key QDS next to COMMAND.

   To display the status of a specific channel only, key QDS and the channel number next to COMMAND (for example, QDS3). To start the display at a specific device (S/370 mode only), key the number of the first device to be checked next to the channel (for example, QDS345).

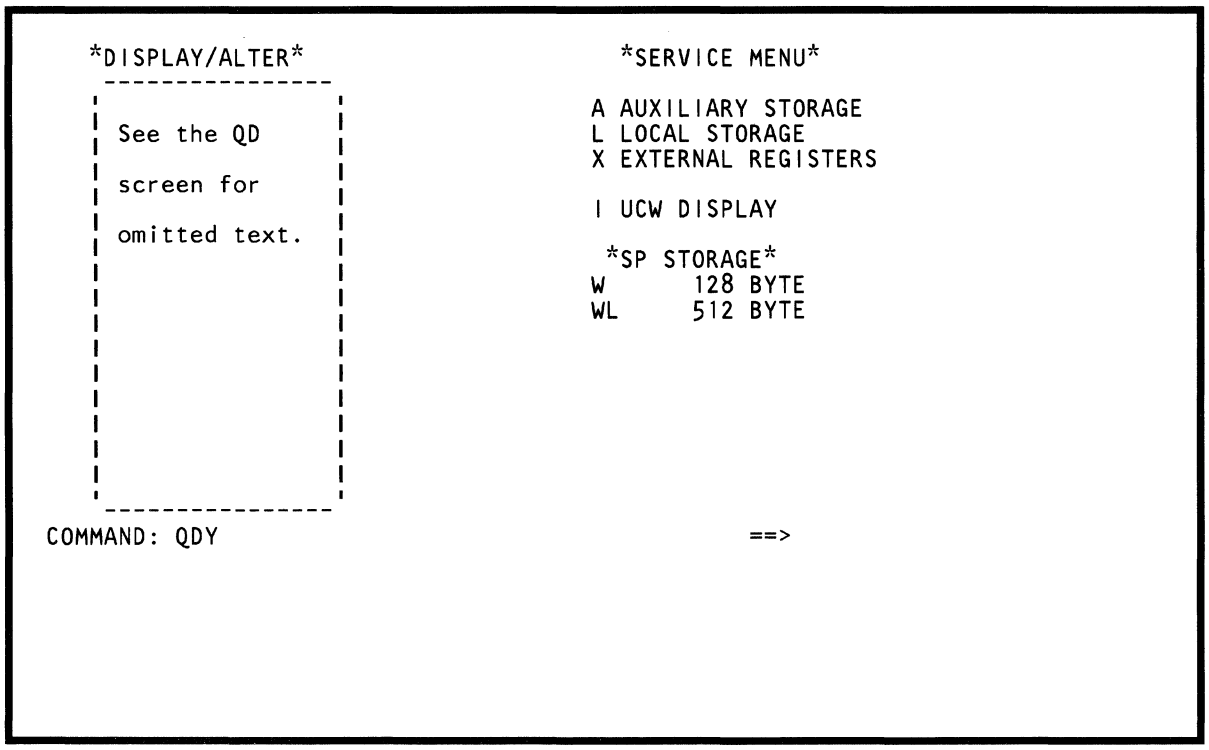
2. Press the ENTER key. Each time you press the ENTER key an updated I/O Device Status screen is displayed.

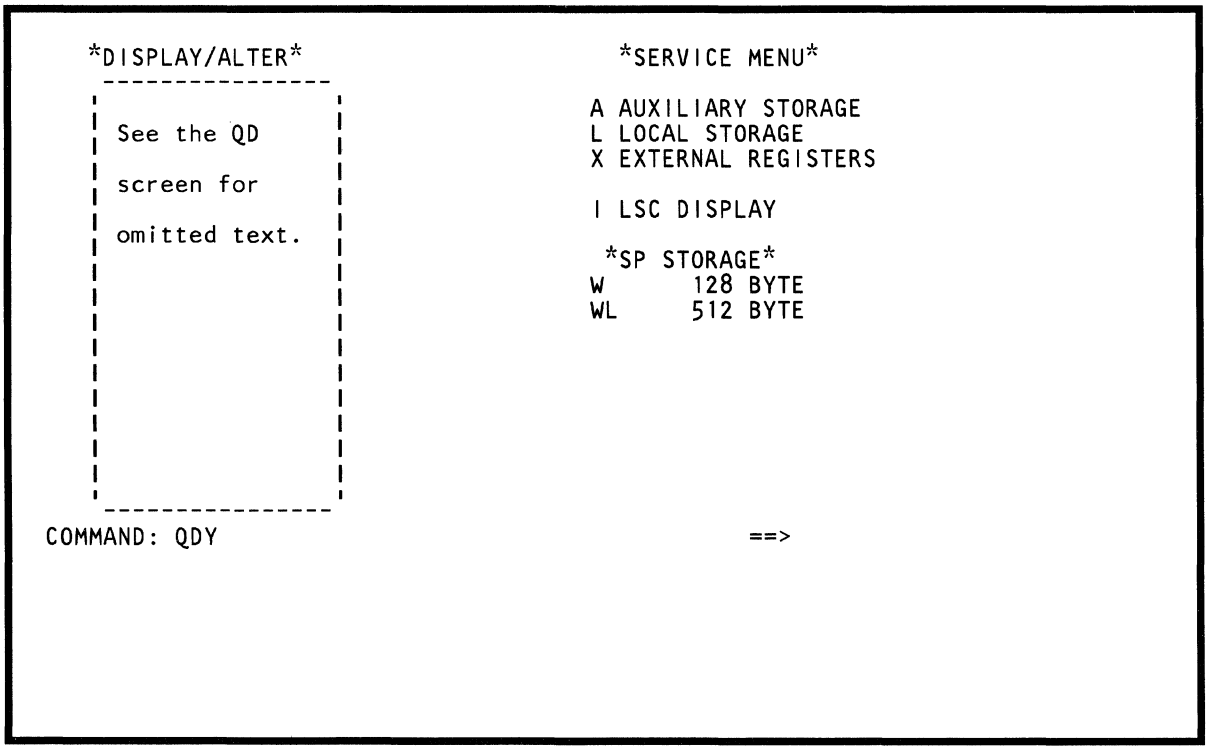
Resetting the I/O Device Status Screen

To reset the I/O Device Status screen:

1. Key QDSR next to COMMAND, and press the ENTER key.
2. Key R next to QDS, and press the ENTER key again. The preceding I/O device status count is cleared, and a new sample is taken.

(QDY) Service Menu





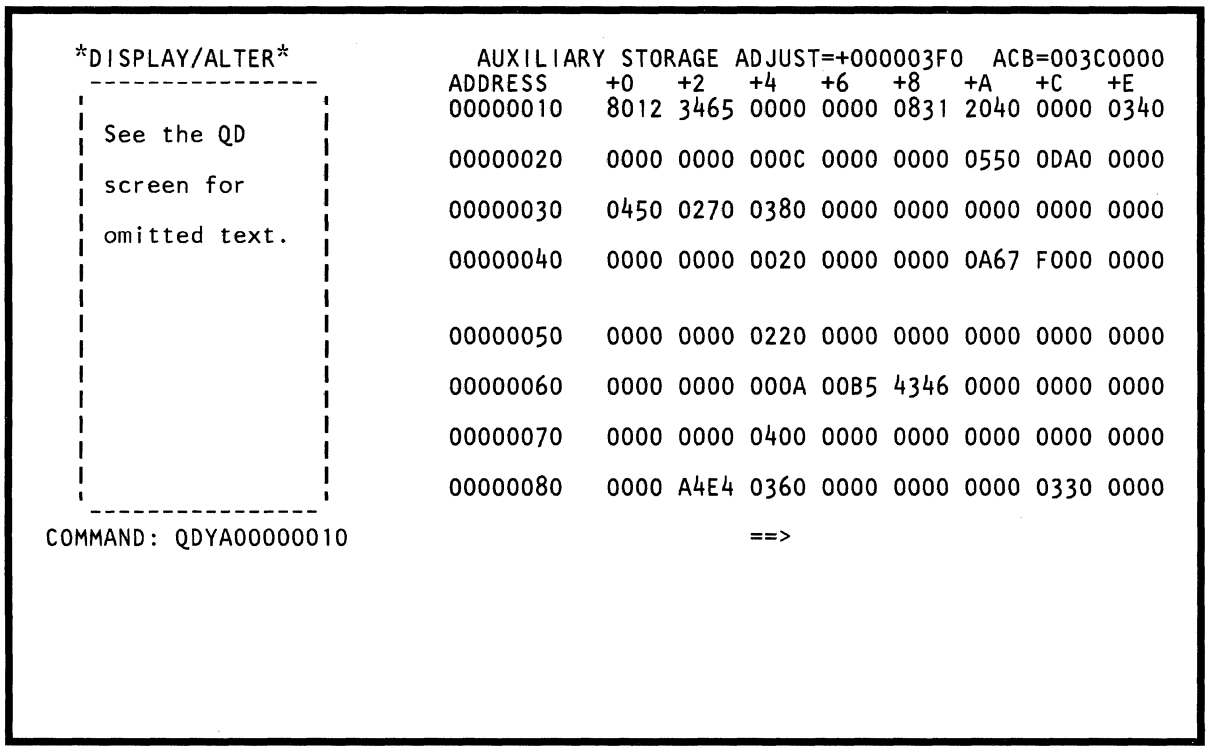
Use the Display/Alter screens (QD/QDY) to display, save, and change data.

To display the list of all (CE and non-CE) Display/Alter screens:

1. Set the CE Mode switch to CE Mode.
2. Key QDY next to COMMAND, and press the ENTER key.

To display the list of non-CE Display/Alter screens, see "(QD) Display/Alter Screens" on page 154.

(QDYA) Auxiliary Storage



Use the QDYA command to display, change, and save auxiliary storage data. The data is in hex.

Note: The QDYA function stops both processing units regardless of targeting.

Displaying Auxiliary Storage

To display auxiliary storage:

1. Set the CE Mode switch to CE Mode.
2. Key QDYA and up to an eight-digit address next to COMMAND. The address value is 0 to one less than the main storage size minus the Address Check Boundary (ACB) size. The default is 0.
3. Press the ENTER key. This displays a 128-byte block of hex data. To display the data in both hex and EBCDIC, add T to the end of the command (for example, QDYA900T). Use the PAGE key to display the next 128-bytes of data.

   Two intensified dots are under the address you specified (only one dot appears with the translate option).

Note: You have the option of using a hex constant (ADJUST= value) to calculate an address value. This adjust value remains available to you until you change it or you leave the Display/Alter screen. See "(QDM) Real Storage" on page 170 for a screen example.

You can specify an adjust value by keying a:

- + (plus) and an adjust value after the QDYA command. This adds the adjust value to the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).
- - (minus) and an adjust value after the QDYA command. This subtracts the adjust value from the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).

Note that it is possible to get twos-complement negative numbers in the ADDRESS column because the ADDRESS column is changed to match the data and the given address.

Changing Auxiliary Storage Data

To change auxiliary storage data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC.

1. Display the auxiliary storage (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Key QDYA next to COMMAND followed by:

   a. A valid address. The default is 0.
   b. An op code (=, &, /).
   c. Data. You can use the entire COMMAND line for data (do not move across the 128-byte boundary).: The = (MOVE) op code, moves the data to the specified address location.

      The & (AND) op code, 'ands' the data with the data at the specified address location.

      The / (OR) op code, 'ors' the data with the data at the specified address location.

2. Press the ENTER key.

Using the QDYA screen on the preceding page as an example, QDYA00000080=F1F2F3F4 changes data at address 00000080 from 0000A4E4 to F1F2F3F4.

Saving Auxiliary Storage Data

To save auxiliary storage data, key QDYAxxxxxxxx? in a block (see "Saving Data" on page 313). Eight bytes of data starting at address xxxxxxxx are saved. xxxxxxxx represents the address value. The question mark (?) indicates that this is a save operation.

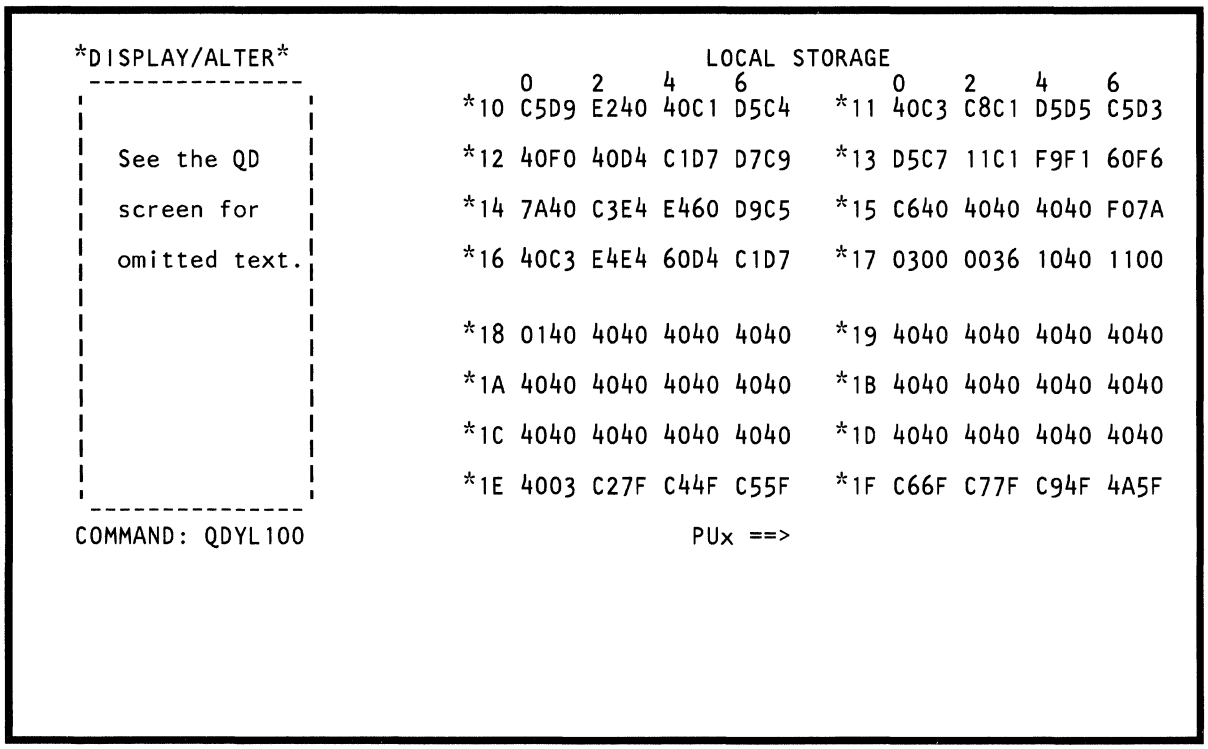
Label Identification

ADJUST: Address adjust value.

ACB: Address check boundary.

ADDRESS: Storage address.

(QDYL) Local Storage



Use the QDYL command to display, change, and save local storage data. The data is in hex.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Local Storage Data

To display local storage data:

1. Set the CE Mode switch to CE Mode.
2. Key QDYL and a three-digit device address (000-FF7) next to COMMAND. (The default is 0.)
3. Press the ENTER key. This displays a 128-byte block of local storage data in hex. To display the data in both hex and EBCDIC, add T to the end of the command (for example, QDYL100T).

   Two intensified dots are under the address you specified (only one dot appears with the translate option).

   Use the PAGE key to display the next 128-bytes of data.

Changing Local Storage Data

To change local storage data, use either of the following methods:

Method 1:

Note: You cannot use this method if the data is displayed in both hex and EBCDIC.

1. Display the local storage (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Set the CE Mode switch to CE Mode.
2. Key QDYL next to COMMAND followed by:

   a. A three-digit device address (000-FF7). (The default is 0.)

   b. An op code (=, &, /).

   c. Eight bytes of data (in hex).

      The = (MOVE) op code, moves the data to the specified register location.

      The & (AND) op code, 'ands' the data with the data at the specified register location.

      The / (OR) op code, 'ors' the data with the data at the specified register location.

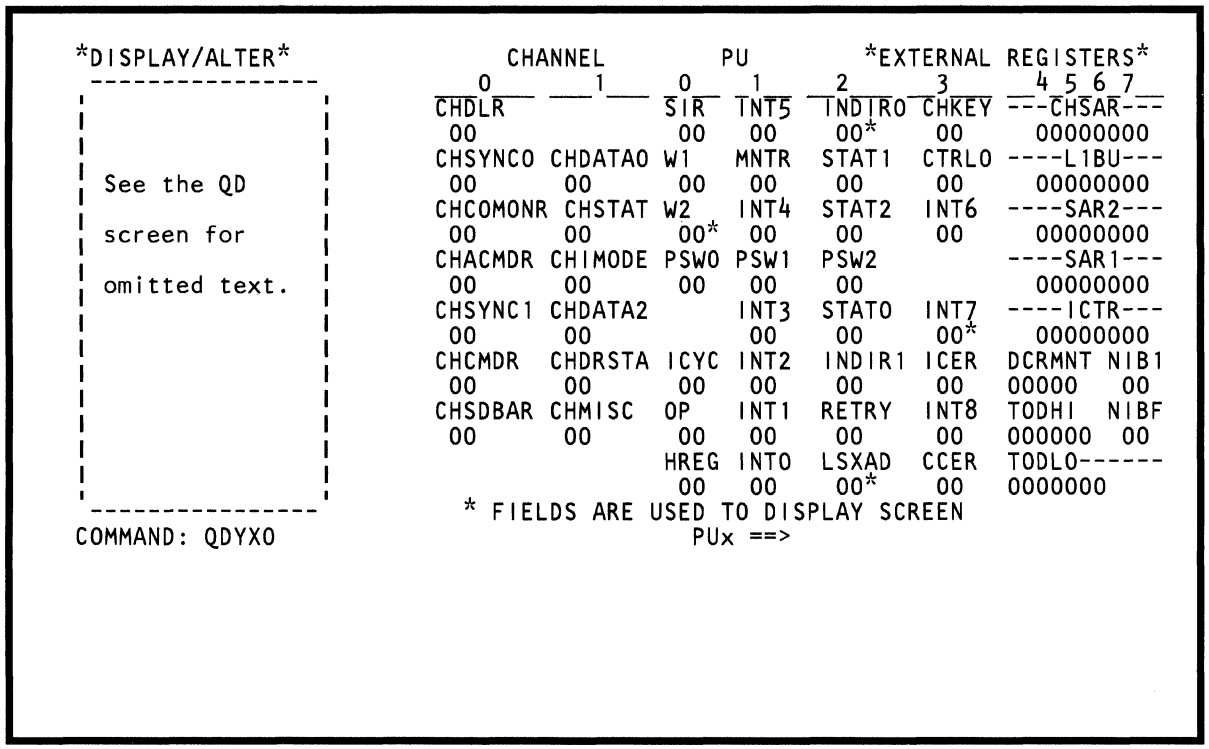
3. Press the ENTER key.

Using the QDYL screen on the preceding page as an example, QDYL160=4000 changes the second byte of data in local storage address 160 from C3 to 00.

Saving Local Storage Data

To save local storage data, key QDYLxxx? in a block (see "Saving Data" on page 313). Eight bytes of data starting at xxx are saved. xxx represents a local storage address (000 to FF7). The question mark (?) indicates that this is a save operation.

(QDYX) External Registers



Use the QDYX command to display external register data. The data is in hex.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying External Registers

To display external registers:

1. Set the CE Mode switch to CE Mode.
2. Key QDYX and a one-digit channel address (0-8) next to COMMAND. (The default is 0.)
3. Press the ENTER key. This displays a 64-byte block of data that contains the address you selected.

   Use the PAGE key to display the next 64 bytes of data.

Label Identification

CCER: Cache control external register. X'00' indicates 4K or 16K cache; X'80' indicates 8K or 32K cache.

CHACMDR: One-byte command from the channel asynchronous command register to the channel (external address is 3,0).

CHCMDR: Channel command register (external address is 5,0).

CHCOMONR: This byte contains the channel control bits in the common register (external address is 2,0). The bit meanings are:

0 S/370 mode
1 Can read other externals
2 LCA meter in
3 Microword channel control check
4 Storage busy
5 Valid TIC (transfer-in-channel)
6 Valid command chain CCW
7 Valid chain data CCW.

CHDATA0: This is the first byte of the channel data register (external address is 1,1).

CHDATA2: Contains the channel sequence count (external address is 4,1).

CHDLR: Contains the count value of the channel data length register (external address is 0,0).

CHDRSTA: Contains the status of the channel data register. The bit meanings are:

0-3 Not used
4 Valid data in data register
5-7 Number of bytes ready to transfer across the channel.

CHIMODE: Contains gating controls for ACB checking and latches for PCI CDA controlling (external address is 3,1). The bit meanings are:

0 Block multiplexer mode latch
1 Byte multiplexer mode latch
2 Enable ACB check latch
3 Data stream mode latch
4 Internal interrupt request latch
5 Implement spare latch
6 PCI latch
7 CD prefetch latch.

CHKEY: Bits 0-3 are key bits; 4-7 are always 0 (external address is 0,4).

CHMISC: Contains miscellaneous bits (external address is 6,1). The bit meanings are:

0 DI parity check
1 Output
2 ISB
3 First character transferred
4-7 Not used.

CHSAR: Contains the address invoked when the channel is used (external address is 0,5-7).

CHSDBAR: Addresses the channel data buffer during a data transfer (external address is 6,0).

CHSTAT: Contains channel status indicators (external address is 6,0). The bit meanings are:

0 0
1 Incorrect length latch
2 Program or protection check latch
3 0
4 Channel data check latch
5 Channel control check latch
6 0
7 Chaining check latch.

CHSYNC0: Contains the value in channel sync 0 register (external address is 1,0).

CHSYNC1: Contains the value in channel sync 1 register (external address is 4,0).

CTRL0: System control register 0.

DCRMNT: Contains the decrementer count (counts down at a rate of one per microsecond).

HREG: Contains status conditions for traps (external address is 7,0). The bit meanings are:

0 Not used
1 Odd branch address (trap level 0)
2 L1 miss (trap level 0)
3 ACB check (trap level 0)
4 DLAT miss (trap level 1)
5 Storage protect check (trap level 1)
6 Block channel traps
7 Channel trap (trap level 2).

ICER: I-cycle external control register (external address is 5,3). The bit meanings are:

0 370 E-mode
1 5K E-mode
2 Trace
3 Low address protect
4 Force 31 bit address
5 P mode
6 Low address fetch protect
7 Block channel key.

ICTR: Contains the starting address of the next instruction (external address is 4,5-7).

ICYC: Contains I-cycle status information (external address is 5,0). The bit meanings are:

0 S/370 mode
1 Unconditional I-cycle storage error
2 Conditional I-cycle storage error
3 Successful branch
4 Execute
5 PU retry mask
6 IB empty
7 Operate latch.

INDIR0: Contains the address that is the R1 field of the current instruction (external address is 0,2).

INDIR1: Contains the address that is the R2 or X2 field of the current instruction (external address is 5,2).

INT0: Contains channel mode information (external address is 0,3). The bit meanings are:

0 Interrupt pending
1 PER
2 Pending channel interrupt
3 Pending external interrupt
4 MSVP request
5 Execute interrupt
6 Decrementer = 0
7 ITIMWRP.

INT1: Contains channel mode information (external address is 6,1). The bit meanings are:

0 Channel 0 interrupt
1 Channel 1 interrupt
2 Channel 2 interrupt
3 Channel 3 interrupt
4 Channel 4 interrupt
5 Channel 5 interrupt
6 Not used
7 Channel external interrupt.

INT2: Contains channel mode information (external address is 5,1). The bit meanings are:

0 Signal DIAGM
1 ITIMWRPA
2 ADRMATCH
3 ISTRSTEP
4 Pending machine check interrupt
5 Decrementer adjustment
6 CCOMPIB
7 CPUTIB.

INT3: Contains channel mode information (external address is 4,1). The bit meanings are:

0 ITIMIB
1 Interrupt key
2 External signal 2
3 External signal 3
4 External signal 4
5 External signal 5
6 External signal 6
7 External signal 7.

INT4: Contains channel mode information (external address is 2,1). The bit meanings are:

0 CPUTIA
1 CCOMPIA
2 ITIMIA
3 Pending machine check interrupt
4 Retry interrupt force
5 Execute transaction in process
6 Restart request
7 Full I-counter trace active.

INT5: Contains channel interrupt request data (external address is 0,1). The bit meanings are:

0 Channel 0 interrupt request
1 Channel 1 interrupt request
2 Channel 2 interrupt request
3 Channel 3 interrupt request
4 Channel 4 interrupt request
5 Channel 5 interrupt request
6 Not used
7 Reset ADDRMATCH.

INT6: Contains channel interrupt request data (external address is 2,3). The bit meanings are:

0 Malfunction alert
1 Emergency signal
2 External call
3 TODC sync check
4 Reserved
5 Reserved
6 Service signal
7 Reserved.

INT7: Contains channel mode information (external address is 4,3). The bit meanings are:

0 PU to SP interrupt request
1 PU to SP response
2 SP to PU interrupt
3 SP to PU response
4 Mask bit PU to SP interrupt
5 Mask bit machine check interrupt
6 Remote 1 MHz oscillator error
7 TODC stopped latch.

INT8: Contains channel mode information (external address is 6,3). The bit meanings for S/370 mode are:

0 Channel 6 interrupt
1 Channel 7 interrupt
2 Channel 8 interrupt
3 Not used
4 Not used
5 Not used
6 Not used
7 Not used.

The bit meanings for S/370XA mode are:

0 I/O interrupt 0
1 I/O interrupt 1
2 I/O interrupt 2
3 I/O interrupt 3
4 I/O interrupt 4
5 I/O interrupt 5
6 I/O interrupt 6
7 I/O interrupt 7.

LSXAD: Local storage extended address register (external address is 7,2).

L1BU: Contains the cache backup address (external address is 1, 5-7).

MNTR: Contains system status information (external address is 1,1). The bit meanings are:

0 Start I/O count
1 SVC interrupt
2 I/O interrupt
3 Page fault interrupt
4-7 Not used.

NIBF: Contains the second byte of the NIB buffer (external address is 6,7).

NIB1: Contains the second byte of the NIB (external address is 5,7).

OP: Contains byte 0 of the current instruction (external address is 6,1).

PSW0: Contains PSW0 information (external address is 3,0).

PSW1: Contains PSW1 information (external address is 3,1).

PSW2: Contains PSW2 information (external address is 3,2).

RETRY: Contains information about a retry operation (external address is 6,2). The bit meanings are:

0 Hardstop
1 Sequential processing
2 Instruction processing
3 SS operation
4 Refresh in progress
5 Retry in progress
6 Unretriable section of code
7 System operation.

SAR1: Contains the address of operand 1 of an instruction (external address is 3,5-7).

SAR2: Contains the address of operand 2 of an instruction (external address is 3,5-7).

SIR: Supplies byte- or bit-shifting information (external address is 0,0).

STAT0: Contains ALU status (external address is 4,2).

0 ALU overflow
1 Negative result
2 Recomplement
3 Destination equal to 0
4 ALU carry
5 1-bit carry
6 Z/* equal to 0
7 ALU size exception.

STAT1: Contains ALU status (external address is 1,2). The bit meanings are:

0 W1 (4) equal to 0
1 W2 (0-4) equal to 0
2 Invalid decimal format (cumulative)
3 True/complement decimal
4 PSW and I/O trace
5-6 Not used
7 ACB check enable.

STAT2: Contains ALU status conditions (external address is 2,2). The bit meanings are:

0 Working status 0
1 Working status 1
2 Working status 2
3 Working status 3
4 Channel working status 0
5 Channel working status 1
6 Instruction length counter
7 Instruction length counter.

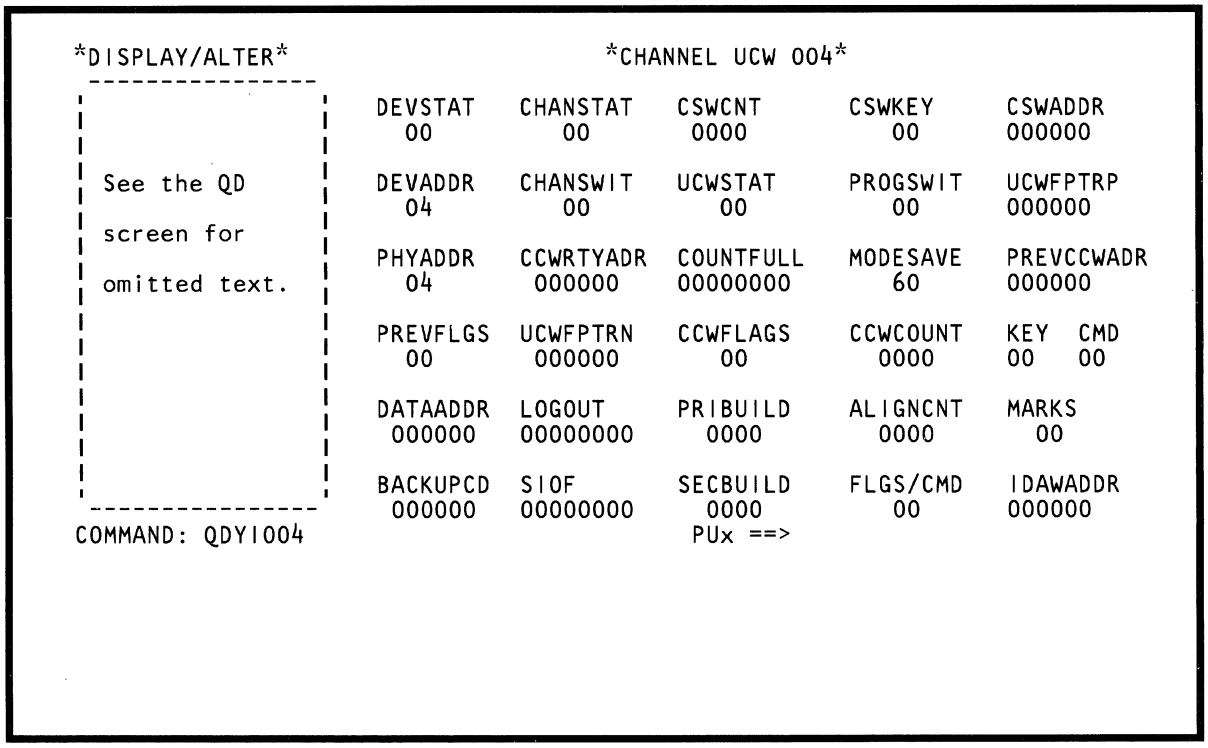
TODHI: Contains the high six-digits of the TOD clock and is set by the store clock instruction.

TODLO: Contains the low seven-digits of the TOD clock and is set by the store clock instruction.

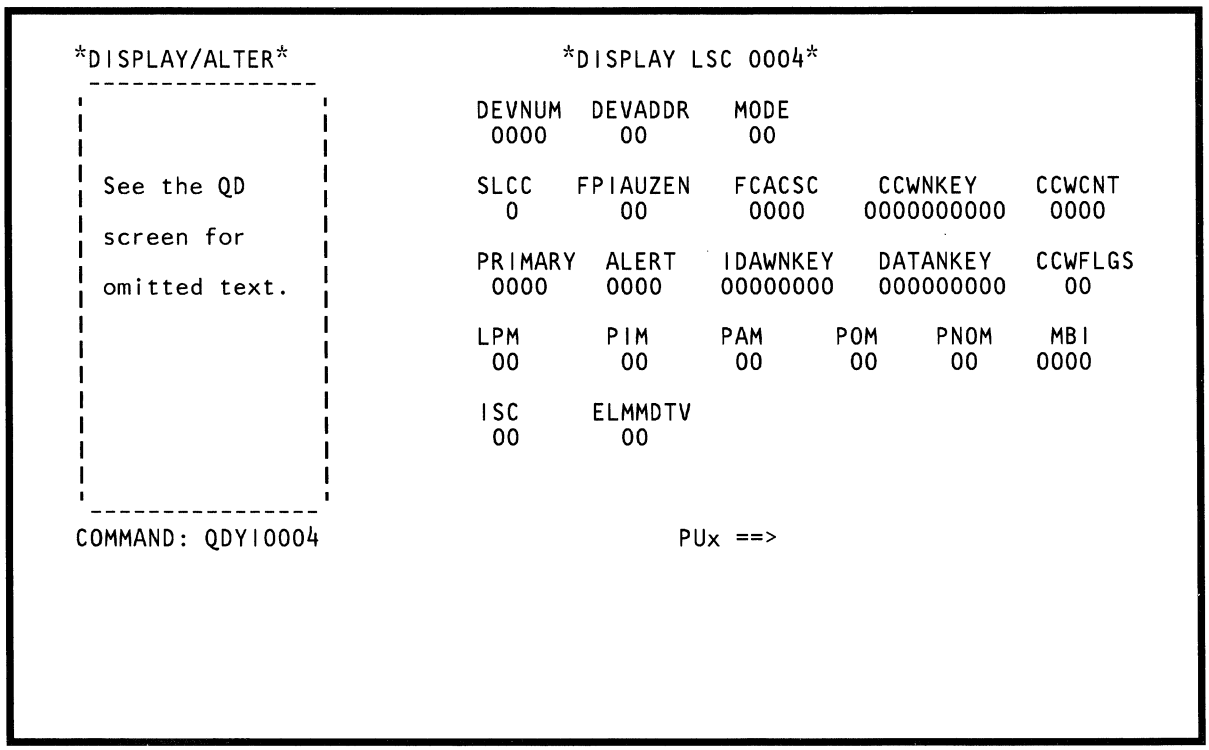
W1: Contains shift length value when W1 register is specified as a length parameter (external address is 1,0).

W2: Contains shift length value when W2 register is specified as a length parameter (external address is 2,0). It can also serve as a loop counter.

(QDYI) UCW or LSC Data



```
*DISPLAY/ALTER*                    *CHANNEL UCW 004*
 ---------------
|               |
| See the QD    |   DEVSTAT   CHANSTAT   CSWCNT      CSWKEY     CSWADDR
| screen for    |     00        00        0000         00       000000
| omitted text. |
|               |   DEVADDR   CHANSWIT   UCWSTAT     PROGSWIT   UCWFPTRP
|               |     04        00         00          00       000000
|               |
|               |   PHYADDR   CCWRTYADR  COUNTFULL   MODESAVE   PREVCCWADR
|               |     04       000000    00000000      60       000000
|               |
|               |   PREVFLGS  UCWFPTRN   CCWFLAGS    CCWCOUNT   KEY  CMD
|               |     00       000000       00          0000     00   00
|               |
|               |   DATAADDR  LOGOUT     PRIBUILD    ALIGNCNT   MARKS
|               |   000000    00000000     0000        0000       00
|               |
|               |   BACKUPCD  SIOF       SECBUILD    FLGS/CMD   IDAWADDR
|               |   000000    00000000     0000          00       000000
 ---------------
COMMAND: QDYI004                        PUx ==>
```



```
*DISPLAY/ALTER*                    *DISPLAY LSC 0004*
 ---------------
|               |
| See the QD    |   DEVNUM   DEVADDR    MODE
| screen for    |    0000      00         00
| omitted text. |
|               |   SLCC     FPIAUZEN   FCACSC     CCWNKEY      CCWCNT
|               |     0        00         0000     0000000000    0000
|               |
|               |   PRIMARY  ALERT      IDAWNKEY    DATANKEY     CCWFLGS
|               |    0000     0000      00000000    000000000      00
|               |
|               |   LPM      PIM        PAM      POM      PNOM      MBI
|               |    00       00         00       00       00      0000
|               |
|               |   ISC      ELMMDTV
|               |    00        00
 ---------------
COMMAND: QDYI0004                       PUx ==>
```

Use the QDYI command to:

- Display UCW data (S/370 mode)
- Display or change LSC (loadable subchannel) data (S/370XA mode)

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying UCW Data (S/370 Mode)

To display 64 bytes of UCW data:

1. Set the CE Mode switch to CE Mode.
2. Key QDYI and a three-digit UCW address next to COMMAND; the leftmost digit indicates the channel number (0-8) and the other two digits are the device address. If you specify less than three digits, zeros are added to the left (for example, QDYI3 is changed to QDYI003). The default is 000.
3. Press the ENTER key.

Displaying LSC Data (S/370XA)

To display LSC (loadable subchannel) data:

1. Set the CE Mode switch to CE Mode.
2. Key QDYI and a four-digit subchannel identification number next to COMMAND. (Valid identification numbers rely on the machine's configuration; they start with 0000 and follow consecutively.) If you specify less than four digits, zeros are added to the left (for example, QDYI4 is changed to QDYI0004.

   The default (which has no valid data) is 0000.
3. Press the ENTER key. This displays 64 bytes of loadable subchannel data.

Changing LSC Data (S/370XA)

The fields that you can change are the ISC, ELMMMDTV (bits 0-5), LPM, MBI, and POM. To change these fields, use either of the following methods:

Method 1:

1. Display the subchannel data (see above).
2. Place the cursor below the field(s) to be changed and key the new data (in hex).
3. Press the ENTER key (do not change the COMMAND line).

Method 2:

1. Set the CE Mode switch to CE Mode.
2. Key QDYI and a valid subchannel number next to COMMAND, followed by:

   a. The desired field identifier:

      - ISC for ISC (this is the default)
      - ELMD for ELMMMDTV (bits 0-5)
      - LPM for LPM
      - MBI for MBI
      - POM for POM

   b. An op code (=, &, /).

   c. The data (in hex).

      - The = (MOVE) op code, moves the data to the specified field.
      - The & (AND) op code, 'ands' the data with the data at the specified field.
      - The / (OR) op code, 'ors' the data with the data at the specified field.
3. Press the ENTER key.

Using the QDYI screen on the preceding page as an example, QDYI2LPM=FF changes the byte at field LPM from C0 to FF.

Label Identification

ALERT: For engineering use only.

ALIGNCNT: The number of bytes that were transferred to get main storage on a 64-byte boundary.

BACKUPCD: This is the data address from a previous Chain Data CCW.

CCWCNT: For engineering use only.

CCWFLAGS: The current CCW is stored here.

CCWFLGS: For engineering use only.

CCWNKEY: For engineering use only.

CCWRTYADR: CCW used for interface command retry sequence.

CHANSTAT: CSW channel status byte.

0 PCI
1 Incorrect length
2 Program check
3 Protection check
4 Channel data check
5 Channel control check
6 Interface control check
7 Chaining check.

CHANSWIT: The bit meanings are:

0 Prime status present
1 Secondary status present
2 Unexpected status present
3 Count already below 256
4 Unload enque byte PCI
5 If 0, backward direction; if 1, forward direction
6 Storage error
7 If 0, input operation; if 1, output operation.

COUNTFULL: For engineering use only.

CSWADDR: CSW bytes holding CCW address.

CSWCNT: CSW count byte.

CSWKEY: CSW key byte.

DATANKEY/ALG: For engineering use only.

DEVADDR: Logical I/O address.

DEVNUM: A number that identifies the device.

DEVSTAT: CSW device status byte.

0 Attention
1 Status modifies
2 Control unit end
3 Busy
4 Channel end
5 Device end
6 Unit check
7 Unit exception.

ELMMMDTV: E, LM, MM, D, T, and V are part of 'PMCW'.

FCACSC: The bit meanings for byte 0 are:

0 0
1 (FC,0) Start function
2 (FC,1) Halt function
3 (FC,2) Clear function
4 (AC,0) Resume pending
5 (AC,1) Start pending
6 (AC,2) Halt pending
7 (AC,3) Clear pending.

The bit meanings for byte 1 are:

0 (AC,4) Subchannel active
1 (AC,5) Device active
2 (AC,6) Suspended
3 (SC,0) Alert status present
4 (SC,1) Intermediate status present
5 (SC,2) Primary status present
6 (SC,3) Secondary status present
7 (SC,4) Status present (SC field is invalid).

FLGS/CMD: CCA flag/command byte.

FPIASZEN: The bit meanings are:

0 (F) CCW format bit from ORB
1 (P) Allow CCW prefetch above 1 chain data
2 (I) If initial status is 0, request interrupt
3 (A) If 1, check for address limit
4 (S) If 1, generate an interrupt when subchannel is suspended
5 (Z) If 1, interrupt for initial status request
6 (E) IRB contains 32 bytes of model-dependent data
7 (N) If 1, indicates select-in over path in POM.

IDAWADDR: Contains the address of the IDAW.

IDAWNKEY: For engineering use only.

ISC: Interruption subclass (initialize to 0).

LOGOUT: For engineering use only.

LPM: In the PMCW.

MARKS: For engineering use only.

MBI: For engineering use only.

MODE: The bit meanings for mode save are:

0 If block or full multiplex modes, set to 1
1 If byte or full multiplex modes, set to 1
2 If ACB checking, set to 1
3 If data streaming, set to 1
4 0
5 Copy of F bit from ORB for hardware control
6 0
7 0.

MODESAVE: When the channel is unloaded the Channel Interface Mode Register is saved here.

PAM: Path available mask.

PHYADDR: Unit address sent out to the device.

PIM: Path installed mask.

PNOM: For engineering use only.

POM: For engineering use only.

PREVCCWADR: Address of the previous CCW.

PREVFLGS: Flags from the previous CCW.

PRIBUILD: Contains the device status byte received at primary (CE) status time and the channel status byte from the UCW.

PRIMARY: For engineering use only.

PROGSWIT: The bit meanings are:

0 SIGP/SIGM
1 SP attached device
2 IDAW fetch required
3 Limited log valid
4 Spare
5 Shared subchannel
6 Byte multiplex data end switch
7 Halt requested.

SECBUILD: Contains the device status byte received at secondary status time and the channel status byte from the UCW.

SIOF: Used for LCA device work area for channel 0. Used for SIOF support for other channels.

SLCC: The bit meanings are:

0 (S) Suspend control bit (from ORB)
1 (L) Logout pending for format 0 ESW.
2 (C) Deferred condition code bit 0
3 (C) Deferred condition code bit 1.

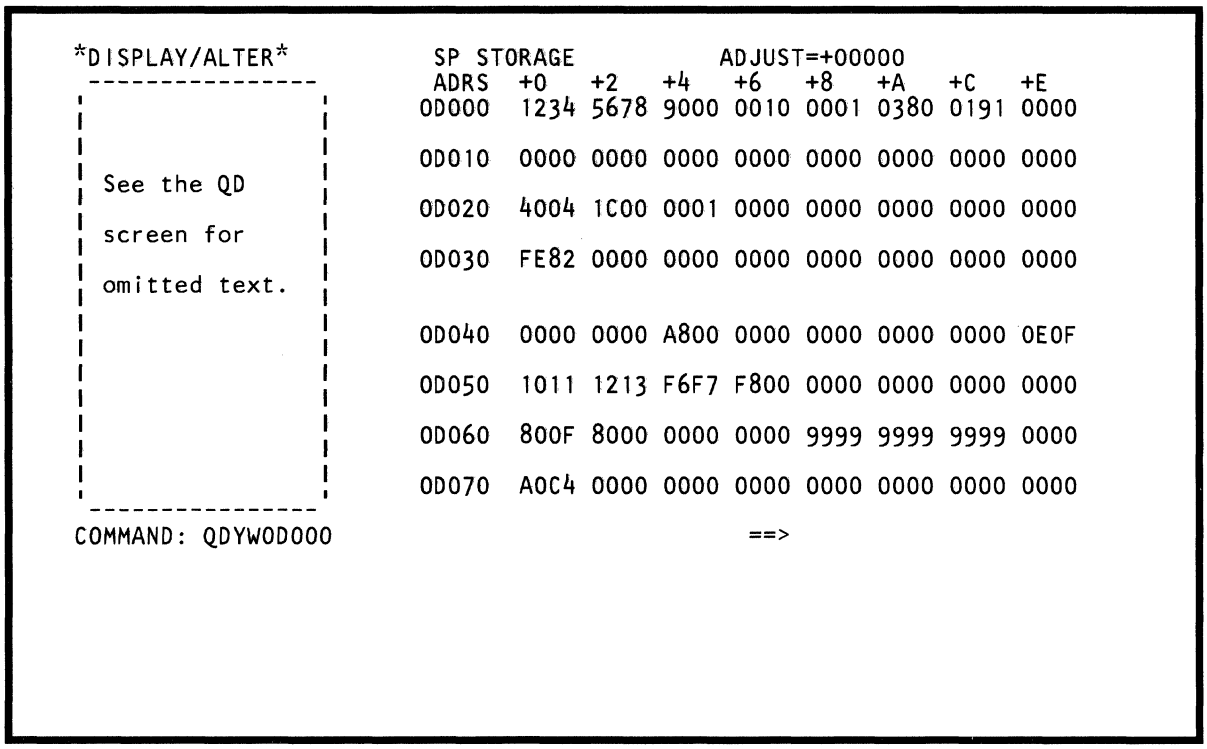
UCWFPTRN: For engineering use only.

UCWFPTRP: For engineering use only.

UCWSTAT: The bit meanings are:

0 Active UCW
1 UCW on PCI queue
2 UCW on normal queue
3 Secondary status expected
4 Data expected check
5 Disconnect command chaining (DCC)
6 Prime status expected check
7 Delayed disconnect.

(QDYW) SP Storage



Use the QDYW command to display and save data in SP storage (to change the data, use the Block Facility.) The data is in hex.

Displaying SP Storage Data

To display SP storage data:

1. Set the CE Mode switch to CE Mode.
2. Key QDYW and up to a five-digit SP address (0 to 1FFFF) next to COMMAND. (The default is 0.)
3. Press the ENTER key. This displays a 128-byte block of hex data (the data at the address you specified is included in the display). To display the data in both hex and EBCDIC, add T to the end of the command (for example, QDYW0D000T).

   Use the PAGE key to display the next 128-bytes of data.

Note: You have the option of using a hex constant (ADJUST= value) to calculate an address value. This adjust value remains available to you until you change it or you leave the Display/Alter screen. See "(QDM) Real Storage" on page 170 for a screen example.

You can specify an adjust value by keying a:

- + (plus) and an adjust value after the QDYW command. This adds the adjust value to the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).
- - (minus) and an adjust value after the QDYW command. This subtracts the adjust value from the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).

Note that it is possible to get twos-complement negative numbers in the ADRS column because the ADRS column is changed to match the data and the given address.

Saving SP Storage Data

To save SP storage data, key QDYWxxxxx? in a block (see "Saving Data" on page 313). Eight bytes of data starting at address xxxxx are saved. xxxxx represents the address number (0 to 1FFFF). The question mark (?) indicates that this is a save operation.

Label Identification

ADJUST: Address adjust value.

ADRS: Storage address.

(QDYWL) SP Storage

```
                                  *SP STORAGE*
 ADRS   +0       +4       +08      +C       +10      +14      +18      +1C
02000  0814000F 70613600 80007061 20323600 40007061 20263600 10007061 2026090C
02020  243E04F0 21CE1FC4 707121B8 0804007B 70610D08 22CC3600 800070C1 207C3800
02040  800022CC 20742808 20580201 0020FFE0 22F422CD 3C0000FF 22F6FFFF 22F422CD
02060  206604F0 20740212 002022F4 000022F4 04F421BB 0982243E 04F021CE 36002000
02080  706120C6 A08040DF 70610814 00807000 080400BF 70CC0804 00BF7070 08340080
020A0  70CB0884 706270CB 083400E9 70711526 22CD22CD 09D822CD 3A002680 228604F0
020C0  265604F0 21FA09D3 243E3600 800070CC 21CE3600 40007070 20FA3600 400070CC
020E0  21CE3600 80007072 21CE3800 80007072 21CE0982 243E04F0 21CE8000 400070CC

02100  0814000F 70613600 80007061 20323600 40007061 20263600 10007061 2026090C
02120  243E04F0 21CE1FC4 707121B8 0804007B 70610D08 22CC3600 800070C1 207C3800
02140  800022CC 20742808 20580201 0020FFE0 22F422CD 3C0000FF 22F6FFFF 22F422CD
02160  206604F0 20740212 002022F4 000022F4 04F421BB 0982243E 04F021CE 36002000
02180  706120C6 A08040DF 70610814 00807000 080400BF 70CC0804 00BF7070 08340080
021A0  70CB0884 706270CB 083400E9 70711526 22CD22CD 09D822CD 3A002680 228604F0
021C0  265604F0 21FA09D3 243E3600 800070CC 21CE3600 40007070 20FA3600 400070CC
021E0  21CE3600 80007072 21CE3800 80007072 21CE0982 243E04F0 21CE8000 400070CC
 COMMAND: QDYWL02000                                    ==>
```

Use the QDYWL command to display SP storage data. The data is in hex.

Displaying SP Storage Data

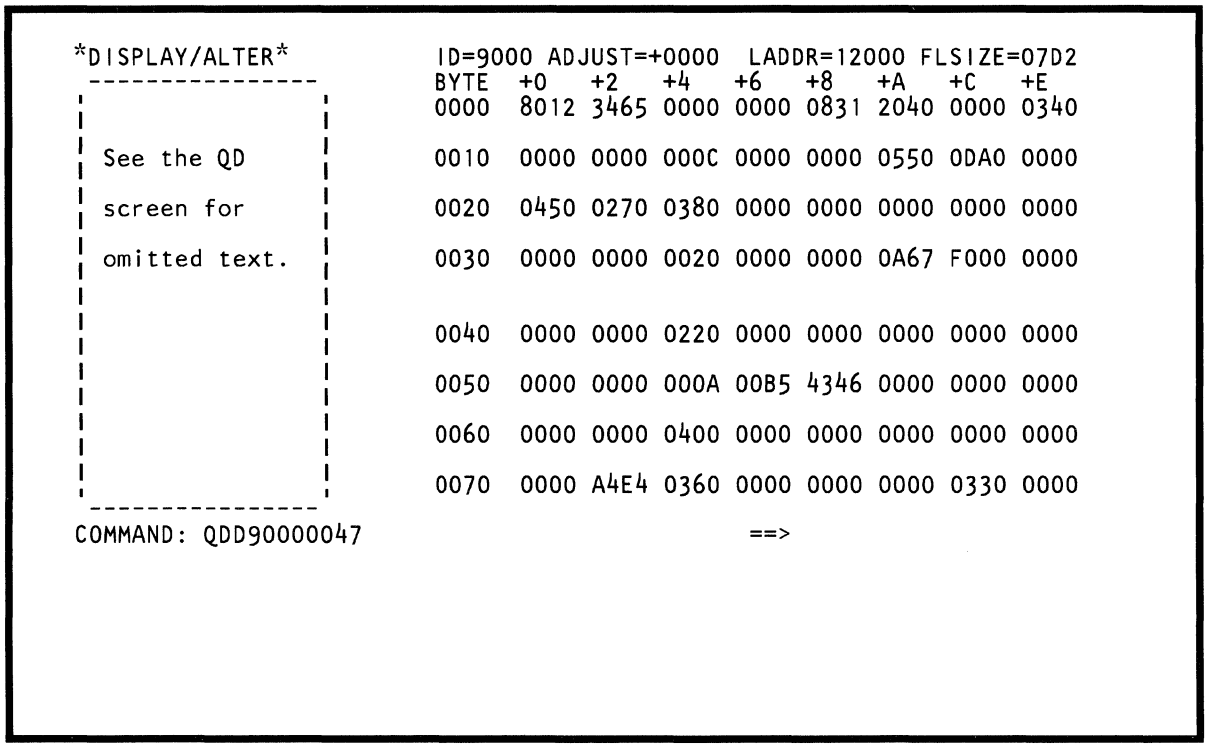
To display data in SP storage, use the QDYWLxxxxx command. xxxxx represents an SP storage address (in hex).

To display SP storage:

1. Set the CE Mode switch to CE Mode.
2. Key QDYWL and up to a five-digit SP address (0 to 1FFFF) next to COMMAND. (The SP address default is 0.)
3. Press the ENTER key. This displays a 512-byte block of data.

   Use the PAGE key to display the next 512 bytes of data.

(QDD) Console Disk File



Use the QDD command to display or save console disk file data. (If diskette data has to be changed, see "(QBTP) Patch Facility" on page 316). The data is in hex.

Displaying Console Disk File

To display the console disk file:

1. Set the CE Mode switch to CE Mode.
2. Key QDD, a four-digit module ID (0001 to FFFE), and a four-digit byte offset next to COMMAND. The byte offset default is 0.
3. Press the ENTER key. This displays a 128-byte block of hex data. To display the data in both hex and EBCDIC format, add T to the end of the command (for example, QDD90000047T).

   Two intensified dots are under the address you specified (only one dot appears with the translate option).

   Use the PAGE key to display the next 128-bytes of data.

Note: You have the option of using a hex constant (ADJUST= value) to calculate an address value. This adjust value remains available to you until you change it or you leave the display/alter screen. See "(QDM) Real Storage" on page 170 for a screen example.

You can specify an adjust value by keying a:

- + (plus) and an adjust value after the QDD command. This adds the adjust value to the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).
- - (minus) and an adjust value after the QDD command. This subtracts the adjust value from the address on the COMMAND line and then this calculated value becomes the address of the data you want to display (intensified dot(s) appear under the data at the calculated address).

Note that it is possible to get twos-complement negative numbers in the address (BYTES) column because this column is changed to match the data and the given address.

Saving Console Disk File Data

To save console disk file data, key QDDxxxxxxxx? in a block (see "Saving Data" on page 313). Eight bytes of data starting at address xxxxxxxx are saved. xxxxxxxx represents the address number. The question mark (?) indicates that this is a save operation.

Label Identification

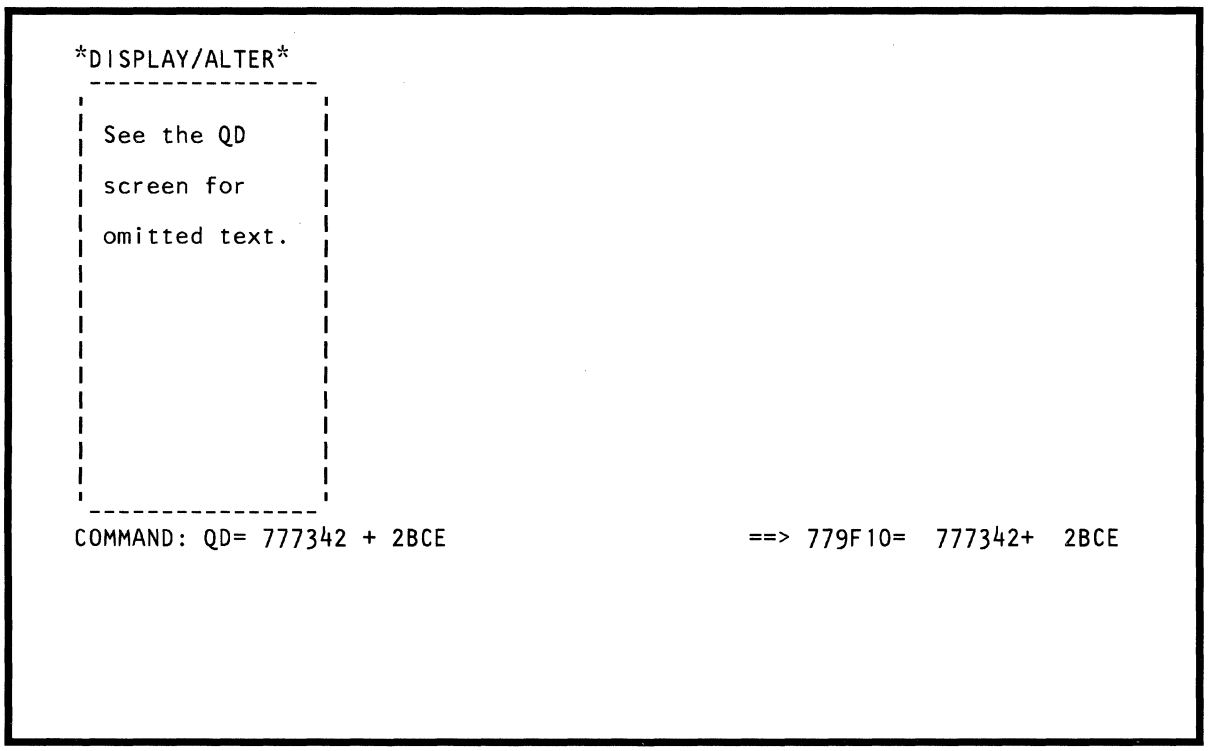
ADJUST: Address adjust value.

FLSIZE: Linked file size of the module.

ID: Module ID of the file.

LADDR: Load address of the module.

(QD=) Hex Calculator



Use this procedure to add, subtract, logically 'AND', or logically 'OR' one hex address to another hex address. Each address can be one to eight digits (the default is 00000000).

The addresses are saved until you specify new ones. Therefore, you can use them as a constant (key QD= to put the last calculation on the COMMAND line).

You can use this procedure from any manual mode (Q) screen (the present screen remains displayed and is not changed, and the calculation result is shown next to the message indicator).

Calculating Hex Addresses

To calculate hex addresses:

1. Key QD= next to COMMAND followed by:

   a. A hex address (if any)

   b. An op code:

      + (Plus) Adds the second address to the first.

      - (Minus) Subtracts the second address from the first.

      & (AND) 'Ands' the two addresses together.

      / (OR) 'Ors' the two addresses together.

   c. Another hex address (if any).

2. Press the ENTER key.

   The result of the calculation (and the addresses) is displayed next to the message indicator.

(QV) Insert/Extract Screens

```
*INSERT/EXTRACT*
S STATUS RING
K SYSTEM CHECKS
I PU HARDWARE
B CS HARDWARE
M MS HARDWARE
H CHNL HARDWARE
C CHNL INTERFACE
X EXTERNAL REGS
R SCAN RING
L LOG DSPL MODE
N CLK IGNORE MDE
T ADDRESS XLATE
G SET CSAR
W MAINT COMMAND
D DSPL BUFR SW
A ARRAY SELECT
Q GENERAL SELECT
Z PROG SYSTEM
COMMAND: QV                                PUx ==>
```

The insert/extract function (QV screen) is used (in CE mode only) to display, save, and change data.

Notes:

1. Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).
2. The insert/extract function is on the DIAG1 diskette.
3. The main storage screen mask values show maximum main storage size.

You can display the QV screen even if parity errors exist (fields with bad parity are intensified on the screen). Parity errors are corrected during a change operation unless a hardware fault exists.

Selecting the Insert/Extract Screen

The QV screen lists the available Insert/Extract screens.

If QOM does not stop the clocks of both processing units, use QOC. If customer data is lost, the message STORAGE ERR - REIPL NEEDED is displayed when the system is started.

To select the QV screen:

1. Set the CE Mode switch to CE Mode.
2. Press MODE SEL (only if not in manual mode).
3. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
4. Install DIAG1 diskette into diskette drive 2.
5. Key QV next to COMMAND, and press the ENTER key.

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

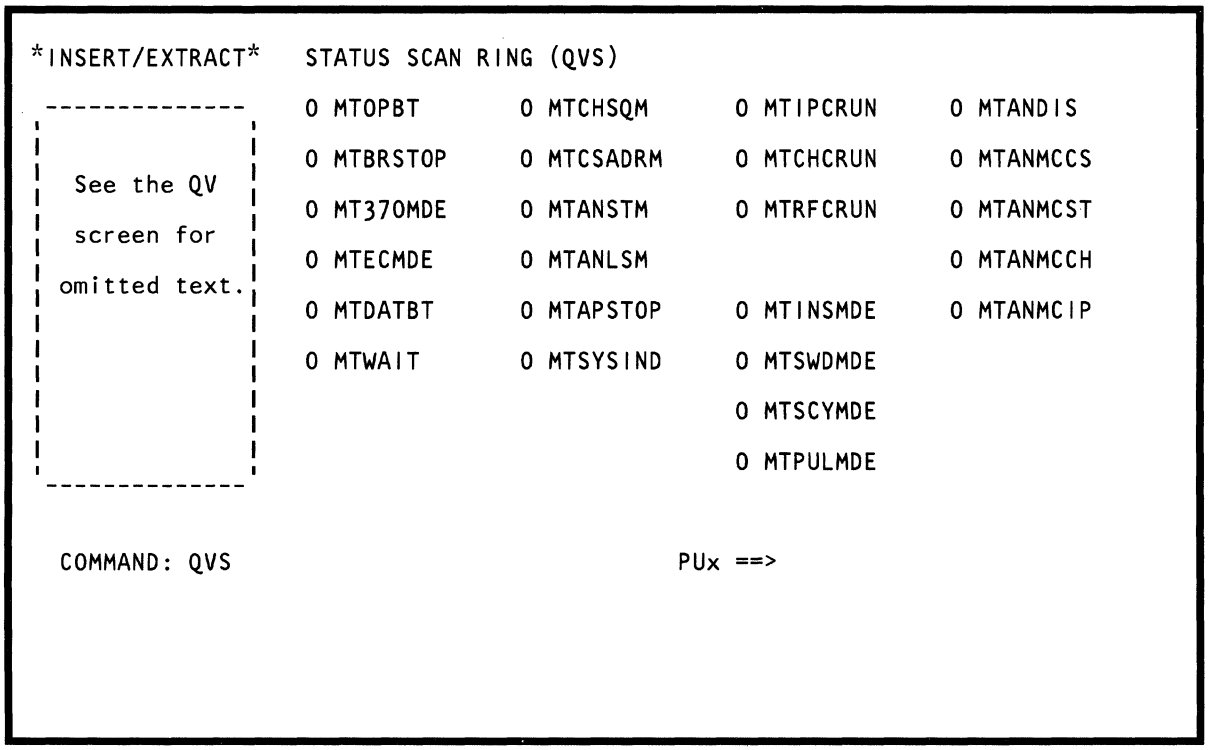
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QVS) System Status



Use the QVS command to display system status information. You cannot save (except through the QVR screen) or change the data on this screen.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying System Status (Scan Ring 23)

To display system status:

1. Set the CE Mode switch to CE Mode.
2. Install DIAG1 diskette into diskette drive 2.
3. Key QVS next to COMMAND, and press the ENTER key.

Label Identification

MTANDIS: If on, one or more of the error disable latches are set for the chip being used.

MTANLSM: Local storage read or write address match.

MTANMCCH: If on, one or more of the channel machine checks are enabled.

MTANMCCS: If on, one or more of the CS machine checks are enabled.

MTANMCIP: If on, one or more of the PU machine checks are enabled.

MTANMCST: If on, one or more of the storage machine checks are enabled.

MTANSTM: Instruction counter address match enabled, any reference address match enabled, data store reference match enabled, or I/O reference address match enabled.

MTAPSTOP: AP soft stop or hard stop.

MTBRSTOP: Branch mask stop.

MTCHCRUN: If on, channel clock is in run mode.

MTCHSQM: Channel sequence count enabled.

MTCSADRM: CSAR address match enabled.

MTDATBT: PSW0 bit 5 (V/R).

MTECMDE: PSW1 bit 4.

MTINSMDE: Instruction-step mode.

MTIPCRUN: If on, the PU clock is in run mode.

MTOPBT: Operate bit.

MTPULMDE: Clock pulse step mode.

MTRFCRUN: Refresh clock run status.

MTSCYMDE: Single clock cycle.

MTSWDMDE: Microword step mode.

MTSYSIND: The status for system indication.

MTWAIT: PSW1 wait bit 14.

MT370MDE: S/370 mode.

(QVK) Checks In System

```
*INSERT/EXTRACT*  SYSTEM CHECKS AND DISABLES (QVK)              *FIELDS 010-170*
                  SYSC D  DFZ FUNCT/AREA DETAIL LATCHES       6 MTEVNODD
 --------------   F    0      CS CONTROL C317 DEF1 0000
|               | BCDE 0      CS ARRAY   0000 0000 0000 0000 0000 0000 0003 9B00
|               | PR   00     CH DBF/CTL 701A 03B5 4634 0000 0000 0000 00
|  See the QV   | 0    0      CH INTFCE1 C948 CA18 2A21 6800 0000
|               | Q    0      CH INTFCE0 335C 521B F6C0 1C00 E0B0
|  screen for   | STUV 0      ST CACHE   C422 7896 2376 7D3B 1E3C EFCC F6DC 0000
|               | XX   0      ST CTL/EC1 07B2 2C78 EB8B 327C 0000 0000
| omitted text. | WW   00     ST BSM/EC2 F450 0000 0000 0000 0000 0000 0000*0000
|               | YY   00     ST SAR/KEY 0F20 0000 0000 0000 00
|               | Z    0      ST DLT/DIR 0000 0000 0180 0000 0000
|               | GG   0  480 PU ALU/DFL 0000 0000 0FAE A2BE 1EB1 5DFA 879F 8A
|               | M    0  4   PU SHIFTER 0000 0000 0000 00
|               | II   00 FB0 PU ICY/SAR 0000 0000 0000 0002 0000 0000 000
|               | FF   00 90  PU INT/TMR 0000 0000 8A00*0000 0000*
|               | J    0  FBF PU LS/EXT  0000 0000 0000 0F5F 70
 --------------   HH   00     CL CONTROL 0000 0000 0000*0000*
                  A    0      CL BSMCLK

COMMAND: QVK                                    PUx ==>
```

Use the QVK command to display, save, and change system checks. An intensified letter in the SYSC field indicates that a failure occurred in the hardware module displayed on this line.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying System Check Data

To display system check data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVK next to COMMAND, and press the ENTER key.

Note: The data displayed between the asterisks (*) may be incorrect at times (this applies to detail latches ST BSM/EC2, PU INT/TMR, and CL CONTROL). Also, the second digit in the DFZ field of the PU INT/TMR latch may be incorrect at times.

If you need to analyze this data and want to ensure its accuracy, stop the refresh clock. (Because the above data comes from the clock subsystem, it is scanned only when the refresh clock is stopped.)

Warning: Stopping the refresh clock alters storage and requires an IML/IPL. Customer data is lost.

Resetting System Check Data

To reset the system check data in the detail latches to zeros, key QVKR on the COMMAND line and press enter. Detail latches set by hardware errors are not reset.

Changing System Check Data

Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVK next to COMMAND followed by:

   a. A three-digit decimal number (010-172).

      The first two digits are the line number (01 to 17). The third digit is either 0 (selects SYSCKS, DISABLE, and DFREEZE), 1 (selects the left eight bytes of detail checks), or 2 (selects the right eight bytes of detail checks).

   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVK, a three-digit decimal number, an OP code, and the new (replacement) hex data.

Using the screen on the preceding page as as example, QVK031=F1....F4 changes the data in field 031 from 701A03B5 to F11A03F4. The periods in the command are used as "do not care" characters; they indicate that you want the third to sixth hex digits in the field to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVK command.
2. If you key more data than the selected field permits, the message INVALID INPUT appears, and the cursor moves to the right of the OP code.

Saving System Check Data

Key QVKxxx? in a block (see "Saving Data" on page 313). xxx represents the field number (010-172) on the screen. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

D: If 1, disables the SYSC (system check) latch (0 is the normal condition).

DETAIL LATCHES: If a bit is on, indicates a low-level error condition.

DFZ: If a bit is on, prevents a hardware portion from becoming inactive when an error condition is present.

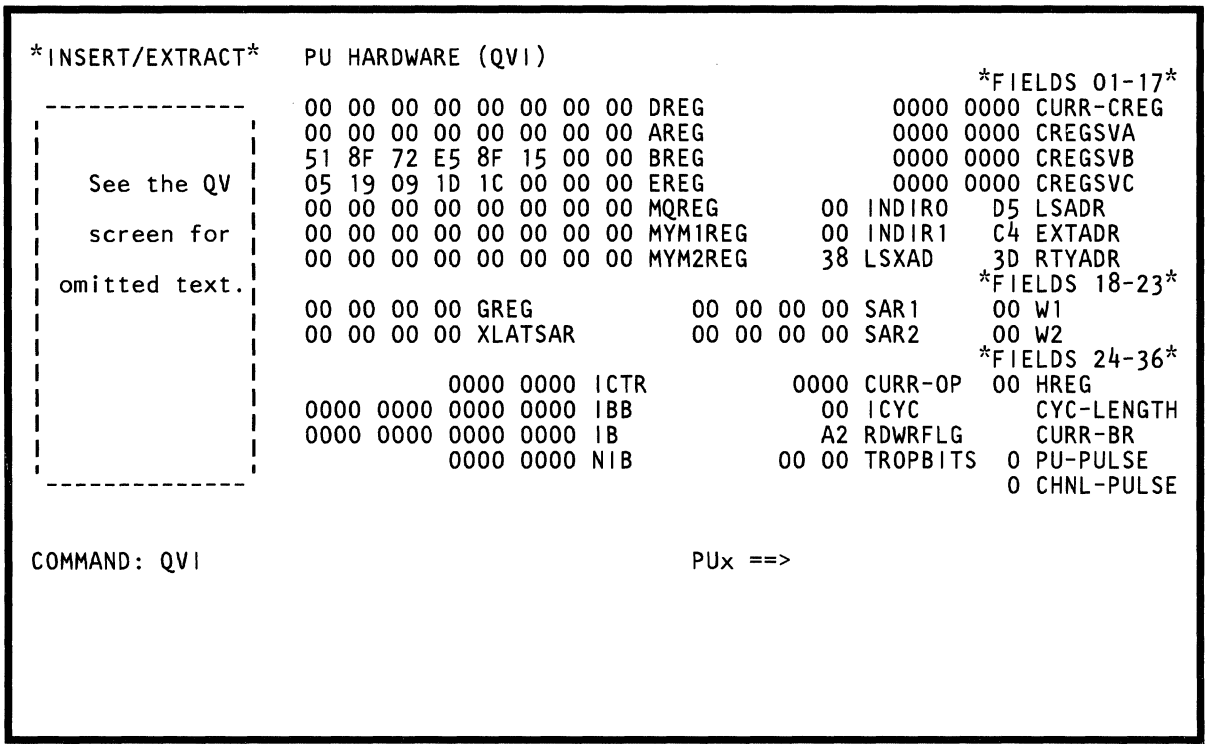
FUNCT/AREA: Identifies the name of the hardware portion for which the error indicators are in effect.

MTEVNODD: Contains three master machine check latches. 0 indicates no errors; 1-7 indicates an error occurred.

SYSC: A summary of the detail latches that exist on the same line. Error conditions that occur in the detail latches are carried over to the appropriate SYSC latch. The failing hardware module identifier (alphabetical character) is indicated in the SYSC column.

For Model Group 1, a K appears in the SYSC column for PU Shifter.

(QVI) PU Hardware



Use the QVI command to display, save, and change the PU hardware fields. The data in the fields is in hex and the fields are numbered left to right and top to bottom on the screen. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying PU Hardware Fields

To display PU hardware fields:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVI next to COMMAND, and press the ENTER key.

Changing a PU Hardware Field

Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVI next to COMMAND followed by:
   a. A field number (01 to 36) in decimal format (see Note 3).
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVI, a field number in decimal, an OP code, and the new (replacement) hex data.

Using the screen on the preceding page as an example, QVI08=F1..F3F4 changes the data in field 08 to F100F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the third and fourth hex digits in the field to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVI command.
2. If you key more data than the selected field permits, the message INVALID INPUT appears and the cursor moves to the right of the OP code.
3. You cannot change the EXTADR, RTYADR, PULSE, or CYC-LENGTH fields.

Saving a PU Hardware Field

Key QVIxx? in a block (see "Saving Data" on page 313). xx represents one of the field numbers (01-36) on the screen. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

AREG: Eight-byte PU register.

BREG: Eight-byte register that contains data from the local storage array. The register output is gated to the B/E assembler and then to the A/B assembler.

CHNL-PULSE: Indicates the last channel clock that was pulsed before the clocks were stopped. The bit meanings are (if blank indicates invalid condition):

0 Last channel clock was C0
1 Last channel clock was C1
2 Last channel clock was C2
3 Last channel clock was C3

CREGSVA: Contains the most recent microword (first level of microword save).

CREGSVB: Second level of microword save.

CREGSVC: Third level of microword save.

CURR-BR: A latch in the clock MCM scan ring that when active indicates the current branch is decoded from the C-register and also that the machine clock cycle will be extended by two clock pulses.

CURR-CREG: Contains the current microword.

CURR-OP: Contains the current instruction op code and immediate byte.

CYC-LENGTH: Clock cycle bits 1 to 4 indicating clock pulse cycles of 4, 6, 8, or forced 4-cycle lengths.

DREG: Eight-byte PU register.

EREG: Eight-byte register that latches data from the external assembler. The register output is gated to the A/B assembler.

EXTADR: External address data. The bit meanings are:

0	Not used
1	If on, indicates that EXTADR is destination to the external register and bits 5, 6, and 7 form the destined external address.
2	If on, indicates the destination is the A-register.
3	If on, indicates the destination is the A-register and the result field specified by the C-register bits 19 through 23.
4	Not used.
5,6,7	See bit 1.

GREG: Holding register for displacement in I-cycle operand address calculation. Storage address selected by or updated by last storage microword operation.

HREG: Contains the status of current trap conditions. The bit meanings are:

0	Block odd branch traps
1	Odd branch trap active
2	ACB check trap active
3	Storage protect trap active
4	Directory miss trap active
5	DLAT miss active
6	Block channel traps
7	Channel trap active

IB: Instruction buffer.

IBB: IB buffer.

ICTR: Contains the starting address of the next instruction.

ICYC: Contains I-cycle control and status information.

INDIR0: Indirect register 0 (I0).

If LSXAD bit 7 = 0, the bit meanings for bits 0-3 are:

1000	PU
0000/0001	PU
1010	Channel 0
1011	Channel 1
1100	Channel 2
1101	Channel 3
1110	Channel 4
1111	Channel 5

If LSXAD bit 7 = 1, the bit meanings for bits 0-3 are:

1000	Channel work area
0000/0001	PU
1010	Channel 6
1011	Channel 7
1100	Channel 8
1101	For engineering use only
1110	For engineering use only
1111	For engineering use only

INDIR1: Indirect register 1 (I1).

If LSXAD bit 7 = 0, the bit meanings for bits 1-3 are:

000	PU
001	PU
010	Channel 0
011	Channel 1
100	Channel 2
101	Channel 3
110	Channel 4
111	Channel 5

If LSXAD bit 7 = 1, the bit meanings for bits 1-3 are:

000	Channel work area
001	PU
010	Channel 6
011	Channel 7
100	Channel 8
101	For engineering use only
110	For engineering use only
111	For engineering use only

LSADR: The local storage address register that is used as the destination register to address the local storage array.

LSXAD: Local storage extended address register. Bit 3 or bit 7 is used to form the high-order address bit of the local storage array.

MQREG: Multiply and divide register.

MYM1REG: This register holds the first multiplier operand (it is set by the load M1 microword).

For Model Group 1, this field displays zeros and cannot be changed to other values.

MYM2REG: This register holds the second multiplier operand (it is set by the load M2 microword).

For Model Group 1, this field displays zeros and cannot be changed to other values.

NIB: Next instruction buffer.

PU-PULSE: Clock MCM scan ring latches that indicate the PU clock pulse that was issued.

RDWRFLG: A bit for each byte to be gated through the shifter control (1 is an active condition; 0 is inactive).

RTYADR: Provides the retry array address for a read. Bits 0-2 are control bits; bits 3-7 form the read address if bit 2 is equal to 1.

SAR1: Operand 1 instruction address register.

SAR2: Operand 2 instruction address register.

TROPBITS: Used to form CSAR bits 8-23 during trap, I-cycle or interrupt breakout addresses. The bit meanings are:

Byte 0

Bits	
0	Not used
1	CSAR bit 9
2	Not used
3	CSAR bit 11
4	CSAR bit 12
5	CSAR bit 13
6	CSAR bit 14
7	CSAR bit 15

Byte 1

Bits	
0	CSAR bit 16
1	CSAR bit 17
2	CSAR bit 18
3	Not used
4	CSAR bit 20
5	Not used
6	CSAR bit 21
7	CSAR bit 21

W1: Contains the shift length value for the operand 1 register when the W1 register is specified as a length parameter.

W2: Contains the shift length value for the operand 1 register when the W2 register is specified as a length parameter. (Can also be a loop counter.)

XLATSAR: Used for storage reads during address translation.

(QVB) Control Storage Hardware

```
*INSERT/EXTRACT*   CS HARDWARE (QVB)                              *FIELDS 01-13*

 --------------    00 00 00 00 00 00 00 00 CREG                     00 CSTRADR
                   00 00 00 00 00 00 00 00 CSLDDA                   00 CSTRCTR
                            00 00 00 00 00 CSEVEN                   00 CSGTBT21
                            00 00 00 00 00 CSODD                     0 CSTBADR
                               00 00 00 00 CREGSVA            00 0000 TRACEREG
                               00 00 00 00 CREGSVB            00 0000 MATCHREG
                               00 00 00 00 CREGSVC
                                                                    *FIELDS 14-26*
                   00 0000 CSAR              0 CSARE                 0 CSAR21
                   00 0000 CSARD             0 CSARINH       0000 0000 CSMCINH
                   00 0000 CSARBU           00 CREGINH           0000 CNTL
                   00 0000 SAVEREG          00 CSOEINH             00 CSREADEN
                                            00 CSFRCINH

                                                                    *FIELDS 27-30*
                         00 CSADRMEN              0000 0000 0000 0000 CSADRM0
                         00 CSAD13EN              0000 0000 0000 0000 CSADRM1

COMMAND: QVB                                  PUx ==>
```

See the QV screen for omitted text.

Use the QVB command to display, save, and change control storage hardware fields. The data in the fields is in hex and the fields are numbered left to right and top to bottom on the screen. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Control Storage Hardware Fields

To display control storage hardware fields:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVB next to COMMAND, and press the ENTER key.

Changing Control Storage Hardware Data

Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVB next to COMMAND followed by:
   a. A field number (01 to 30) in decimal format.
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVB, a field number in decimal, an OP code, and the new (replacement) hex data.

Using the screen on the preceding page as an example, QVB11=F1F2..F3 changes the data in field 11 from 00000000 to F1F200F3. The periods in the command are used as "do not care" characters; they indicate that you want the fifth and sixth hex digits in field 11 to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVB command.
2. If you key more data than the selected field permits, the message INVALID INPUT appears and the cursor moves to the right of the OP code.

Saving Control Storage Hardware Data

Key QVBxx? in a block (see "Saving Data" on page 313). xx represents one of the field numbers (01-30) on the screen. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

CNTL: Bit sensitive bytes.

Byte 0
Bits
0 Not used
1 CSBALADR 0
2 CSBALADR 1
3 CSTRSEL
4 CSMDESW
5 CSSTWT
6 CSFNTREN
7 CSTPWT

Byte 1
Bits
0 CSBALWT
1 CSBKSAVE
2 CSDCDIC
3 CSARINH 1
4 CSARINH 2
5 CSARINH 3
6 CSADMTSS
7 CSADMTEN

CREG: Two four-byte control words. If the even latch is on, the even word (byte 0-3) is used; if the odd latch is on, the odd word (byte 4-7) is used.

CREGINH: If enabled, blocks the system clock to the C register.

CREGSVA: Contains the most recent microword (first level of microword save).

CREGSVB: Second level of microword save.

CREGSVC: Third level of microword save.

CSADRMEN: A control for the eight possible reconfiguration regions.

CSADRM0: Contains the address of four of the reconfiguration regions.

CSADRM1: Contains the address of four of the reconfiguration regions.

CSAD13EN: When enabled, reduces the reserved area of control storage to 1K bytes.

CSAR: Together with CSARD and CSARE, supplies the microword address.

CSARBU: Contains the address of the current microword.

CSARD: Together with CSAR and CSARE, supplies the microword address.

CSARE: Together with CSAR and CSARD, supplies the microword address.

CSARINH: Scan only latches that can be used to block the setting of the CSAR.

CSAR21: Set when CSAR address bit 21 is on (used with USE21 to set the odd latch).

CSEVEN: All bits are set to 1 when the even word is to be selected.

CSFRCINH: Disables the toggle function for the array chip.

CSGTBT21: When all bits are set to 1, allows CSAR bit 21 to select even or odd words.

CSLDDA: Scan in register that loads the microcode into the control array.

CSMCINH: Scan only latches that can be used to block the setting of the error latches.

CSODD: All bits are set to 1 when the odd word is to be selected.

CSOEINH: If enabled, blocks the system clock to the odd/even latches.

CSREADEN: If enabled, blocks the write pulse to the control storage array.

CSTBADR: Two-bit address of the trap/BAL array with values for trap levels 0, 1, 2, or 3.

CSTRADR: Five-bit address of the trace array.

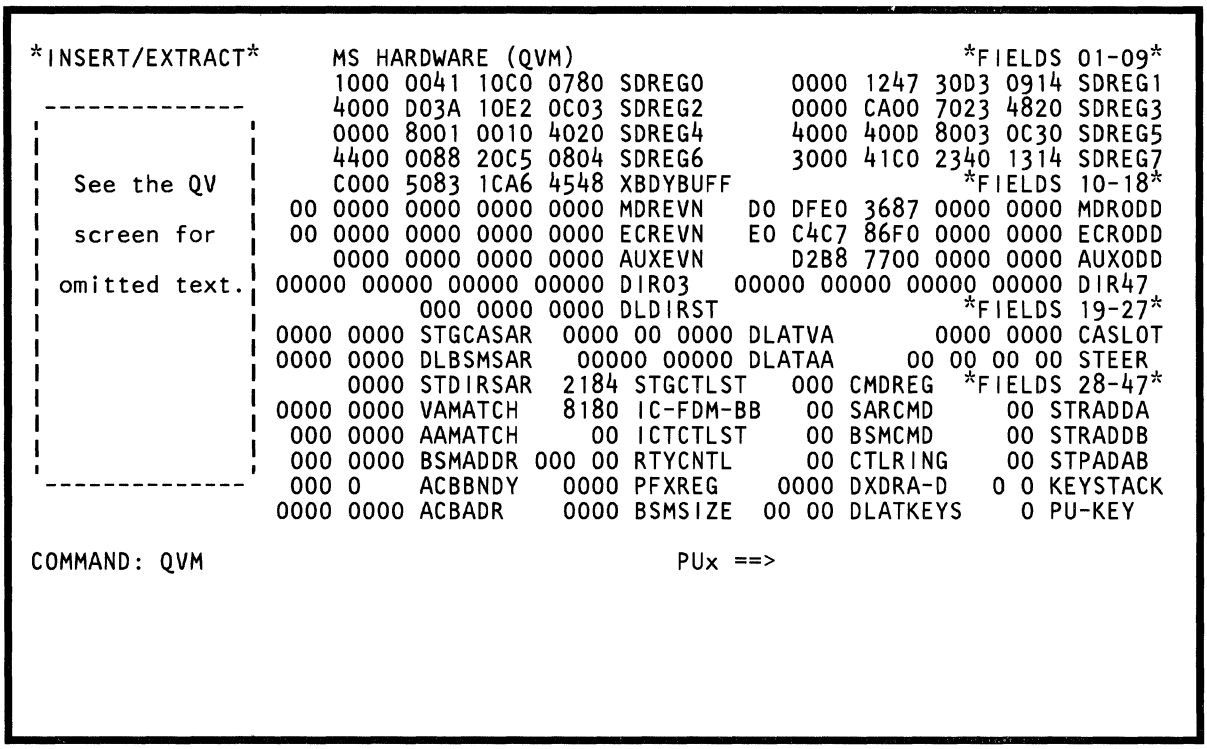
CSTRCTR: Counter latches for the trace array address.

MATCHREG: Scan only latches that contain a CSAR address to be matched for a stop condition.

SAVEREG: Data-in register for the trace and trap/BAL arrays (normally contains the address of the last microword).

TRACEREG: Trace register (contains the CSAR address).

(QVM) Main Storage Hardware



Use the QVM command to display, save, and change the main storage hardware fields. The data in the fields is in hex and the fields are numbered left to right and top to bottom on the screen. An intensified field indicates a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Main Storage Hardware Data

To display main storage hardware data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVM next to COMMAND, and press the ENTER key.

Changing Main Storage Hardware Data

Omit steps 1 and 2 if the PU clock is stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVM next to COMMAND followed by:
   a. A field number (01 to 47) in decimal format.
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press ENTER.

You can also change data in a field by keying: QVM, a field number in decimal, an OP code, and the new (replacement) hex data.

Using the screen on the preceding page as an example, QVM02=F1..F3 changes the data in field 02 to F100F3. The periods in the command are used as "do not care" characters; they indicate that you want the third and fourth hex digits in the field to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVM command.
2. If you key more data than the selected field permits, message INVALID INPUT appears and the cursor moves to the right of the OP code.

Saving Main Storage Hardware Data

Key QVMxx? in a block (see "Saving Data" on page 313). xx represents one of the field numbers (01-47) on the screen. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

AAMATCH: Scan only register that compares the absolute address with bits 7-20 of the absolute address assembler and bits 21-28 of the SSAR.

ACBADR: The ACB address that identifies K-addressable storage. Bits 0-21 are latched in storage SAR during K-addressable microwords.

ACBBNDY: This scan-only register holds ACB address bits 7-19. This register and DREG4 bits 0-6 determine the value of the ACB bad bit during a load DLAT.

AUXEVN: Auxiliary storage data register (even doubleword) used for partial channel writes to the BSM.

AUXODD for partial channel writes to the BSM.

BSMADDR: Main storage address register (bits 0-6 used to access the BSM; bits 26-31 are 0).

Note: Parity highlighting on the first group of data is performed by BSMADDR bits 0 to 16 and on the second group of data by BSMADDR bits 17 to 27.

BSMCMD: Six-bit BSM command register. The bit meanings for source 1 memory are:

0	Inhibit refresh
1	Store/fetch
2,3	Not used
4	Card select
5,6,7	Not used.

The bit meanings for source 2 memory are:

0	Fetch
1	Store
2	CAS
3	Address multiplexer
4	RAS
5	Data out gate
6,7	Not used.

BSMSIZE: The following is the main memory size:

007F	8 Mb
00FF	16 Mb
17FF	24 Mb
1FFF	32 Mb.

CASLOT: Registers for encoded cache slot from DLAT/DIR module.

CMDREG: A 9-bit storage command register that contains C-REG bits. The bit meanings are:

0,1,B	Not used
2	CREG byte 0, bit 2
3	CREG byte 0, bit 3
4	CREG byte 0, bit 4
5	CREG byte 0, bit 5
6	CREG byte 2, bit 1
7	CREG byte 2, bit 2
8	CREG byte 1, bit 0
9	CREG byte 1, bit 1
A	CREG byte 1, bit 2.

CTLRING: Indicates the BSM control ring status. The bit meanings are:

0	Control ring position 0/5
1	Control ring position 1/6
2	Control ring position 2/7
3	Control ring position 3/8
4	Control ring position 4/9
5	Control ring position 5-9
6	Second control ring cycle
7	First control ring cycle.

DIR03: Four registers that latch the absolute address outputs of directories 0, 1, 2, and 3 arrays.

If the cache array is 4K or 8K bytes, the register fields for slots 2 and 3 cannot be changed to anything but zeros.

DIR47: Four registers that latch the absolute address outputs of directories 4, 5, 6, and 7 arrays.

If the cache array is 4K or 8K bytes, these fields cannot be changed to anything but zeros.

DLATAA: Two registers that latch the absolute address outputs from DLAT0 and DLAT1 arrays.

DLATKEYS: Two registers that latch the output of the DLAT keys (key 0 through key 4) from the DLAT STAT/KEY array.

DLATVA: Registers that latch the virtual address outputs of the DLAT0 and DLAT1 arrays. Displayed bit meanings left to right are:

Bits 0-15	DLAT 0 output
Bits 16-23	Channel DLAT output
Bits 24-39	DLAT 1 output.

DLBSMSAR: Storage address register with destinations to the DLAT and BSM.

DLDIRST: Contains the status bits latched from the DLAT and directory arrays. The groups displayed left to right are DLAT status bits, encoded directory status bits for slots 0-3, and encoded directory status bits for slots 4-7.

The status bits for slots 2-7 are always X'5' and cannot be changed to other values (applies if the cache array is 4K or 8K bytes).

DLAT Status Bits

0,1,2	Not used
3	Channel DLAT valid
4	DLAT 0 valid
5	DLAT 0 V/R
6	DLAT 0 ACB bad
7	DLAT 0 LRU
8	DLAT 1 valid
9	DLAT 1 V/R
A	DLAT 1 ACB bad
B	DLAT 1 LRU.

Directory Status Decodes

0 (000)	Normal
1 (001)	Copy
2 (010)	Modified
3 (011)	NIH
4 (100)	Not used
5 (101)	Bad entry
6 (110)	Invalid
7 (111)	Not used.

DXDRA-D: Indicates the data transfer ring positions. The bit meanings are:

Bits 0-3	Data transfer ring A positions 0/1-6/7
Bits 4-7	Data transfer ring B positions 0/1-6/7
Bits 8-11	Data transfer ring C positions 0/1-6/7
Bits 12-15	Data transfer ring D positions 0/1-6/7.

ECREVN: Contains the output of the ECC logic for the even doubleword.

ECRODD: Contains the output of the ECC logic for the odd doubleword.

IC-FDM-BB: Contains status information on the storage control sequence. The bit meanings are:

Bit	
0,1	Not used
2	Load first PU CMPL
3	First PU CMPL
4,5	Not used
6	Load second PU CMPL
7	Second PU CMPL
8	PU CMPL ICT
9	Force DIR MISS ICT
A	Force DIR MISS STG 1
B	Force DIR MISS STG 2
C	Storage control latch A
D	Storage control latch B
E	BSM busy EXT A
F	BSM busy EXT B.

ICTCTLST: Contains the control sequence status for an inter-cache transfer (ICT). The bit meanings are:

Bit	
0	SVC deadlock
1	Not used
2	X busy
3	X DIR request
4	Not used
5	Y busy
6	REQ accepted
7	ARM request.

KEYSTACK: Key stack entry. The bit meanings are:

Bit	
0-3	Storage key
4	Not used
5	Fetch protect
6	Reference bit
7	Change bit.

MDREVN: Main data register (even doubleword). Receives data from the storage data register (during stores) or from the BSM (during fetches) and inputs this data to the ECC logic.

MDRODD: Main data register (odd doubleword). Receives data from cache (during stores) or from the BSM (during fetches) and inputs this data to the ECC logic.

PFXREG: Prefix register that contains address bits 7-19 that page 0 in storage is translated into.

PU-KEY: Contains the key from PU (PSW or CAW) used to compare with the storage key (from DLAT or KEYSTACK) for protection exceptions.

RTYCNTL: Contains storage retry control data. The bit meanings are:

Bit	
0	Storage retry active
1	Predicted count-up parity
2	Predicted countdown parity
3	Predicted hold parity
4,5	Not used
6	Retry overflow
7-B	Retry counter (array address)
C-13	One byte of R/W flags.

SARCMD: SAR control for cache address generation.

SDREG0: Storage data registers of slot 0 for data transfer between cache, BSM, PU, retry array, and key stack.

SDREG1: Storage data registers of slot 1 for data transfer between cache, BSM, PU, retry array, and key stack.

SDREG2: Storage data registers of slot 2 for data transfer between cache, BSM, PU, retry array, and key stack. See note.

SDREG3: Storage data registers of slot 3 for data transfer between cache, BSM, PU, retry array, and key stack. See note.

SDREG4: Storage data registers of slot 4 for data transfer between cache, BSM, PU, retry array, and key stack. See note.

SDREG5: Storage data registers of slot 5 for data transfer between cache, BSM, PU, retry array, and key stack. See note.

SDREG6: Storage data registers of slot 6 for data transfer between cache, BSM, PU, retry array, and key stack. See note.

SDREG7: Storage data registers of slot 7 for data transfer between cache, BSM, PU, retry array, and key stack. See note.

Note: If the cache array is 4K or 8K bytes, these fields cannot be changed to anything but zeros.

STDIRSAR: Storage address register with destinations to STAT/KEY array and directory array.

STEER: Four 1-byte fields which contain a bit steering code for 4 bytes of data. The leftmost field is for bytes 0-3, the next field is for bytes 4-7, the next for bytes 8-11, and the next for bytes 12-15.

STGCASAR: Storage address register which provides input to cache.

STGCTLST: Contains status information on the storage control function. The bit meanings are:

Bit	
0	Write operation
1	Reset reference bit
2	Retry address
3	Gate retry data
4	Allow stack key check
5	Allow DLAT key check
6	Set key
7	Insert key
8	Not used
9	Not used
A	Set change bit
B	Set reference bit
C	V/R mode
D	XBDY operation
E	Not used
F	Not used.

STPADAB: Six-bit register that contains bits 26-31 of the BSM ending address (right adjusted).

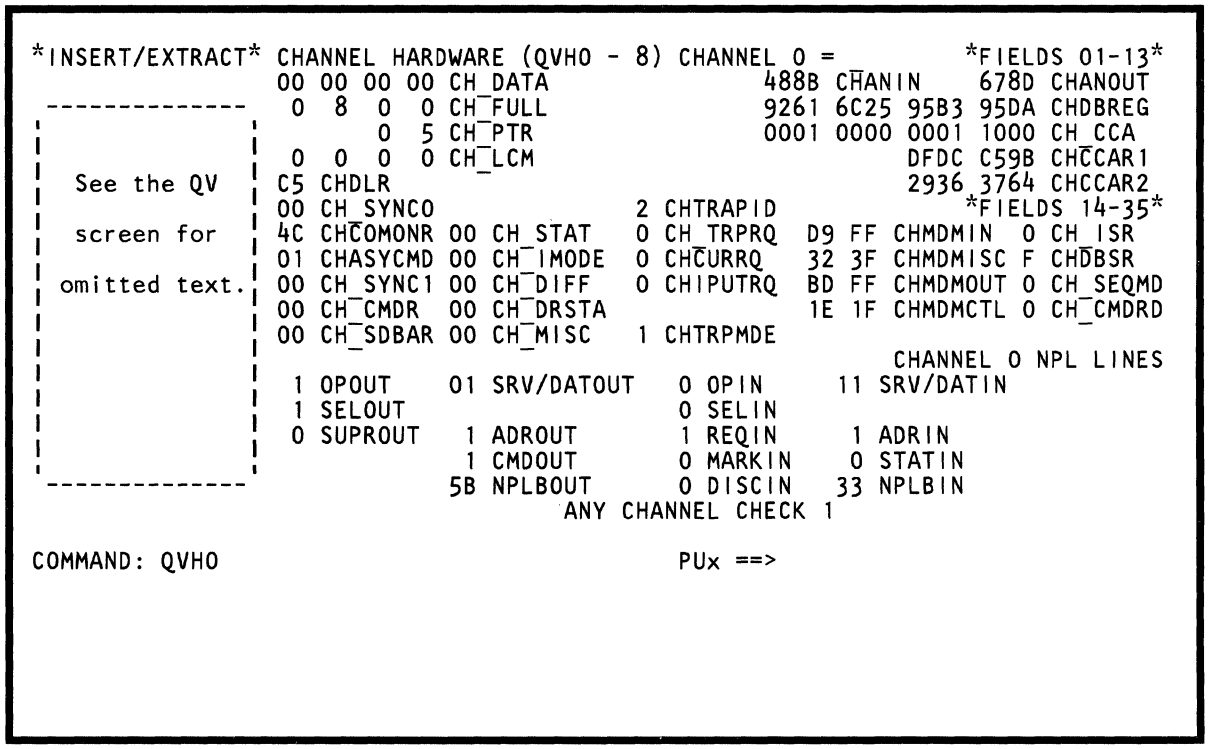
STRADDA: Six-bit register that contains bits 26-31 of the BSM starting address (right adjusted).

STRADDB: Six-bit register that contains bits 26-31 of the BSM starting address (right adjusted).

VAMATCH: Virtual address match register.

XBDYBUFF: Storage data register for cross doubleword boundary PU read - hit operation.

(QVH) Channel Hardware



Use the QVH command to display, save, and change the channel hardware fields. The data in the fields is in hex and the fields are numbered left to right and top to bottom on the screen. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Channel Hardware Data

To display channel hardware data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVH and a channel number next to COMMAND (the range of valid channel numbers relies on the number of attached channels). If you do not key a channel number, the default is channel 0.
5. Press the ENTER key.

Changing a Channel Hardware Field

Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVH next to COMMAND followed by:
   a. A channel number (in hex).
   b. A field number (01 to 35) in decimal format.
   c. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVH, a channel number in hex, a field number in decimal, an OP code, and the new (replacement) hex data.

Using the screen on the preceding page as an example, QVH013=..F2F3 changes the data in channel 0, field 13 from 29363764 to 29F2F364. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in the field to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVH command.
2. If you key too much data, message INVALID INPUT appears, and the cursor moves to the right of the OP code.
3. You cannot change anything on the screen below the CHANNEL x NPL LINES label.

Saving a Channel Hardware Field

Key QVHcxx? in a block (see "Saving Data" on page 313). c represents the desired channel number (in hex) and xx represents one of the field numbers on the screen. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

CHANIN: The two bytes of data to the channel-in register.

CHANOUT: The two bytes of data from the channel-out register.

CHASYCMD: The channel asynchronous command (external address is 3,0).

Bits 0 to 3	Channel ID latches
Bit 4	Inhibit select-out and unload trap latch
Bits 5 to 7	Command function bit latches.

CHCCAR1: The output from the channel control array.

CHCCAR2: The input to the channel control array.

CHCOMONR: The common register control bits (external address is 2,0).

Bits	
0	Spare
1	Allow external read
2	Meter on latch
3	Microdetected channel control check
4	Internal interrupt
5	Valid TIC
6	Valid CC CCW
7	Valid CD CCW

CHCURRQ: Identifies the channel that is trying to trap. 2 indicates channel 0; 3 indicates channel 1; 4 indicates channel 2; etc.

CHDBREG: The data in the channel data buffer register.

CHDBSR: Identifies the channel that is storing data (CHCCAR2) into the CCA array. 2 indicates channel 0; 3 indicates channel 1; 4 indicates channel 2; etc.

CHDLR: Contains the count value of the channel data length register (external address is 0,0).

CHIPUTRQ: If 1, indicates an active trap request.

CHMDMCTL: One-byte MDM control bus (left byte for channels 0-5; right byte for channels 6-B).

CHMDMIN: One-byte MDM bus-in (left byte for channels 0-5; right byte for channels 6-B).

CHMDMISC: One-byte MDM miscellaneous bus-in (left byte for channels 0-5; right byte for channels 6-B).

CHMDMOUT: One-byte MDM bus-out (left byte for channels 0-5; right byte for channels 6-B).

CHTRAPID: Identifies the channel (channel in traps). 2 indicates channel 0; 3 indicates channel 1; 4 indicates channel 2; etc.

CHTRPMDE: Identifies latches that observe the channel trap bit.

CH__CCA: Channel control information (bytes 0-3 are used in data mode; bytes 4-7 are used in sequence mode).

CH__CMDR: Channel command register (identifies the type of channel command). External address is 5,0.

CH__CMDRD: If 1, indicates that a channel command is ready (external address is 5,0).

CH__DATA :Indicates the data in the interface controller data register.

CH__DIFF: For data mode, indicates the difference between the data buffer count and the compare count.

CH__DRSTA: Contains the status of the data register (external address is 5,1).

Bits	
0	Internal interrupt request
1	PCI
2	CD prefetch
3	Spare
4	LCMs >=1
5,6,7	Number of full bits

CH__FULL: Indicates that a channel data register position is full of data (a bit is on for each byte).

CH__IMODE: Indicates the channel interface mode (external address is 3,1).

Bits	
0	Block multiplexer
1	Byte multiplexer
2	Enable ACB check
3	Data stream mode
4	Internal interrupt request
5	Format 1
6,7	Spare

CH__ISR: If 1, indicates that channel is aligned with channel control array fetch cycle.

CH__LCM: Points (left to right) to the last byte of data to be transferred for the current CCW. More than one LCM can be on during data chaining.

CH_MISC: Contains miscellaneous bits (external address is 6,1). The bit meanings are:

Bits	
0	DI parity check
1	Output
2	ISB
3	First character transferred
4	Mark-in
5	Device stopped
6,7	Spare

CH_PTR: Points (left to right) to those bytes of data to be transferred from the channel data register.

CH_SDBAR: Addresses the channel data buffer when transferring and receiving data from the storage buffer (external address is 6,0).

CH_SEQMD If 1, the channel is in sequence count mode. If 0, the channel is in data mode.

CH_STAT: Contains channel status indicators (external address is 2,1). The bit meanings are:

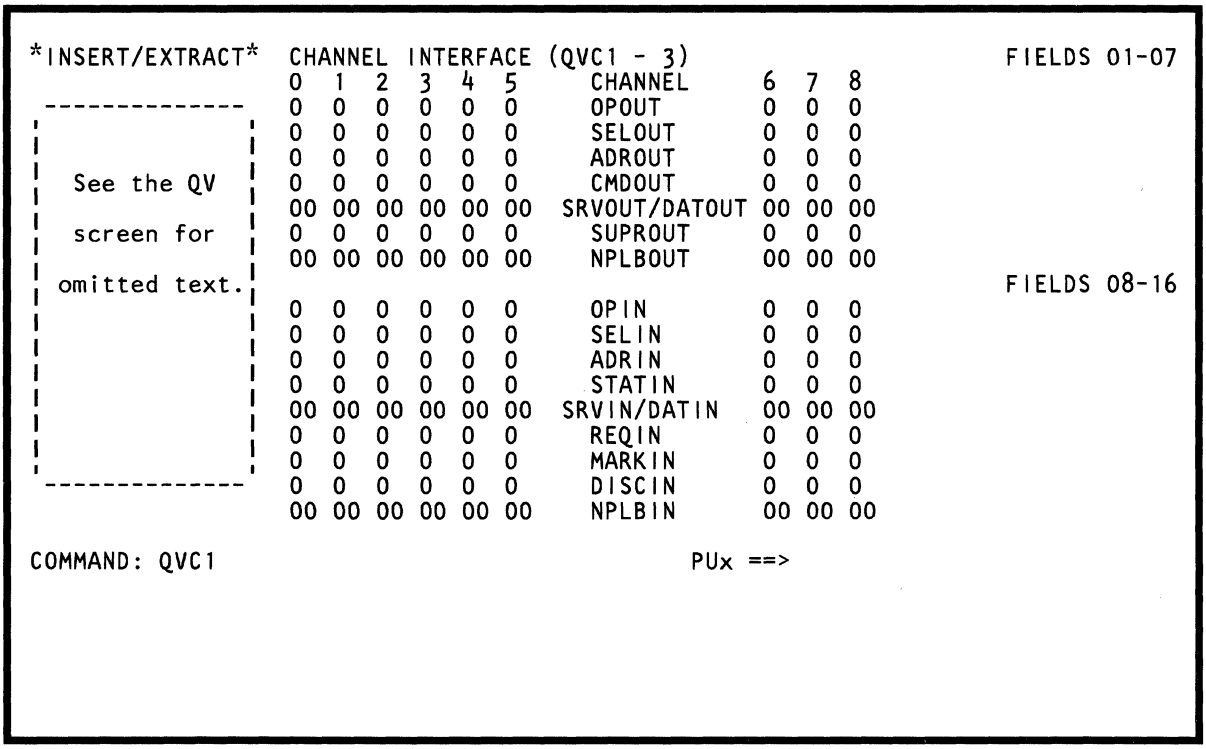
0	0
1	Incorrect length latch
2	Program or protect check latch
3	0
4	Channel data check latch
5	Channel control check latch
6	0
7	Chaining check latch

CH_SYNC0: Contains sequence count values, device address, and device commands (external address is 7,0).

CH_SYNC1: Contains trap addresses, flags, and timeout values (external address is 4,0).

CH_TRPRQ: Indicates whether this channel has a trap request.

(QVC) Channel Interface



Use the QVC command to display and save information about the channel interface. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Channel Interface Data

To display channel interface data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVC and an address digit (1-3) next to COMMAND. If you do not specify an address digit, the default is address 1.
5. Press the ENTER key.

Saving Channel Interface Data

Key QVCnxx? in a block (see "Saving Data" on page 313). n represents the number (1-3) of the channel interface; xx represents one of the field numbers on the screen. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification (QVC1)

ADRIN: If on, indicates that the address of the currently-selected I/O device is on the bus-in lines.

ADROUT: If 1, identifies data on the bus-out lines as an address or signals the control unit to disconnect.

CMDOUT: If 1, identifies the data on the bus-out lines as a command.

DISCIN: If 1, indicates that a control unit signaled that an error occurred.

MARKIN: Indicates number of bytes on bus-in lines or number of bytes required for data transfer.

NPLBIN: NPL bus-in data.

NPLBOUT: NPL bus-out data.

OPIN: If 1, signals that an I/O device is selected.

OPOUT: If 1, interlocks the control units and channel.

REQIN: If 1, indicates to the channel that a control unit needs service.

SELIN: If 1, indicates that a control unit was not selected (SELIN is the return path for SELOUT).

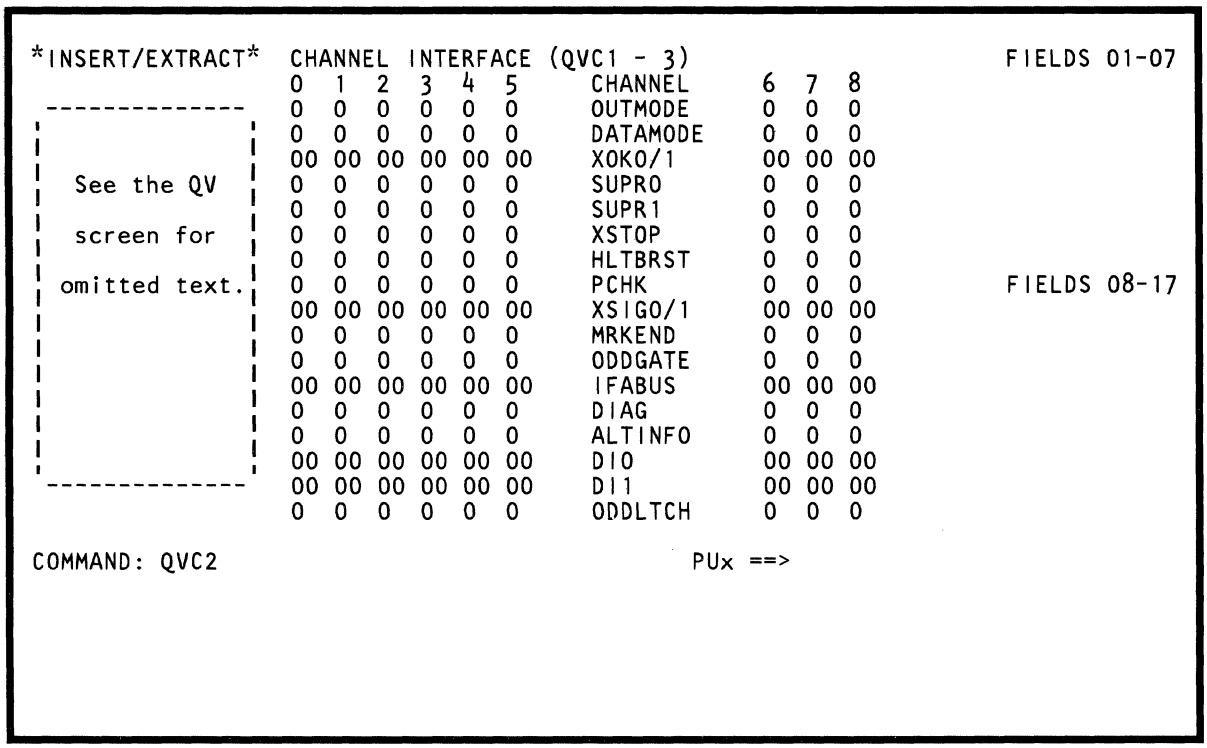
SELOUT: If 1, indicates that a control unit was selected.

SRVIN/DATIN: Indicates the data available on the bus-in lines.

SRVOUT/DATOUT: Indicates the data available on the bus-out lines.

STATIN: If 1, indicates the bus-in data is status information.

SUPROUT: If 1, indicates that status or a data transfer is suppressed.


INSERT/EXTRACT
CHANNEL INTERFACE (QVC1 - 3)
FIELDS 01-07
0 1 2 3 4 5 CHANNEL 6 7 8
0 0 0 0 0 0 OUTMODE 0 0 0
0 0 0 0 0 0 DATAMODE 0 0 0
00 00 00 00 00 00 XOKO/1 00 00 00
0 0 0 0 0 0 SUPRO 0 0 0
0 0 0 0 0 0 SUPR1 0 0 0
0 0 0 0 0 0 XSTOP 0 0 0
0 0 0 0 0 0 HLTBRST 0 0 0
0 0 0 0 0 0 PCHK 0 0 0
FIELDS 08-17
00 00 00 00 00 00 XSIGO/1 00 00 00
0 0 0 0 0 0 MRKEND 0 0 0
0 0 0 0 0 0 ODDGATE 0 0 0
00 00 00 00 00 00 IFABUS 00 00 00
0 0 0 0 0 0 DIAG 0 0 0
0 0 0 0 0 0 ALTINFO 0 0 0
00 00 00 00 00 00 DIO 00 00 00
00 00 00 00 00 00 DI1 00 00 00
0 0 0 0 0 0 ODDLTCH 0 0 0
See the QV screen for omitted text.
COMMAND: QVC2
PUx ==>

Label Identification (QVC2)

ALTINFO: Used to extract sequence code information.

DATAMODE: If 1, enables the interface to transfer data.

DIAG: If 1, assigns the diagnostics to observe the bus and tag lines.

DI0: The byte of data in the even data-in register

DI1: The byte of data in the odd data-in register.

HLTBRST: If 1, indicates a halt operation.

IFABUS: One byte interface between the IFA and interface controller.

MRKEND: If 1 during data mode, indicates data transfer end. If 1 during sequence count mode, indicates IFA mark-in.

ODDGATE: If 1 during output mode, gates the odd data register. If 1 during input mode, gates the odd data-in register.

ODDLTCH: If 0, signals that an even data byte is to be transferred. If 1, signals that an odd data byte is to be transferred.

OUTMODE: If 1, signals a data out condition. If 0, signals a data in condition.

PCHK: If 1, indicates a parity check occurred on the channel data bus.

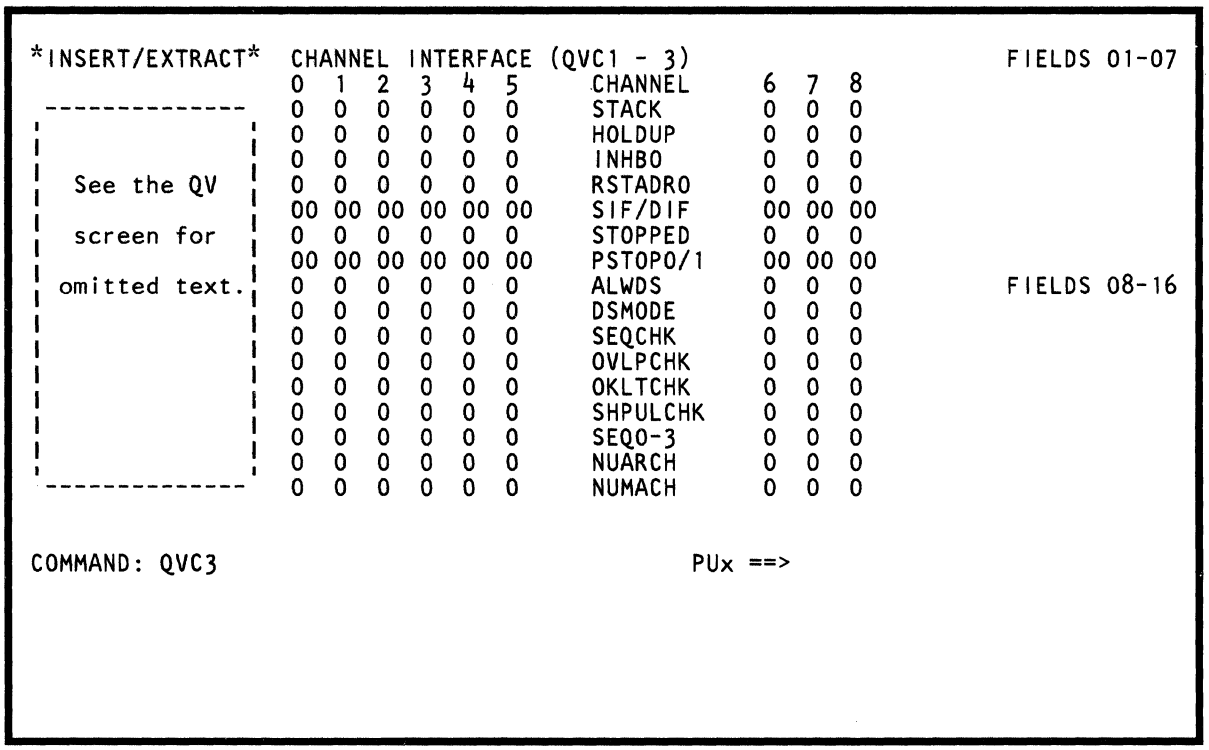
SUPR0: If 1 during data mode, indicates suppress out. If 1 during sequence count mode, indicates bus mode.

SUPR1: If 1, indicates suppress out.

XOK0/1: In input mode, the data to the IFA data-in register. In output mode, the data to the IFA data-out register.

XSIG0/1: Indicates the even/odd byte to be transferred in data mode.

XSTOP: If 1, indicates command out will be raised to the next data request.


INSERT/EXTRACT
CHANNEL INTERFACE (QVC1 - 3)
FIELDS 01-07
0 1 2 3 4 5 CHANNEL 6 7 8
0 0 0 0 0 0 STACK 0 0 0
0 0 0 0 0 0 HOLDUP 0 0 0
0 0 0 0 0 0 INHBO 0 0 0
0 0 0 0 0 0 RSTADRO 0 0 0
00 00 00 00 00 00 SIF/DIF 00 00 00
0 0 0 0 0 0 STOPPED 0 0 0
00 00 00 00 00 00 PSTOPO/1 00 00 00
0 0 0 0 0 0 ALWDS 0 0 0
FIELDS 08-16
0 0 0 0 0 0 DSMODE 0 0 0
0 0 0 0 0 0 SEQCHK 0 0 0
0 0 0 0 0 0 OVLPCHK 0 0 0
0 0 0 0 0 0 OKLTCHK 0 0 0
0 0 0 0 0 0 SHPULCHK 0 0 0
0 0 0 0 0 0 SEQO-3 0 0 0
0 0 0 0 0 0 NUARCH 0 0 0
0 0 0 0 0 0 NUMACH 0 0 0
See the QV screen for omitted text.
COMMAND: QVC3
PUx ==>

Label Identification (QVC3)

ALWDS: If 1, indicates high speed mode for data streaming operation.

DSMODE: If 1, indicates data streaming is active.

HOLDUP: If 1, holds NPLSRVOUT until the channel is ready to transfer data.

INHBO: If 1, inhibits the bus-out lines.

NUARCH: If 1, indicates S/370XA.

NUMACH: If 1, indicates 4381.

OKLTCHK: If 1, indicates a data overrun check in data streaming mode.

OVLPCHK: If 1, indicates data-in tag was active too soon (before the last data-out tag).

PSTOP0/1: If 10, indicates a stop on the next odd byte; if 01 indicates a stop on the next even byte.

RSTADRO: If 1, resets the address out tag.

SEQCHK: If 1, indicates that the same data-in tag was active twice in a row during high speed mode.

SEQ0-3: A three-bit sequence code for the extended CSW.

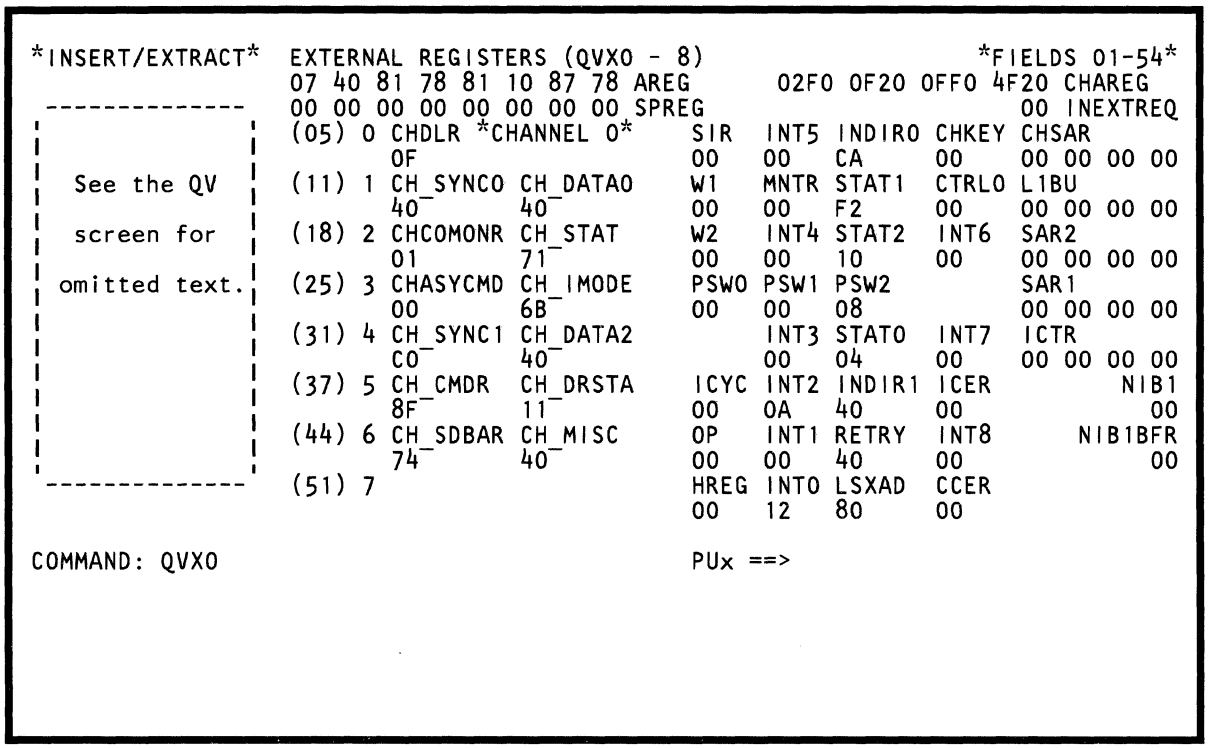
SHPULCHK: If 1, indicates the data-in tag was less than 120 nanoseconds.

SIF/DIF: If 10, indicates service in occurred first; if 01, indicates data-in occurred first (at the start of a data transfer).

STACK: If 1, indicates a stack status condition.

STOPPED: If 1, indicates the data transfer stopped.

(QVX) External Registers



Use the QVX command to display, save, and change the external register fields. The data in the fields is in hex and the fields are numbered left to right and top to bottom on the screen. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying External Register Data

To display external register data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVX and a channel number (in hex) next to COMMAND. The range of valid channel numbers depends on the number of attached channels. If you do not key a channel number, the default is channel 0.
5. Press the ENTER key.

Changing External Register Data

Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVX next to COMMAND followed by:
   a. A channel number (in hex).
   b. A field number (01 to 54) in decimal format .
   c. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVX, a channel number in hex, a field number in decimal, an OP code, and the new (replacement) hex data.

Using the screen on the preceding page as an example, QVX002=F1..F3 changes the data in channel 0, field 02 from 02F00F to F1F0F3. The periods in the command are used as "do not care" characters; they indicate that you want the third and fourth hex digits in the field to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVX command.
2. If you key more data than the selected field permits, the message INVALID INPUT appears, and the cursor moves to the right of the OP code.

Saving External Register Data

Key QVXcxx? in a block (see "Saving Data" on page 313). c represents the desired channel number (in hex) and xx represents one of the field numbers (in decimal) on the screen. The question mark (?) indicates a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

AREG: Eight-byte PU register.

CCER

CCER: Cache control external register (external address is 7,3). X'00' indicates 4K or 16K cache; X'80' indicates 8K or 32K cache.

CHAREG: Contains channel hex data.

CHASYCMD: Channel asynchronous command register (external address is 3,0).

CHCOMONR: This byte contains the channel control bits in the common register (external address is 2,0). The bit meanings are:

0 Spare
1 Can read other externals
2 LCA meter in
3 Microword channel control check
4 Internal interrupt request
5 Valid TIC (transfer-in-channel)
6 Valid command chain CCW
7 Valid chain data CCW

CHDLR: Contains the count value of the channel data length register (external address is 0,0).

CHKEY: Bits 0-3 are key bits; 4-7 are always 0 (external address is 0,3).

CHSAR: Contains the address invoked when the channel is used (external address is 0, 4-7).

CH_CMDR: Channel command register (identifies the type of channel command). External address is 5,0.

CH_DATA0: This is the first byte of the channel data register (external address is 1,1).

CH_DATA2: Contains the channel sequence count (external address is 4,1).

CH_DRSTA: Contains the status of the data register (external address is 5,1).

Bit	
0	Internal interrupt request
1	PCI
2	CD prefetch
3	Spare
4	LCMs greater than 0
5,6,7	Number of full bits.

CH_IMODE: Contains gating controls for ACB checking and latches for PCI CDA controlling (external address is 3,1). The bit meanings are:

Bit	
0	Block multiplexer
1	Byte multiplexer
2	Enable ACB check
3	Data streaming mode
4	Internal interrupt request
5	Format 1
6,7	Spare.

CH_MISC: Contains miscellaneous bits (external address is 6,1). The bit meanings are:

Bit	
0	DI parity check
1	Output
2	ISB
3	First character transferred
4	Mark-in
5	Device stopped
6,7	Spare.

CH_SDBAR: Addresses the channel data buffer during a data transfer (external address is 6,0).

CH_STAT: Contains channel status indicators (external address is 4,1). The bit meanings are:

Bit	
0	0
1	Incorrect length latch
2	Program or protect check latch
3	0
4	Channel data check latch
5	Channel control check latch
6	0
7	Chaining check latch.

CH_SYNC0: Contains the value in channel sync 0 register (external address is 1,0).

CH_SYNC1: Contains trap addresses, flags and time-out values (external address is 4,0).

CTRLO: Five-bit translation control register (external address is 1,3). The bit meanings are:

0 4K page size
1 2K page size
2 P mode
3 1M/64K segment size
4 P/370 translate control.

HREG: Contains the status of current trap conditions (external address is 7,0). The bit meanings are:

0 Block odd branch traps
1 Odd branch trap active
2 ACB check trap active
3 Storage protect trap active
4 Directory miss trap active
5 DLAT miss active
6 Block channel traps
7 Channel trap active.

ICER: I-cycle external control register (external address is 5,3). The bit meanings are:

0 370 E-mode
1 SIE mode
2 Trace
3 Low address protect
4 Force 31-bit address
5 P mode
6 Low address fetch protect inhibit
7 Block channel request (nn).

ICTR: Contains the starting address of the next instruction.

ICYC: Contains I-cycle status information (external address is 5,0). The bit meanings are:

0 S/370 mode
1 Unconditional I-cycle storage error
2 Conditional I-cycle storage error
3 Successful branch
4 Execute latch
5 Execute mask latch
6 IB empty
7 Operate latch.

INDIR0: Contains the address that is the R1 field of the current instruction (external address is 0,2).

INDIR1: Contains the address that is the R2 or X2 field of the current instruction (external address is 5,2).

INEXTREQ: External signal request.

INT0: Contains channel mode information (external address is 7,1). The bit meanings are:

0 Interrupt pending
1 PER
2 Pending channel interrupt
3 Pending external interrupt
4 MSVP request
5 Execute interrupt
6 Decrementer = 0
7 Stop request.

INT1: Contains channel mode information (external address is 6,1). The bit meanings are:

0 Channel 0 interrupt
1 Channel 1 interrupt
2 Channel 2 interrupt
3 Channel 3 interrupt
4 Channel 4 interrupt
5 Channel 5 interrupt
6 Not used
7 Channel internal interrupt.

INT2: Contains channel mode information (external address is 5,1). The bit meanings are:

0 Signal DIAGM
1 ITIMWRPA
2 ADRMATCH
3 ISTRSTEP
4 Pending machine check interrupt
5 Decrementer adjustment
6 CCOMPIB
7 CPUTIB.

INT3: Contains channel mode information (external address is 4,1). The bit meanings are:

0 ITIMIB
1 Interrupt key
2 External signal 2
3 External signal 3
4 External signal 4
5 External signal 5
6 External signal 6
7 External signal 7.

INT4: Contains channel mode information (external address is 2,1). The bit meanings are:

0 CPUTIA
1 CCOMPIA
2 ITIMIA
3 Pending machine check interrupt
4 Retry interrupt force
5 Interrupt key request
6 Restart request
7 Full I-counter trace active.

INT5: Contains channel interrupt request data (external address is 0,1). The bit meanings are:

0 Channel 0 interrupt request
1 Channel 1 interrupt request
2 Channel 2 interrupt request
3 Channel 3 interrupt request
4 Channel 4 interrupt request
5 Channel 5 interrupt request
6 Not used
7 Reset ADRMATCH.

INT6: Contains channel interrupt request data (external address is 2,3). The bit meanings are:

0 Malfunction alert
1 Emergency signal
2 External call
3 TODC sync check
4 Reserved
5 Reserved
6 Service signal
7 Reserved.

INT7: Contains channel mode information (external address is 4,3). The bit meanings are:

0 PU to SP interrupt request
1 PU to SP response
2 SP to PU interrupt
3 SP to PU response
4 Mask bit PU to SP interrupt
5 Mask bit machine check interrupt
6 Remote 1 MHz oscillator error
7 TODC stopped latch.

INT8: Contains channel mode information (external address is 6,3). The bit meanings for S/370 mode are:

0 Channel 6 interrupt
1 Channel 7 interrupt
2 Channel 8 interrupt
3 Not used
4 Not used
5 Not used
6 Not used
7 Not used.

The bit meanings for S/370XA mode are:

0 I/O interrupt 0
1 I/O interrupt 1
2 I/O interrupt 2
3 I/O interrupt 3
4 I/O interrupt 4
5 I/O interrupt 5
6 I/O interrupt 6
7 I/O interrupt 7.

LSXAD: Local storage extended address register (external address is 7,2). Bit 3 or bit 7 is used to form the high-order address bit of the local storage array.

L1BU: Contains the cache backup address (external address is 1, 4-7).

MNTR: Contains system status information (external address is 1,1). The bit meanings are:

0 Start I/O count
1 SVC interrupt
2 I/O interrupt
3 Page fault interrupt
4-7 Not used.

NIB1: Contains the second byte of the NIB (external address is 5,7).

NIB1BFR: Contains the second byte of the NIB buffer (external address is 6,7).

OP: Contains byte 0 of the current instruction (external address is 6,0).

PSW0: Contains PSW0 information (external address is 3,0).

PSW1: Contains PSW1 information (external address is 3,1).

PSW2: Contains PSW2 information (external address is 3,2).

RETRY: Contains information about a retry operation (external address is 6,3). The bit meanings are:

0 Hardstop
1 Sequential processing
2 Instruction processing
3 SS operation
4 Refresh in progress
5 Retry in progress
6 Unretriable section of code
7 System operation.

SAR1: Contains the address of operand 1 of an instruction (external address is 3, 4-7).

SAR2: Contains the address of operand 2 of an instruction (external address is 2, 4-7).

SIR: Supplies byte or bit shifting information (external address is 0,0). This register can also be used as write flags to storage.

SPREG: The service processor register that is used to communicate between the SP and the unit processor.

STAT0: Contains ALU status (external address is 4,2). The bit meanings are:

0 ALU overflow
1 Negative result
2 Recomplement
3 Destination equal to 0
4 ALU carry
5 1-bit carry
6 Z not equal to 0
7 ALU size exception.

STAT1: Contains ALU status (external address is 1,2). The bit meanings are:

0 W1 (4) equal to 0
1 W2 (0-4) equal to 0
2 Invalid decimal format (cumulative)
3 True/complement decimal
4 PSW and I/O trace
5-6 Not used
7 ACB enable.

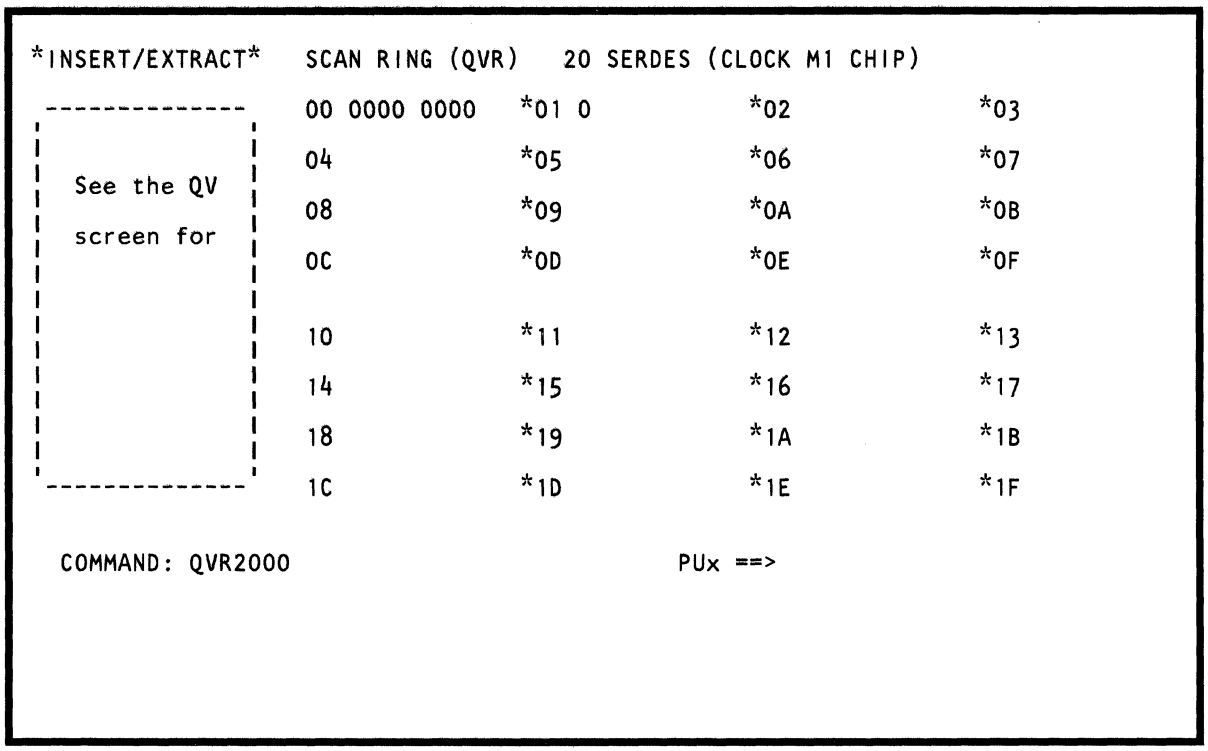
STAT2: Contains ALU status conditions (external address is 2,2). The bit meanings are:

0 Working status 0
1 Working status 1
2 Working status 2
3 Working status 3
4 Channel working status 0
5 Channel working status 1
6 Instruction length counter
7 Instruction length counter.

W1: Contains shift length value when W1 register is specified as a length parameter (external address is 1,0).

W2: Contains shift length value when W2 register is specified as a length parameter (external address is 2,0). It can also serve as a loop counter.

(QVR) Scan Rings



Warning: Use the QVR command only when directed by your support center.

Use the QVR command to display, change, save, and loop a scan ring and its data.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Scan Ring Data

To display scan ring data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVR, a two-digit scan ring number, and a byte number next to COMMAND. For example, to display the data in scan ring 24 and byte number 14, QVR2414. If you do not specify a scan ring and byte number, the default is scan ring 20 and byte 00.
5. Press the ENTER key.

Notes:

1. Scan ring data is displayed in binary.
2. You can use the PAGE key with this screen.

Changing Scan Ring Data

To change scan ring data, use either of the following methods:

Method 1:

1. Display the desired scan ring data (see above).
2. Place the cursor under the location(s) to be changed, and key (in binary) the new data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVR next to COMMAND followed by:
   a. A scan ring number.
   b. A byte number.
   c. An equal (=) symbol (designates the MOVE op code).
   d. Up to 16 bits of data (always start with the leftmost bit position of the specified byte).

      For example, QVR8514=10011 changes the leftmost five bits of data in byte number 14, scan ring 85 to 10011. QVR8514=0011001100 changes all the bits in byte 14 and the two leftmost bits in byte 15 to 0011001100.
5. Press the ENTER key.

If you key a data pattern that is not valid (that is, hex characters or more than 16 bits), the message INVALID INPUT appears and the cursor is placed to the right of the equal (=) symbol.

Saving Scan Ring Data

Key QVRxxbb? in a block (see "Saving Data" on page 313). xx is the scan ring number and bb is the byte number. The question mark (?) indicates that this is a save operation.

Looping Data into a Scan Ring

To loop an eight-bit data pattern into a scan ring, enter:

- QVRxxbbLyy—this loops hex-bit pattern yy into scan ring number xx. bb is the byte number.
- QVRxxbbL—this loops bit pattern X'00' into scan ring xx. (If you do not specify a bit pattern, the default is bit pattern X'00'.) bb is the byte number.

An initial test pattern of X'A5' (and parity bit) precedes the looping of the desired data pattern (with no parity bit). Looping continues until you press the CNCL key.

Scan Rings

20	SERDES (Clock M1 Chip)
21*	Diagnostic Latches Clock
22*	Refresh Clock and SM1 Latch
23	Dynamic Status (M2 Chip)
24	Maintenance Clock, PU/Channel/L1 Clock
27*	Oscillator Frequency
40	SERDES (PU M1 Chip)
41*	Diagnostic Latches - PU/Channel
42**	Timer and SM1 Latch
43	Interrupt
44	PU SAR and I-Cycles
45	PU Shifter
46	PU LS/External Addressing, LS and Retry
47	PU, ALU, Data Flow, Stats
48	Channel Data Buffer
49	Channel Control
4A	Channel Interface (0:5)
4B	Channel Interface Adptr (0:5)
4C	Channel Interface (6:11)
4D	Channel Interface Adapter (6:11)
80	SERDES (Cache/Storage M1 Chip)
81*	Diagnostics Latches (Cache/Storage)
82*	Main Storage Refresh and SM1 Latch
83	BSM Controls and ECC2/Data Flow
84	SAR, Keys, and Retry Controls
85	DLAT and DIR
86	Storage Controls, ECC1/Data Flow
87	Cache Data Register Bytes 0/1
88	Cache Data Register Bytes 2/3
89	Cache Data Register Bytes 4/5
8A	Cache Data Register Bytes 6/7
C0	SERDES (Control Storage M1 Chip)
C1*	Diagnostic (Control Storage)
C2	SP Data Register and SM1 Latch
C3	CS Array Bytes 0/4
C4	CS Array Bytes 1/5
C5	CS Array Bytes 2/6
C6	CS Array Bytes 3/7
C7	CS Control

* The refresh clock must be stopped to display or change the indicated scan rings.

** The TOD clock is invalidated, and the refresh clock must be stopped if you display or change scan ring 42.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVLxxxx) Log Display Mode (CE-Only)

Use the Log Display mode (QVLxxxx) command (in combination with the screen listed below) to display PU error information that pertains to a specific log ID. (Use the QEPD command to get the desired log ID.)

QVB QVM
QVC QVR
QVH QVS
QVI QVX
QVK

You do not need to stop the PU clock to use this function.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying Log Display Mode

To specify Log Display mode, key QVL and a four-digit log ID next to COMMAND, and press the ENTER key. (Log Display mode is intensified on the screen.)

Now whenever you display the Insert/Extract screens (listed above), the error data (logged at the time of the error) is displayed rather than the actual data.

Resetting Log Display Mode

To reset Log Display mode, key QVL next to COMMAND, and press the ENTER key. (Log Display mode is no longer intensified on the screen.)

Certain commands (for example, QOM) also reset Log Display mode. These commands, however, do not return the screen intensity to normal.

(QVN) Clock Ignore Mode (CE-Only)

Warning: Use the QVN command only when directed by your support center.

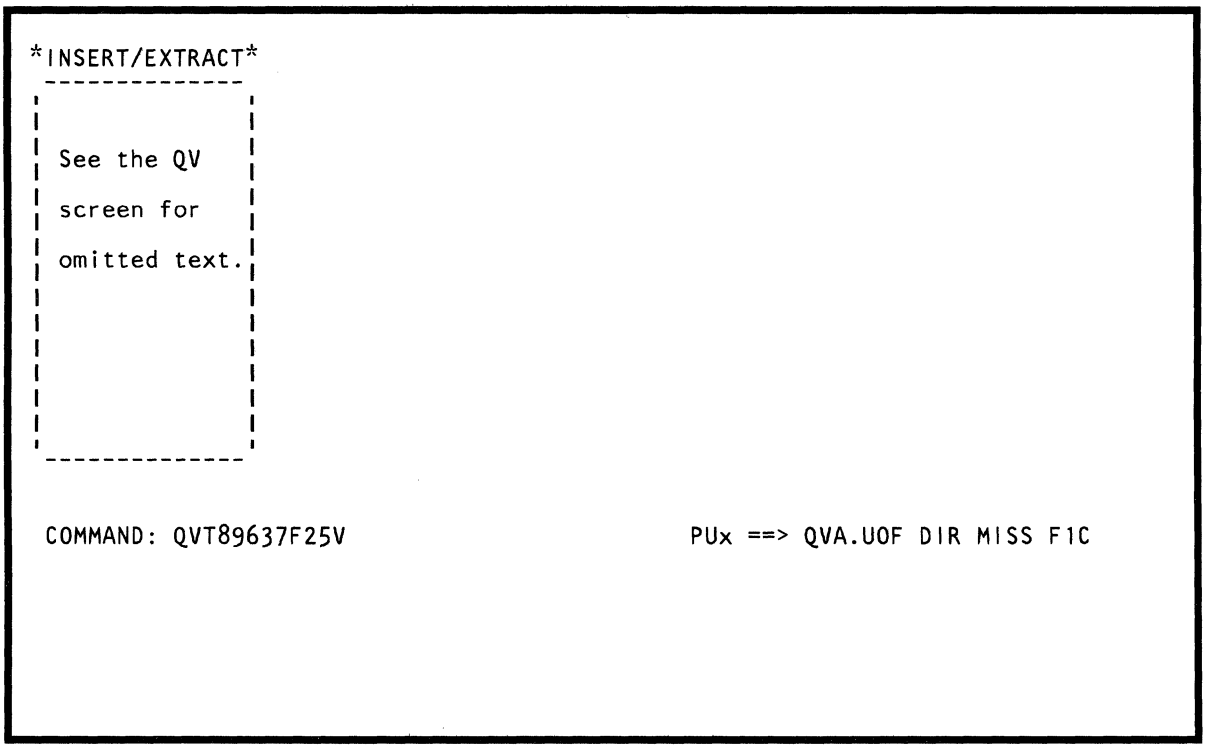
Use the QVN command to cancel all clock status checking while using the insert/extract function. Any insert/extract command can then be specified regardless of the status of the clocks in the PU. Do not specify the QVN command unless you know the clock status because the scanning process changes a ring if the clocks are running and can cause processor errors.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

The following applies to the QVN command:

- Clock Ignore mode remains off until you set it on with the QVN command.
- Each successive use of the QVN command sets Clock Ignore mode to the opposite (on or off) condition.
- The CLK IGNORE MDE selection is intensified when on.
- The last command before QVN is redisplayed next to COMMAND.

(QVT) Translate Address



Use the QVT command to convert a SAR address to a cache address.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Converting a SAR Address

To convert a SAR address:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVT next to COMMAND, and press the ENTER key.
5. Observe message: ENTER 8 DIG AND V, R, OR M.
6. Key a SAR address (one to eight hex digits) plus V (virtual), R (real), or M (absolute) next to T. For example, QVT2CC4V indicates that you want to convert SAR address 2CC4 to a cache address.
7. Press the ENTER key. The DLAT, directory, and cache addresses are displayed next to the message indicator.

To specify an address located in secondary space, enter QVT, the SAR address (one to eight hex digits), and VS (V indicates Virtual; S indicates Secondary).

Quick Reference Command

QVTxM	Absolute
QVTxR	Real
QVTxV	Virtual
QVTxVS	Virtual secondary

where x equals one- to eight-digits.

Messages

INVALID INPUT: Indicates that you used an incorrect address format.

QVA:DIR MISS Fxx: Indicates that a match was not found in the directory array (applies only to the QVTxR or QVTxM command).

Fxx is the directory address.

QVA:Fxx Gxxxx: Indicates that a directory match occurred (applies only to the QVTxR or QVTxM command).

Fxx is the directory address.

Gxxxx is the cache address.

QVA:DLAT MISS Uxx: Indicates that a match was not found in the DLAT array (applies only to the QVTxV command).

Uxx is the DLAT address.

QVA:Uxx DIR MISS Fxx: Indicates that a match was found in the DLAT array but not in the directory (applies only to the QVTxV command).

Uxx is the matched DLAT address.

Fxx is the directory address.

QVA:Uxx Fxx Gxxxx: Indicates that a DLAT and directory match occurred (applies only to the QVTxV command).

Uxx is the DLAT address.

Fxx is the directory address.

Gxxxx is the cache address.

QVA:Uxx Fxx Gxxxx Gxxxx S: Indicates that a DLAT and directory match occurred that used nonsecondary and secondary space (applies only to the QVTxV command).

Uxx is the DLAT address.

Fxx is the directory address.

The first Gxxxx is the cache address from nonsecondary space.

The second Gxxxx is the cache address from secondary space.

(QVG) Set Control Storage Address

Use the QVG command to specify the CS (control storage) address of a microword to be branched to. This microword becomes the next one to be run. (The QVG command sets up a double-branch microword in the CREG, and cycles the machine to move the doubleword at the specified CS address into the CREG.)

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Specifying a Control Storage Address

To specify a control storage address:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVG and the desired CS address next to COMMAND. The CS address must be:
   - One- to five-digits (in hex).
   - In the range of the processor's control storage.
   - On a word boundary.
5. Press the ENTER key.

   Note: A decrementer timer check occurs after (with the processor IMLed) you press the START key. This is because you changed the normal microcode sequence. To prevent this check, disable all machine checks with the QK screen (QKD) or disable PU interrupt checks with the QVK screen (QVK140=10).

After the QVG command is run:

- The Insert/Extract (QV) selection screen is displayed.
- The message THE CSAR HAS BEEN SET is displayed and remains displayed until another command is run or you press the ENTER key.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVW) Maintenance Command

Warning: Use the QVW command only when directed by your support center.

Use the QVW command to diagnose hardware problems. Unpredictable results may occur if you do not set the PU to the required condition.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Invoking the QVW Command

1. Set the CE Mode switch to CE Mode.
2. Install DIAG1 diskette into diskette drive 2.
3. Key QVW and a two-digit command number next to COMMAND. The valid command numbers are listed on this page.
4. Press the ENTER key.

After the QVW command is performed:

- The last command (before QVW) is redisplayed next to COMMAND.
- The message CMD SENT xx is displayed and remains displayed until you press the ENTER key or another command is performed. xx is the two-digit command number.

Looping the QVW Command

Key QVWxxL. This loops command number xx continuously.

Key QVWxxLyyyy. This loops (for yyyy times in hex) command number xx.

To end a loop, press the CNCL key; the message LOOP ENDED BY CANCEL KEY is displayed.

The message SENDING SBA MAINT CMD xx is displayed when you loop the QVW command.

The message CMD SENT xx yyyy TIMES is displayed when a successful loop ends.

For all the above, the last command (before QVW) is redisplayed next to COMMAND.

Stopping the PU Clock

To stop the PU clock, key QVW2D or QVW2E.

To continue normal operation, key QVW2F, press ENTER; key QVW30, and press ENTER again.

Clock Maintenance Chip Commands

2A Start Refresh Clock
2B Stop Refresh Clock
2C Set Clock-0 Start. This is required for each single cycle.
2D Set Single-Cycle/Hard-Stop Mode
2E Set Clock Cycle Mode
2F Set Run Mode, Reset Clock Control
30 Start Clock
31 Read Local Store Array
Read Local Store Retry Array
Read Channel Data Buffer Array
Read Channel Control Array
Read PU Trap/BAL (TBALSAVE) Array
32 Write Local Store Array
Write Local Store Retry Array
Write Channel Data Buffer Array
Write Channel Control Array
Write PU Trap/BAL (TBALSAVE) Array
33* Signal Diagnostic Monitor, Set SP-PU Response
34 Pulse Go
35 Set Instruction-Step/Soft-Stop Mode
36 Set Single Pulse Mode
37 Reset Pulse Mode

Control Storage Maintenance Chip

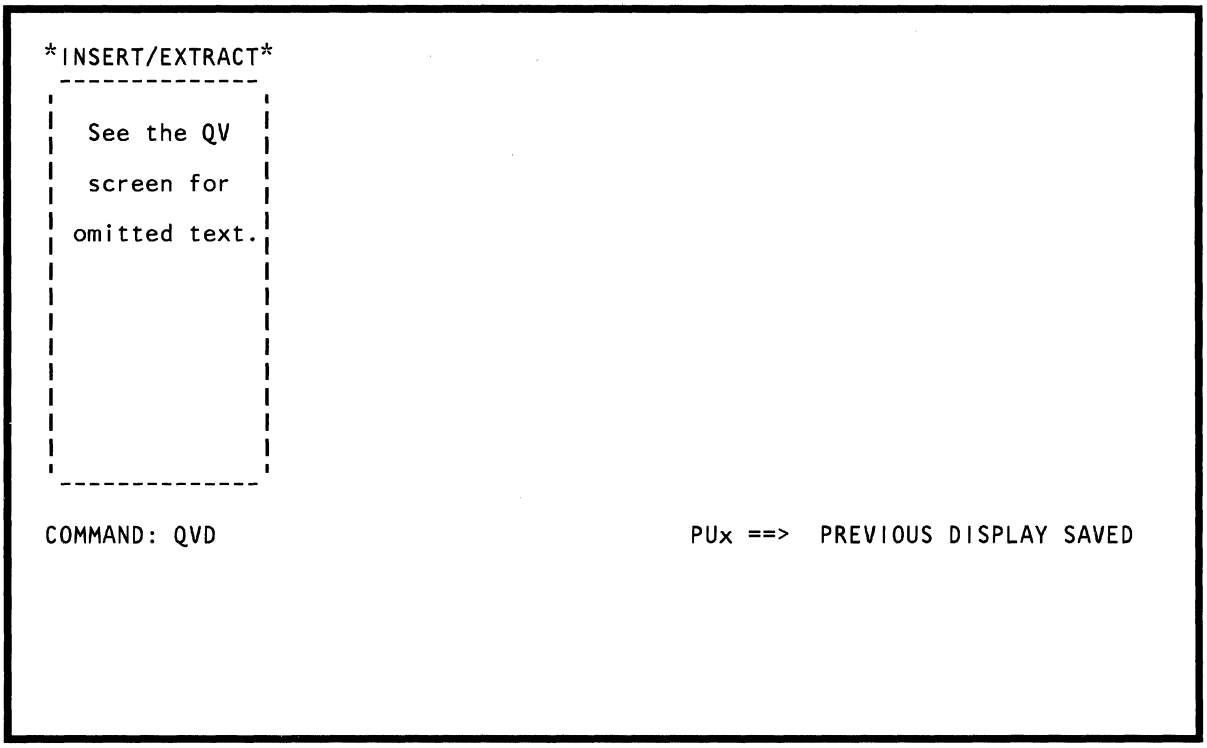
CA Set/Reset CSAR
CB Set/Reset CREG
CC Set/Reset CSAR Backup, Read Trace Array
CF Write CS Array
D0 Write Trap/BAL Array
D1 Write Trace Array
D2* Enable Machine Check and Clock Stop Interrupts from PU
D3* Set SP/PU Interrupt
D4* Reset SP/PU Response
D5* Disable Machine Clock, Clock Stop, SIGM, and Soft-Stop Interrupts from PU
D6* Enable SIGM and Soft-Stop Interrupts from PU
D7* Reset SP/PU Interrupt

* These are commands for communication protocol between the SP and PU.

Cache/Storage Maintenance Chip

EA Read DLAT/Directory Arrays
EB Read Cache/Cache Retry Arrays
EC Read Key Stack Array
EE Write Key Stack Array
F0 Write Cache Array
F1 Write Swap Buffer Array
F2 Read Swap Buffer Array
F3 Write DLAT Arrays
F4 Write Directory Array
F5 Write Cache Retry Address and Flags Array
F7 Write Cache Retry Data Buffer Array

(QVD) Display Buffer Switch



Use the QVD command to compare the currently-displayed screen with a screen that had been previously saved with the QVD function. Only lines 1 through 20 of a screen are saved.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Set the CE Mode switch to CE Mode. Key QVD next to COMMAND, and press the ENTER key.

The QVD command:

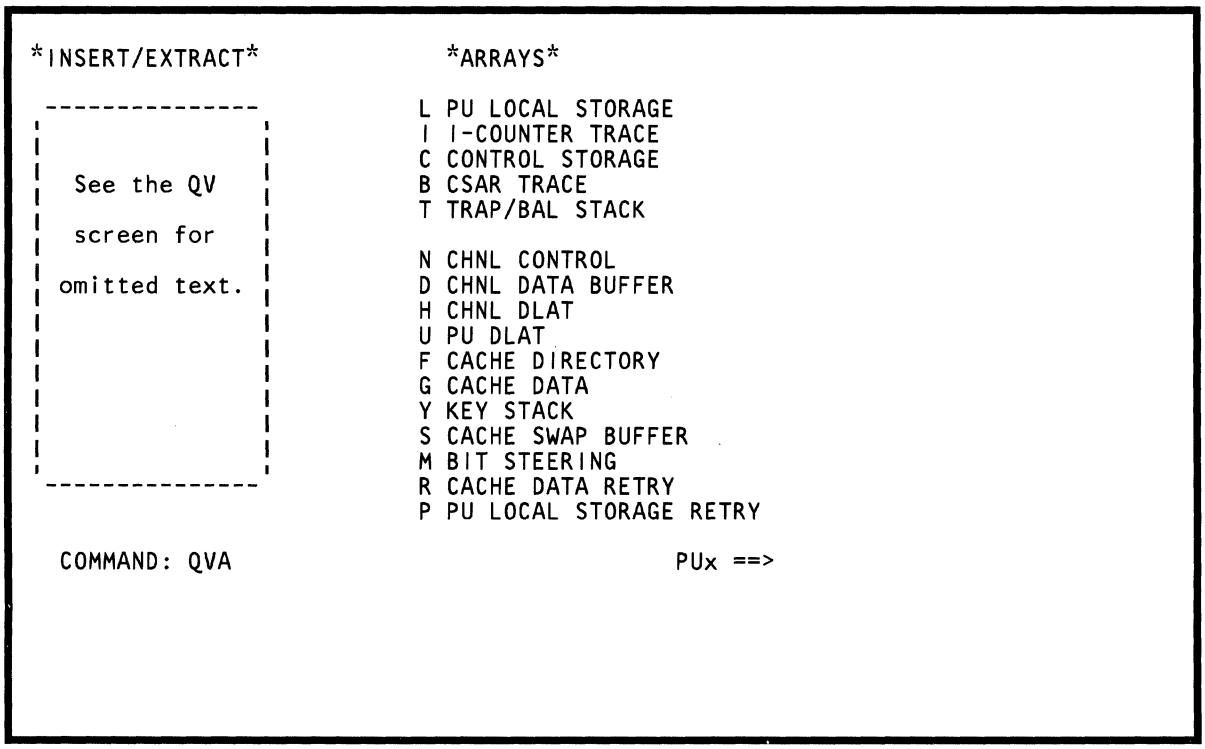
1. Displays a screen that was previously saved in a buffer.

   Note that a screen might not be in the buffer the first time you specify the QVD command.

2. Erases this screen from the buffer.

3. Saves a new screen in the buffer (this new screen is the last screen displayed before you specify QVD).

(QVA) Array Selection



The QVA screen lists all the array screens you can select. The top line of each array screen contains the screen:

1. Name
2. Command
3. Correct address range.

Some array screens also display a mask value on the top line. This value indicates which bits in a field you can set on (if a mask value is not displayed, all bits in the field can be set on or off).

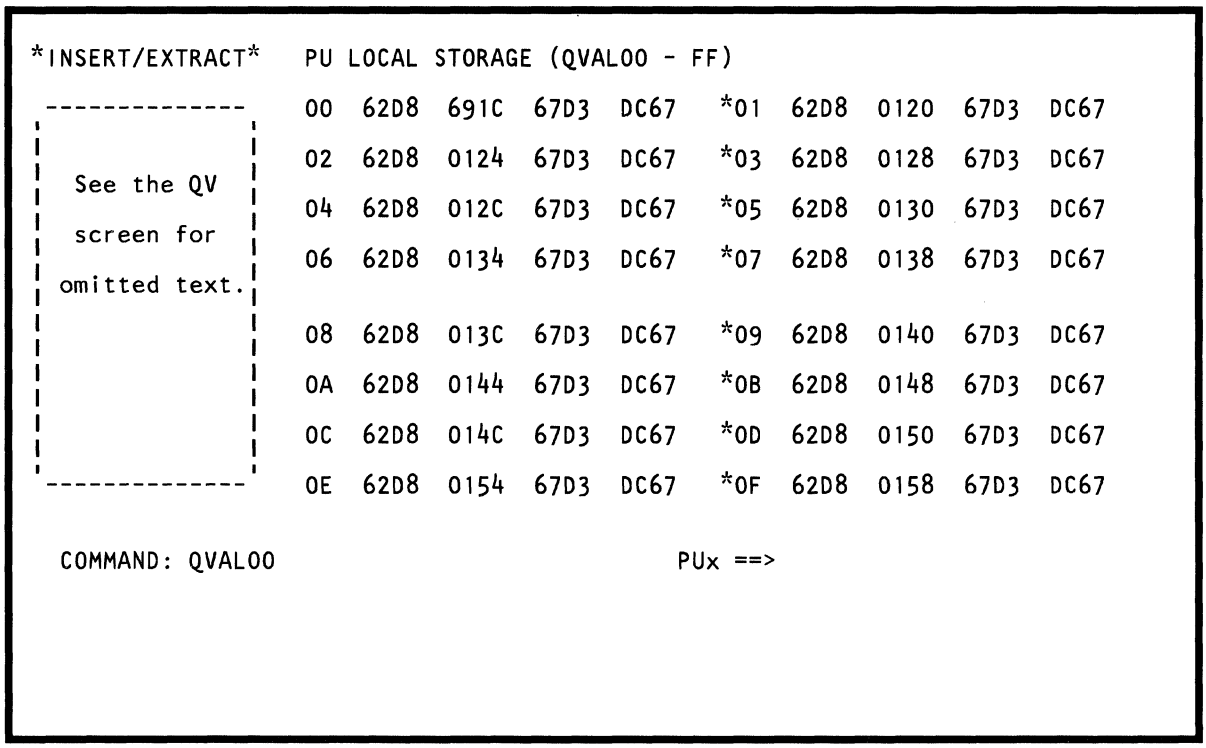
Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To select the QVA screen:

1. Set the CE Mode switch to CE Mode.
2. Press MODE SEL (only if not in manual mode).
3. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
4. Install DIAG1 diskette into diskette drive 2.
5. Key QVA next to COMMAND, and press the ENTER key.

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVAL) PU Local Storage



Use the QVAL command to display, save, and change data in the PU local storage array. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying PU Local Storage Data

To display PU local storage data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAL and a hex address (00 to FF) next to COMMAND. If you do not specify an address, the default is address 00.
5. Press the ENTER key. This displays a 128-byte area of PU local storage (the address you specified is in this area of storage).

Note: You can use the PAGE key with this screen.

Changing PU Local Storage Data

To change PU local storage data, use either of the following methods:

Method 1:

1. Display the desired area of PU local storage (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAL next to COMMAND followed by:
   a. A PU local storage address (00-FF)
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAL, an address (00-FF), an OP code, and the new (replacement) hex data (up to eight bytes).

Using the screen on the preceding page as an example, QVAL04=..F2F3F4 changes the first four bytes of data in PU local storage (address X'04') from 62D8012C to 62F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'04' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAL command.

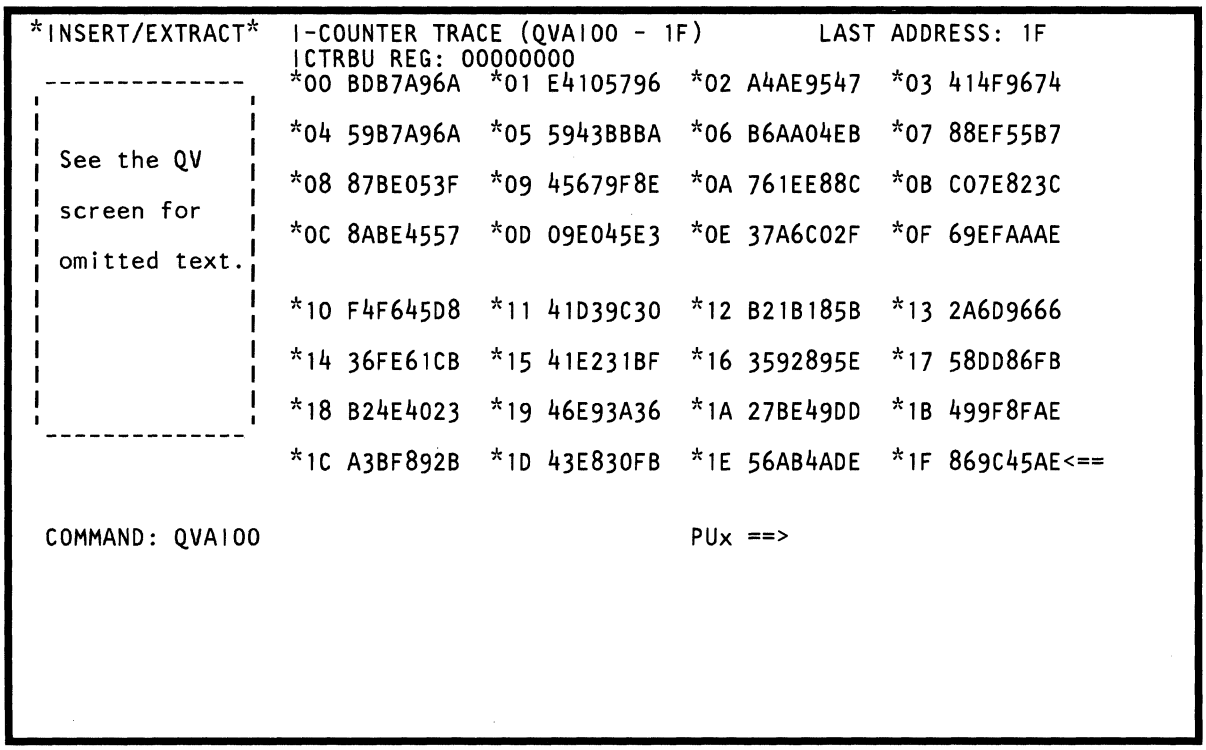
Saving PU Local Storage Data

Key QVALxx? in a block (see "Saving Data" on page 313). xx represents a PU local storage address (00 to FF). (The eight bytes to be saved are at this address.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVAI) I-Counter Trace



Use the QVAI command to display, save, and change data in the I-counter trace array. The data is in hex. (Normal input to the array is from the I-counter register except on a retry, when the I-counter backup register supplies the input.)

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying I-Counter Trace Data

To display I-counter trace data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAI next to COMMAND, and press the ENTER key. This displays the last 32 instruction addresses (including branches).

Changing I-Counter Trace Data

To change I-counter trace data, use either of the following methods:

Method 1:

1. Display the I-counter trace data (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAI next to COMMAND followed by:
   a. A I-counter trace array address (00-1F).
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAI, an address (00 to 1F), an OP code, and the new (replacement) hex data (up to four bytes).

Using the screen on the preceding page as an example, QVAI07=..F1F2F3 changes the four bytes of data in the I-counter trace array (address X'07') from 88EF55B7 to 88F1F2F3. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'07' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAI command.

Saving I-Counter Trace Data

Key QVAIxx? in a block (see "Saving Data" on page 313). xx represents an I-counter trace array address (00 to 1F). (The four bytes to be saved are at this address.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

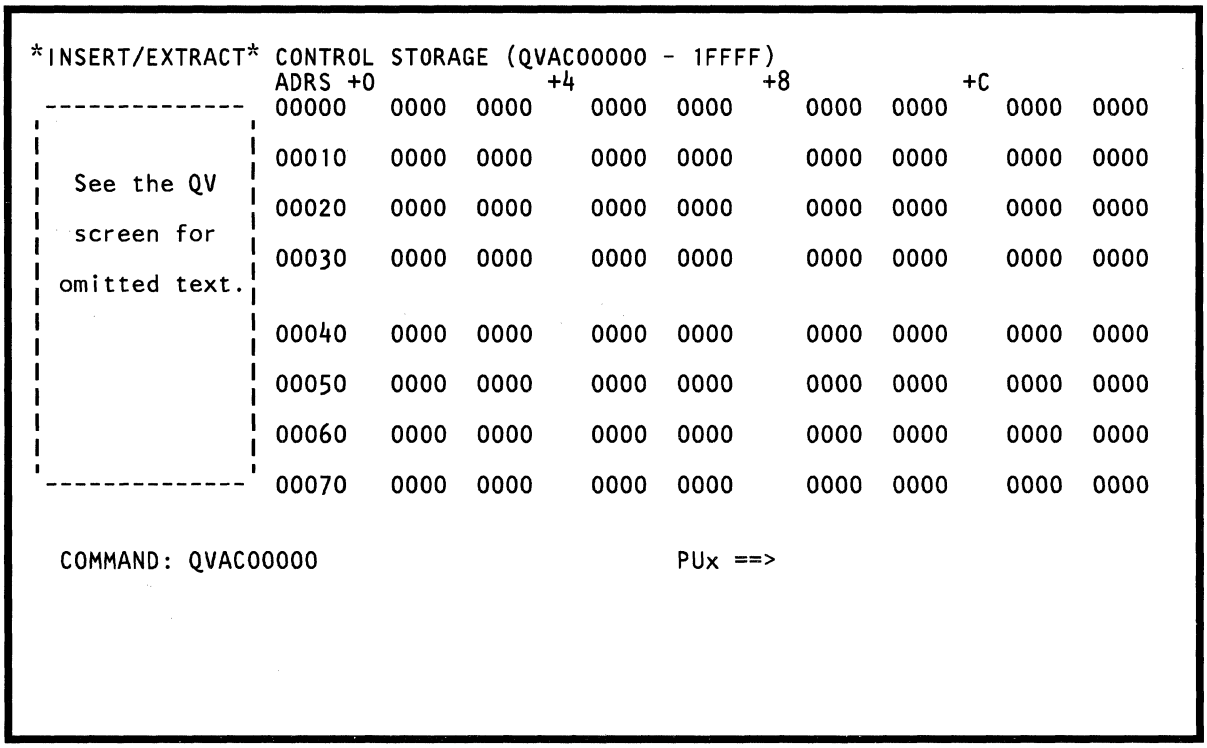
To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

ICTRBU: This register contains the address of the current instruction (it is used for instruction retry).

LAST ADDRESS: Points to the address of the last-run instruction, which is also indicated by the arrow at the lower right corner of the screen.

(QVAC) Control Storage



Use the QVAC command to display, save, and change hex data in control storage. An intensified field indicates that the field contains a parity error. The top line of the screen indicates the maximum control storage address.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Control Storage Data

To display control storage data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAC and a one- to five-digit address (in hex) next to COMMAND. If you do not specify an address, the default is address 00000.
5. Press the ENTER key. This displays a 128-byte area of control storage.

Note: You can use the PAGE key with this screen.

Substitute Hardware For Control Storage

If the primary hardware in the control storage array fails, the processor substitutes other hardware for the failing position(s). This is indicated on the display by:

- Intensified headings above those data columns that are now using substitute hardware.
- Message: RECONFIGURATION ACTIVE.

Changing Control Storage Data

To change control storage data, use either:

Method 1:

1. Display the desired area of control storage.

   Note: If the screen (or most of the screen) is filled with FFs, enter QOM next to COMMAND to stop the clock. Press the START key several times, and then press the ENTER key. The screen display should now be correct (this procedure prevents you from entering incorrect data into control storage).

2. Place the cursor under the location(s) to be changed, and key the new hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAC next to COMMAND followed by:

   a. A one- to five-digit control storage address. The rightmost digit must be 0, 4, 8, or C.

   b. An op code: = (MOVE); & (AND); / (OR).

5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data and press the ENTER key.

You can also change data in a field by keying: QVAC, a one or five hex-digit address (the single or rightmost digit must be 0, 4, 8, or C), an OP code, and the new hex data (up to eight bytes).

Using the screen on the preceding page as an example, QVAC00000=..F2F3F4 changes the first four bytes of data in control storage (address X'00000') from 00000000 to 00F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two digits in address X'00000' to remain the same.

Notes:

1. If in Method 2 you specify an address that ends in 7C or FC, only one to four bytes of data can be changed.
2. If you doubt the validity of the control storage data after a display, re-IML the processor.
3. Spaces between characters on the COMMAND line are deleted by the QVAC command.

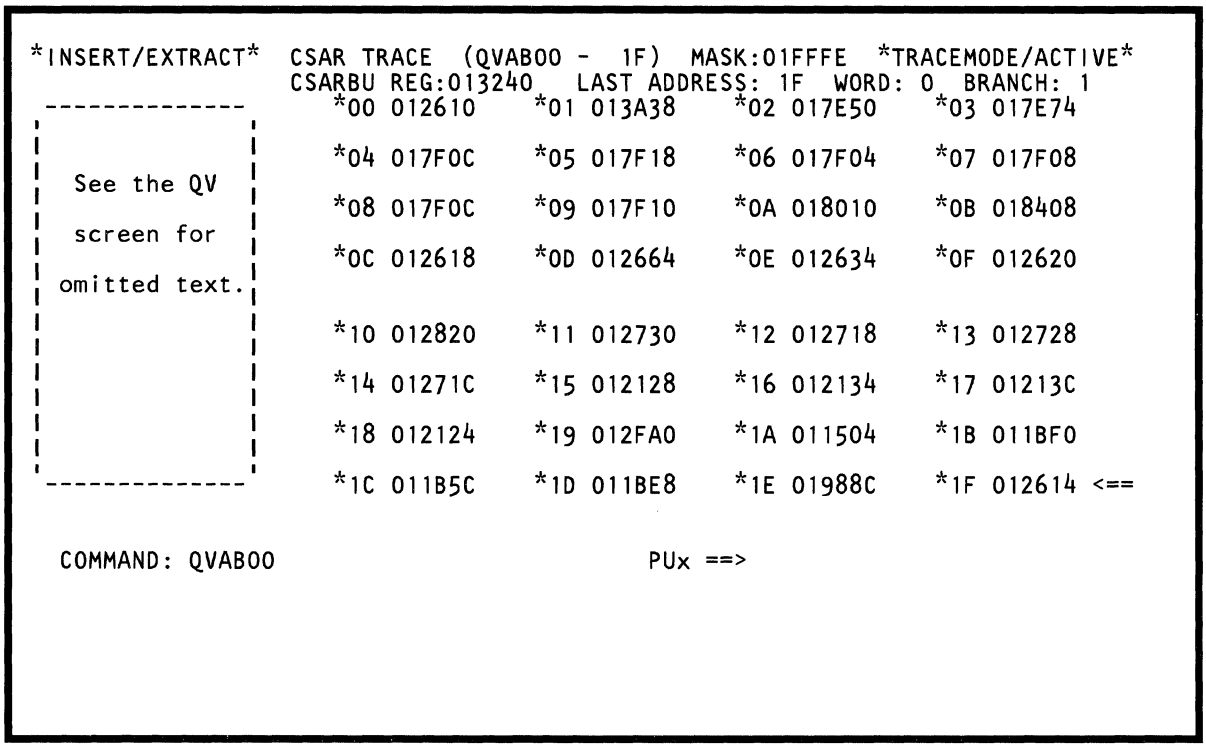
Saving Control Storage Data

Key QVACxxxxx? in a block (see "Saving Data" on page 313). xxxxx represents a control storage address (00000 to 1FFFF). (The eight bytes to be saved are at this address.) Ensure that the control storage address is on a word boundary. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVAB) CSAR Trace



Use the QVAB command to display, save, and change hex data in the CSAR trace array.

The value (01FFFE) that appears on the top line of the screen is the mask for the control storage address.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying CSAR Trace Data

To display CSAR trace data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAB next to COMMAND, and press the ENTER key. This displays 32 control storage addresses.

   Either:

   - The addresses of the last 32 microwords run if QAIM, QAN, or QAIN was selected.
   - The addresses of the last 32 targets of microwords that caused a module switch if QAIB was selected.

Changing CSAR Trace Array Data

To change CSAR trace array data, use either of the following methods:

Method 1:

1. Display the CSAR trace array (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAB next to COMMAND followed by:

   a. A CSAR trace array address (00 to 1F).

   b. An op code: = (MOVE); & (AND); / (OR).

5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press ENTER.

You can also change data in a field by keying: QVAB, an address (00 to 1F), an OP code, and the new (replacement) hex data (up to three bytes).

Using the screen on the preceding page as an example, QVAB1F=..FFFE changes the three bytes of data in the CSAR Trace Array (address X'1F') from 012614 to 01FFFE. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'1F' to remain the same.

Notes:

1. Spaces between characters on the COMMAND line are deleted by the QVAB command.
2. The leftmost digit in each three-byte field cannot be changed.

Saving CSAR Trace Data

Key QVABxx? in a block (see "Saving Data" on page 313). xx represents a CSAR trace array address (00 to 1F). (The three bytes to be saved are at this address.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

CSARBU REG: The control storage address of the microword now being processed.

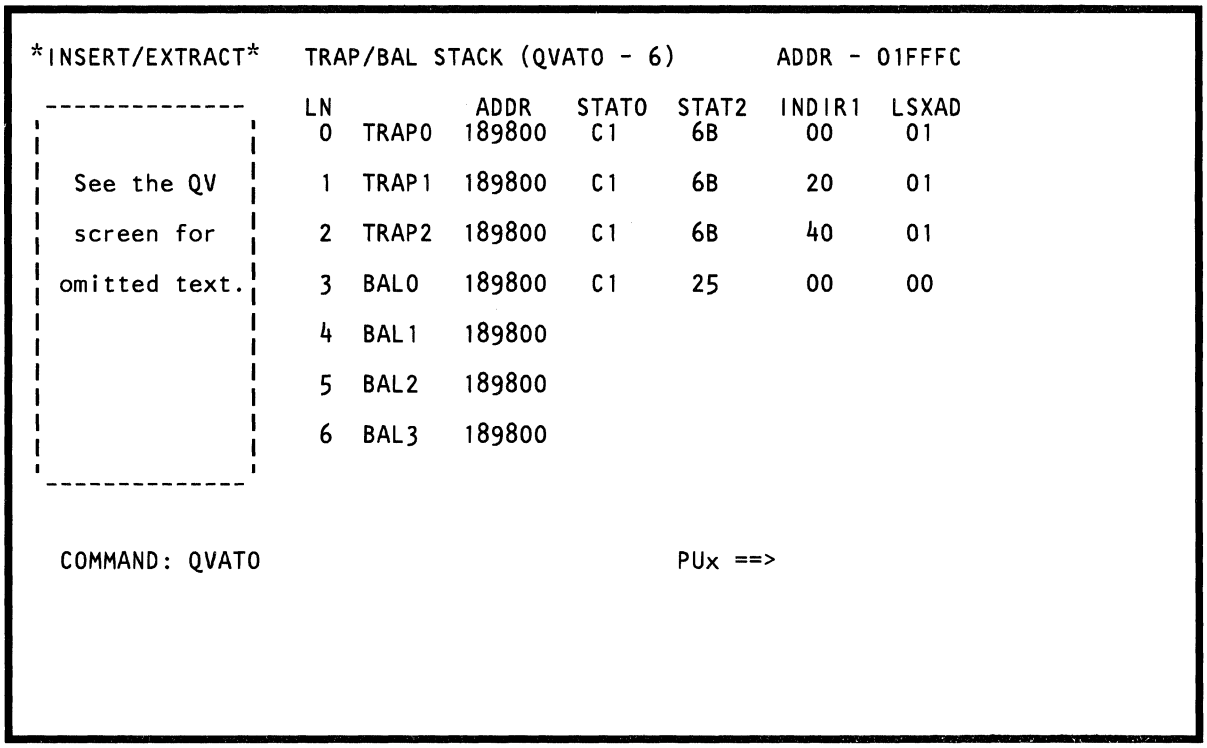
LAST ADDRESS: Points to the control storage address of the last-processed microword (for example, 1E points to address 01988C), which is also indicated by the arrow at the lower right corner of the screen.

TRACEMODE/ACTIVE: Indicates the active trace:

WORD:1 BRANCH:0 — active microword trace.

WORD:0 BRANCH:1 — active microbranch trace.

(QVAT) Trap/BAL Stack



Use the QVAT command to display, save, and change trap/BAL stack data. An intensified field indicates that the field contains a parity error.

The value (01FFFC) that appears on the top line of the screen is the mask for the control storage address.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Trap/BAL Stack Data

To display trap/BAL stack data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAT and an address digit (0 to 6) next to COMMAND. If you do not specify an address, the default is address 0.
5. Press the ENTER key.

Changing Trap/BAL Stack Data

To change trap/BAL stack data, use either of the following methods:

Method 1:

1. Display the trap/BAL stack data (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAT next to COMMAND followed by:
   a. A line number (0 to 6).
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAT, an address (0-6), a line number (0-6), an OP code, and the new (replacement) hex data (up to seven bytes).

For example, QVAT3=F1..F3F4250001 changes the data on line 3 of QVAT0 to F198F3F4250001. The periods in the command are used as "do not care" characters; they indicate that you want the third and fourth hex digits on line 3 to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAL command.

Saving Trap/BAL Stack Data

Key QVATx? in a block (see "Saving Data" on page 313). x represents the line number (0-6) of the data to be saved (up to seven bytes of data can be saved). The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

ADDR: Control store address used for returning from trap or BAL.

INDIR1: Indirect register 1. Contains information used for addressing local storage.

LN: An addressable line number.

LSXAD: Local storage extended address register (external address is 7,2). The bit meanings are:

0 Channel ID bit 0 from last channel trap.
1 Channel ID bit 0 from last channel trap.
2 Reserved
3 I0 register extension
4 Reserved
5 Reserved
6 Reserved
7 I1 register extension.

STAT0: Status register 0. Contains ALU information. The bit meanings are:

0 ALU overflow
1 Negative results
2 Recomplement
3 Destination equal to 0
4 ALU carry
5 1-bit carry
6 Z not equal to 0 (cumulative)
7 ALU size exception.

STAT2: Status register 2. Contains microword type information. The bit meanings are:

0 Working status 0
1 Working status 1
2 Working status 2
3 Working status 3
4 Channel working status 0
5 Channel working status 1
6 Instruction length counter bit 0
7 Instruction length counter bit 1.

(QVAN) Channel Control

```
*INSERT/EXTRACT* CHANNEL CONTROL (QVAN00 - B1)

 --------------  CHNL  0           1            CHNL 0           1
|              |  0    0001 0000   0001 1000     *1  0001 0000   0001 1000
|              |
|  See the QV  |  2    0001 0000   0001 1000     *3  0001 1000   0001 0000
|              |
|  screen for  |  4    0001 0000   0001 1000     *5  0001 0800   0001 1800
|              |
| omitted text.|
|              |  6    0001 0800   0001 1800     *7  0001 0800   0001 1800
|              |
|              |  8    0001 0800   0001 1800     *9  0000 0000   0000 0000
|              |
|              |  A    0000 0000   0000 0000     *B  0000 0000   0000 0000
|              |
|              |
 --------------

  COMMAND: QVAN00                          PUx ==>
```

Use the QVAN command to display, save, and change data in the channel control array. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Channel Control Data

To display channel control data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAN and a hex address (00 to B1) next to COMMAND. The first digit selects a channel number (0-B); the second digit (0 or 1) selects one-half of the channel data. If you do not specify an address, the default address is 00.
5. Press the ENTER key. This displays the full array for all channels (the address you specified is contained in this display).

Note: The data on lines 9, A, and B is for engineering use only.

Changing Channel Control Data

To change channel control data, use either of the following methods:

Method 1:

1. Display the desired channel control area (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAN next to COMMAND followed by:
   a. A channel number (0-B)
   b. The first or second half (0-1) of data for that channel
   c. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAN, an address (00-B1), an OP code, and the new (replacement) hex data (up to four bytes).

Using the screen on the preceding page as an example, QVAN60=..F2F3F4 changes the channel control data at address X'60' from 00010800 to 00F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'60' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAN command.

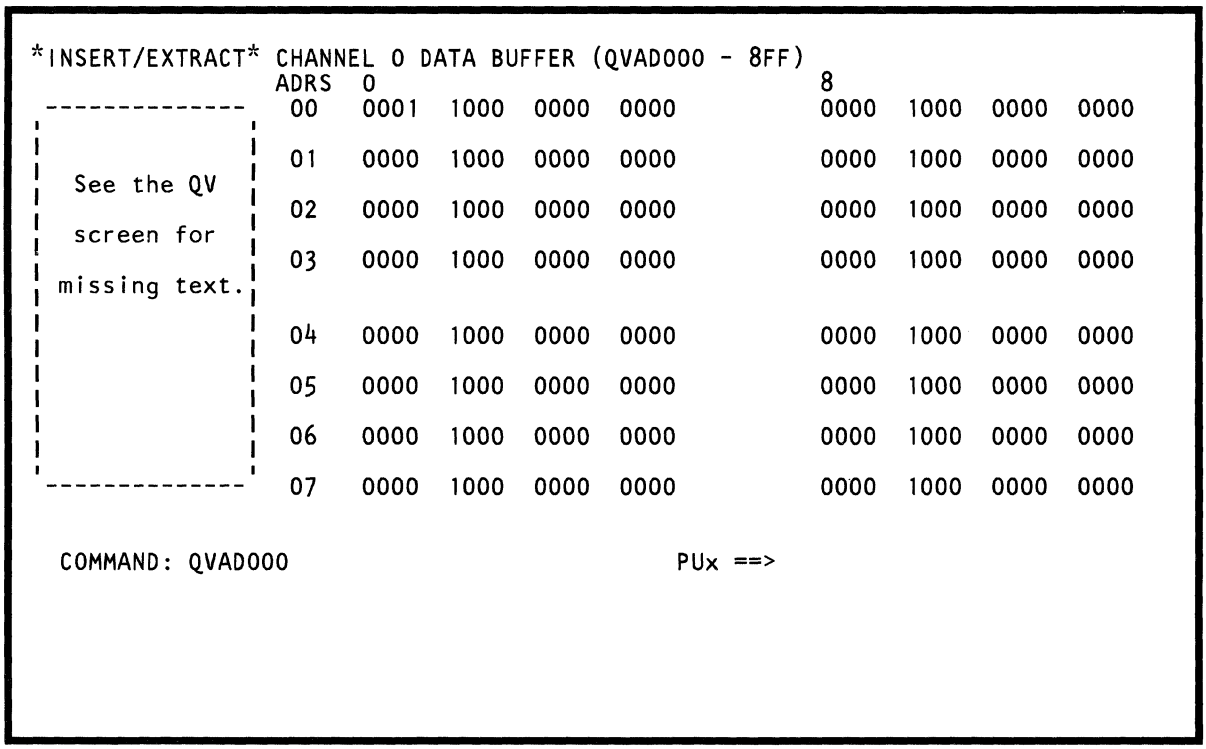
Saving Channel Control Data

Key QVANxx? in a block (see "Saving Data" on page 313). xx represents a channel control address (00 to B1). (The four bytes to be saved are at this address.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVAD) Channel Data Buffer



Use the QVAD command to display, save, and change data in the channel data buffer array. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Channel Data Buffer Data

To display channel data buffer data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAD and a hex address (000 to 8FF) next to COMMAND. The first digit (0-8) selects a channel number; the second digit (0-F) selects a 16-byte area; the third digit (0-F) selects one byte in that area. If you do not specify an address, the default address is 000.
5. Press the ENTER key. This displays a 128-byte area of the channel data buffer (the address you specified is in this area).

Note: You can use the PAGE key with this screen.

Substitute Hardware for the Channel Data Buffer

If the primary hardware in the channel data buffer (for the selected channel) fails, the processor substitutes other hardware for the failing position(s). The message RECONFIGURATION ACTIVE displays when the data displayed on the screen is in the substituted hardware range.

Changing Channel Data Buffer Data

To change channel data buffer data, use either of the following methods:

Method 1:

1. Display the desired area of the channel data buffer (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAD next to COMMAND followed by:
   a. A channel number (0-8)
   b. A digit (0-F) to select a 16-byte area
   c. A digit (0 or 8) to select an 8-byte area
   d. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAD, an address (000-8F8), an OP code, and the new (replacement) hex data (up to eight bytes).

Using the screen on the preceding page as an example, QVAD040=..F2F3F4 changes the first four bytes of data at address X'040' from 00001000 to 00F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'040' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAD command.

Saving Channel Data Buffer Data

Key QVADxxx? in a block (see "Saving Data" on page 313). xxx represents a channel data buffer address (000 to 8F8). (The eight bytes to be saved are at this address.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

(QVAH) Channel DLAT

```
*INSERT/EXTRACT* CHANNEL DLAT (QVAH00 - B1)                    VA-FFF8,RA-FFF8,S-1

 --------------  CHNL     DATA          CCW          CHNL     DATA          CCW
 |            |     0 VA    RA  S 1 VA    RA  S         0 VA    RA  S 1 VA    RA  S
 |            |   0  5110 F0E0 0  5210 F0E0 0      *1  5310 F0E0 0  5410 F0E0 0
 |  See the QV |
 |            |   2  5510 F0E0 0  5610 F0E0 0      *3  5710 F0E0 0  5810 F0E0 0
 |  screen for |
 |            |   4  5910 F0E0 0  5A10 F0E0 0      *5  5B10 F0E0 0  5C10 F0E0 0
 | omitted text.|
 |            |
 |            |   6  5D10 F0E0 0  5E10 F0E0 0      *7  5F10 F0E0 0  6010 F0E0 0
 |            |   8  6110 F0E0 0  6210 F0E0 0      *9  0000 0000 0  0000 0000 0
 |            |   A  0000 0000 0  0000 0000 0      *B  0000 0000 0  0000 0000 0
 |            |
 --------------

  COMMAND: QVAH00                                PUx ==>
```

Note: The QVAH screen is for engineering use only.

Use the QVAH command to display, save, and change the channel DLAT. The information is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying the Channel DLAT

To display the channel DLAT:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAH and a hex address (00 to B1) next to COMMAND. The first digit selects a channel number (0-B); the second digit selects the data field (0) or the CCW field (1). If you do not specify a value, the default address is 00.
5. Press the ENTER key.

Changing the Channel DLAT

To change channel DLAT data, use either of the following methods:

Method 1:

1. Display the desired channel DLAT (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex information.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAH next to COMMAND followed by:
   a. A channel number (0-B)
   b. 0 (if you want to change the DATA field) or 1 (if you want to change the CCW field).
   c. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAH, a value (00-B1), an OP code, and the new (replacement) hex information.

Using the screen on the preceding page as an example, QVAH60=..F2F3F8 changes the channel DLAT at X'60' from 5D10F0E00 to FDF2F3F80. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits at X'60' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAH command.

Saving the Channel DLAT

Key QVAHxx? in a block (see "Saving Data" on page 313). xx represents a channel DLAT value (00 to B1). The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

CCW: Indicates the virtual and real CCW addresses for a channel.

CHNL: Indicates the channel number.

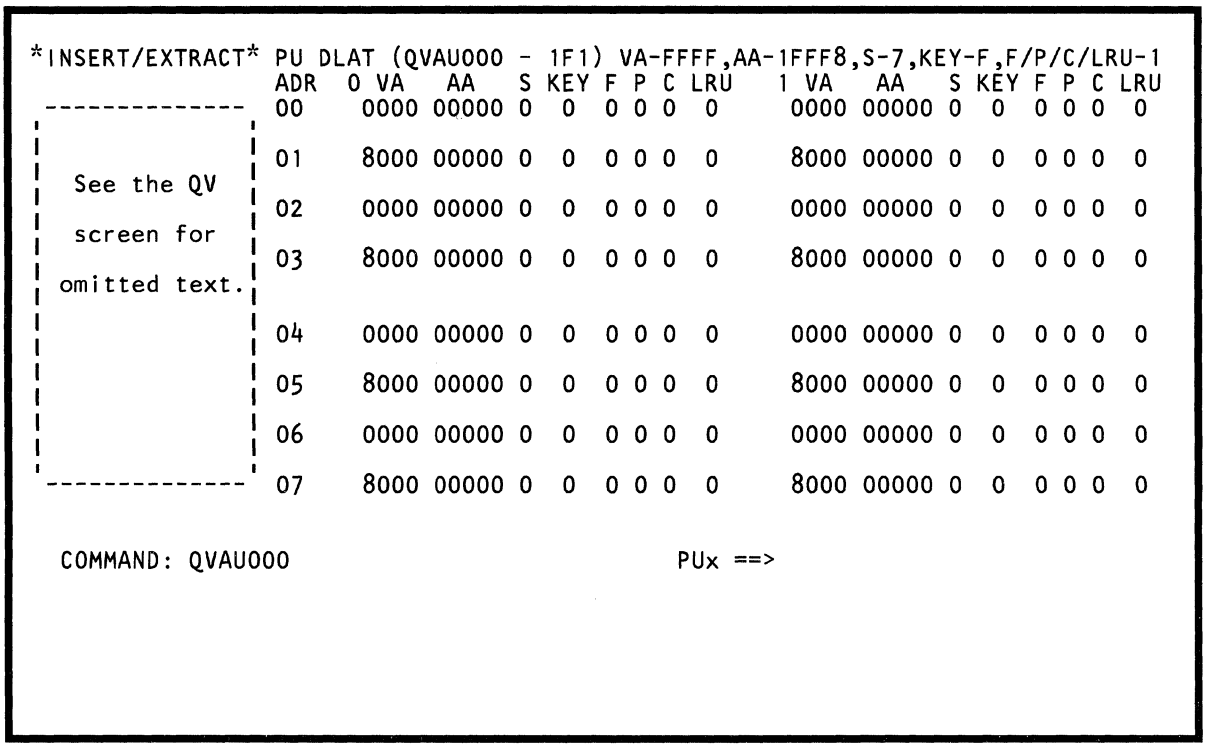
DATA: Indicates the virtual and real data addresses for a channel.

RA: Contains a 13-bit real address that is stored in the channel DLAT array.

S: Valid bit (if one, indicates that the associated address is valid).

VA: Contains a 13-bit virtual address that is stored in the channel DLAT array.

(QVAU) PU DLAT


INSERT/EXTRACT PU DLAT (QVAU000 - 1F1) VA-FFFF,AA-1FFF8,S-7,KEY-F,F/P/C/LRU-1
ADR 0 VA AA S KEY F P C LRU 1 VA AA S KEY F P C LRU
00 0000 00000 0 0 0 0 0 0 0000 00000 0 0 0 0 0 0
01 8000 00000 0 0 0 0 0 0 8000 00000 0 0 0 0 0 0
02 0000 00000 0 0 0 0 0 0 0000 00000 0 0 0 0 0 0
03 8000 00000 0 0 0 0 0 0 8000 00000 0 0 0 0 0 0
04 0000 00000 0 0 0 0 0 0 0000 00000 0 0 0 0 0 0
05 8000 00000 0 0 0 0 0 0 8000 00000 0 0 0 0 0 0
06 0000 00000 0 0 0 0 0 0 0000 00000 0 0 0 0 0 0
07 8000 00000 0 0 0 0 0 0 8000 00000 0 0 0 0 0 0
See the QV screen for omitted text.
COMMAND: QVAU000
PUx ==>

Use the QVAU command to display, save, and change PU DLAT data. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying PU DLAT Data

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAU and a three-digit line number (000 to 1F1) next to COMMAND. If you do not specify a line number, the default is line number 000.
5. Press the ENTER key. This displays eight of 32 line numbers (the line number you specified is in this range).

Note: You can use the PAGE key with this screen.

Changing PU DLAT Data

To change PU DLAT data, use either of the following methods:

Method 1:

1. Display the desired PU DLAT data (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAU next to COMMAND followed by:
   a. A line number (000-1F1)
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is from the line number you selected in step 4.
7. Change the data as desired, and press the ENTER key.

You can also change data on a line number by keying: QVAU, a line number (000-1F1), an OP code, and the new (replacement) hex data (up to 15 hex digits).

Using the screen on the preceding page as an example, QVAU031=..F8F3F4 changes the first four bytes on line number 031 from 80000000 to 80F8F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits on line number 031 to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAU command.

Saving PU DLAT Data

Key QVAUxxx? in a block (see "Saving Data" on page 313). xx represents a line number (000-1F1). The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

Note: The top line on the screen indicates the mask bits for a label.

AA: A 14-bit absolute address (see note).

C: Common (can be used by many users) segment (see note). This decreases the number of DLAT misses.

F: A fetch-protection bit (see note). If 0, indicates that only store-type references are monitored and that fetching with any access key is permitted. If 1, indicates that protection applies to both fetching and storing.

KEY: A storage key (see note). The key is associated with a 2K block of storage. A store is permitted only when the storage key matches the access key (ACC) associated with the request for storage access; a fetch is permitted when the keys match or when the fetch-protection bit of the storage key is zero.

LRU: The DLAT least recently used points to the next DLAT 0 or 1 to be used if both are valid (see note).

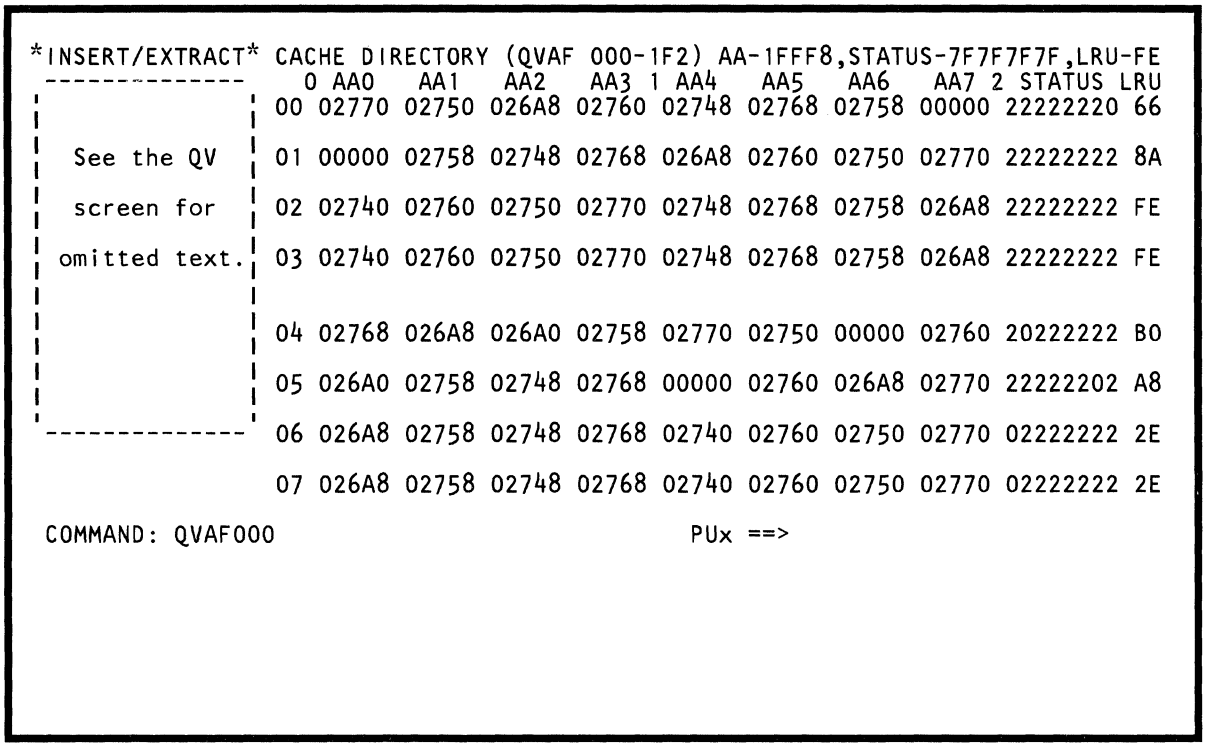
P: If the page protect (P) bit is on, provides storage protection for write operations using virtual addresses (see note).

S: Status information (see note). The bit meanings are:

0 Invalid status
1 Invalid status
2 Invalid status
3 Invalid status
4 Virtual, no ACB error
5 Virtual, ACB error. (The absolute address loaded into the DLAT is above the ACB boundary.)
6 Real, no ACB error
7 Real, ACB error (The absolute address loaded into the DLAT is above the ACB boundary.)

VA: A 16-bit virtual address (see note).

(QVAF) Cache Directory



Use the QVAF command to display, save, and change data in the cache directory. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Cache Directory Data

To display cache directory data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAF and a line number (000 to 1F2) next to COMMAND. The first two digits in the line number indicate the line on the screen. The last digit (0, 1, or 2) identifies a portion of the data on the line (0 =AA0 to AA3; 1 = AA4 to AA7; 2 = STATUS and LRU). If you do not specify a line number, the default is line number 000.
5. Press the ENTER key. This displays eight of 32 line numbers (the line number you specified is in this range).

Note: You can use the PAGE key with this screen.

Changing Cache Directory Data

To change cache directory data, use either of the following methods:

Method 1:

1. Display the desired area of the directory (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAF next to COMMAND followed by:
   a. A line number (000-1F2). The first two digits indicate the line number. The last digit (0, 1, or 2) identifies a portion of the data on the line (0 =AA0 to AA3; 1 =AA4 to AA7; 2 = STATUS and LRU).
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data on a line by keying: QVAF, 000 to 1F2, an OP code, and the new (replacement) hex data (up to ten bytes).

Using the screen on the preceding page as an example, QVAF020=1..98..... changes 02740 02760 to 12798 02760. The periods in the command are used as "do not care" characters; they indicate that you want these digits on line number 02 to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAF command.

Saving Cache Directory Data

Key QVAFxxy? in a block (see "Saving Data" on page 313). xx represents a cache directory line number (00 to 1F). y (can be 0, 1, or 2) represents a specific portion of the line. (The ten bytes at this location are saved.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

Note: The top line on the screen indicates the mask bits for a label.

AA0 to AA7: An absolute address in directory slot number 0 to 7.

LRU: The least-recently-used slot of the directory.

Status: Each value displayed under the word STATUS on the QVAF screen relates to one of the eight associated cache-page addresses that are also shown on the QVAF screen (AA0 through AA7). Listed below are the values that appear in the status field on the QVAF screen when the cache pages are not locked.

Value Displayed and Directory Status		Comment
0	Normal	Cache page of data is valid and not modified.
1	Copy	A copy of this cache page was previously sent to the other PU.
2	Modified	Cache page of data has been changed.
3	NIH	Cache page of data is not here; it is in the BSM.
4	Not Defined	This value cannot be used. Entering this value causes the message INVALID INPUT to display.
5	Bad Entry	The cache page is in error and is not usable.
6	Invalid	The cache page data is no longer in cache.
7	Not Defined	This value cannot be used. Entering this value causes the message INVALID INPUT to display.

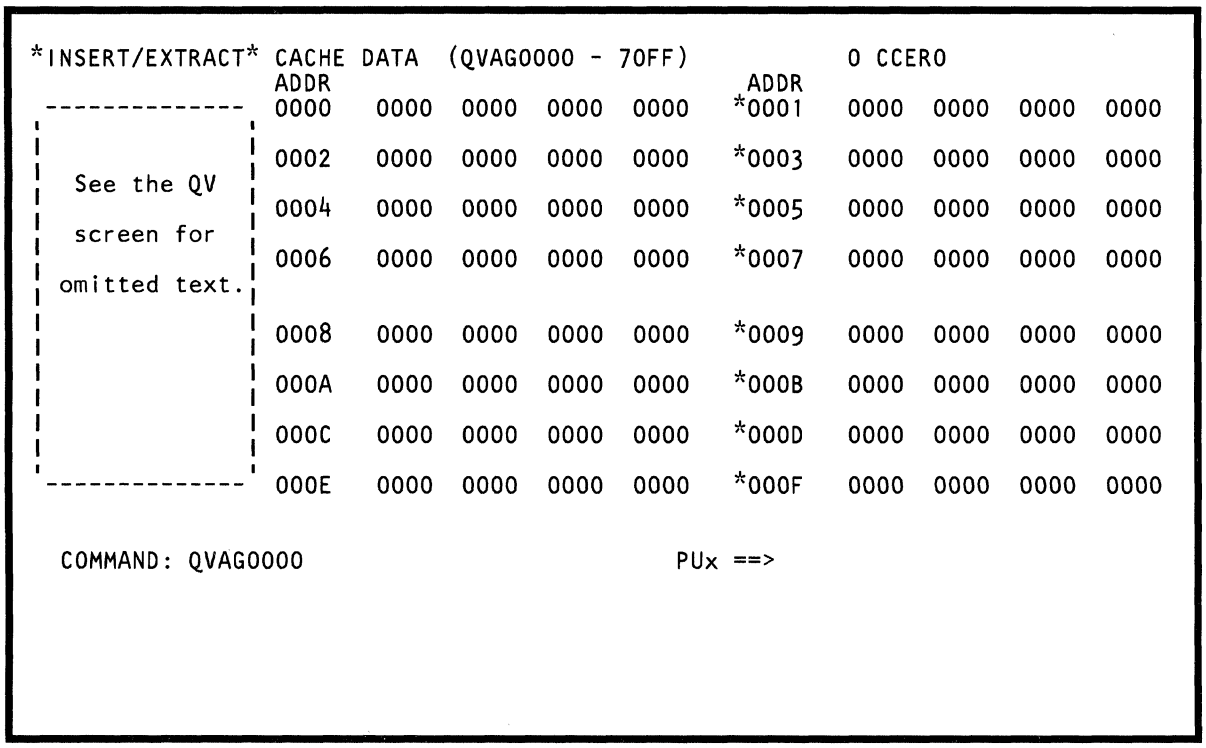
Note: If the cache array is 4K or 8K bytes, the status field for AA2 through AA7 can only be changed to a value of 5.

Cache pages are locked in even/odd pairs. The locked condition for an even and the next higher odd cache page is indicated by turning on the high order bit of the odd directory status value. The status value of the remaining three bits stay as listed above.

Example: STATUS
XX0AXXXX

The 0 indicates that the cache page of data at AA2 directory address is normal and has not been modified. The A indicates that the cache page of data at the AA3 directory address is modified and that both pages (associated cache page AA2/AA3) are locked.

(QVAG) Cache Data



Use the QVAG command to display, save, and change the cache data array. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Cache Data

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAG and a four-digit hex address next to COMMAND (the address range is 0-70FF for 16K cache; 0-71FF for 32K cache). The first digit represents the directory associativity class (slot) number; the next three digits select an eight-byte area. If you do not specify an address, the default is address 0000.
5. Press the ENTER key. This displays a 128-byte area of cache data (the address you specified is in this area).

Note: You can use the PAGE key with this screen.

Substitute Hardware for the Cache Data Array

If the primary hardware in the cache data array fails, the processor substitutes other hardware for the failing position(s). This is indicated on the display by:

- Intensified Vs above those data columns that are now using substitute hardware.
- Message: RECONFIGURATION ACTIVE.

Changing Cache Data

To change cache data, use either of the following methods:

Method 1:

1. Display the desired area of cache data (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAG next to COMMAND followed by:
   a. A digit (0-7). This digit selects the directory associativity class (slot).
   b. A three-digit address which selects an eight-byte area. If the 16K cache mode is active, the range is 000-0FF; if the 32K cache mode is active, the range is 000-1FF.
   c. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAG, an address an OP code, and the new (replacement) hex data (up to eight bytes).

Using the screen on the preceding page as an example, QVAG0004=..F2F3F4 changes the first four bytes of cache data at address X'0004' from 00000000 to 00F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'04' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAG command.

Saving Cache Data

Key QVAGxxxx? in a block (see "Saving Data" on page 313). xxxx represents a cache data address (0000-70FF or 0000-71FF). The eight bytes to be saved are at this address. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

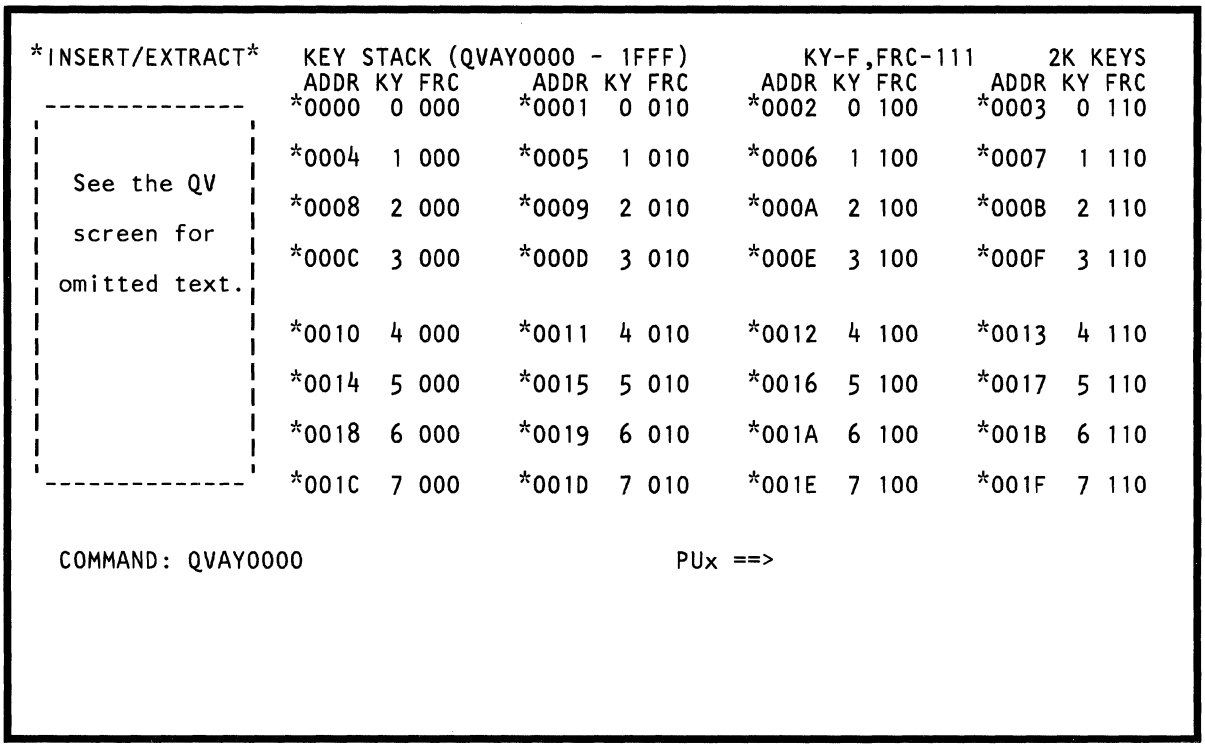
To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

CCER0: Cache control external register bit 0 equal to:

- 0 indicates 16K cache
- 1 indicates 32K cache.

(QVAY) Key Stack



Use the QVAY command to display, save, and change key stack data. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Key Stack Data

To display key stack data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAY and a four-digit line number (0000 to 1FFF) next to COMMAND. If you do not specify a line number, the default is line number 0000.
5. Press the ENTER key. This displays 32 line numbers (starting with the one you specified).

Note: You can use the PAGE key with this screen.

Changing Key Stack Data

To change key stack data, use either of the following methods:

Method 1:

1. Display the desired key stack data (see above).
2. Place the cursor under the location(s) to be changed, and key the new data (one hex digit for key; three bits for status FRC).
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAY next to COMMAND followed by:
   a. A line number (0000 to 1FFF)
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is from the line number you selected in step 4.
7. Change the data as desired, and press the ENTER key (one hex digit for key; three bits for status FRC).

You can also change data on a line number by keying: QVAY, a line number (0000 to 1FFF), an OP code, and the new data (one hex digit for key; three bits for status FRC).

Using the screen on the preceding page as an example, QVAY0003=7000 changes line number 0003 from 0110 to 7000.

Note: Spaces between characters on the COMMAND line are deleted by the QVAY command.

Saving Key Stack Data

Key QVAYxxxx? in a block (see "Saving Data" on page 313). xxxx represents a line number (0000 to 1FFF). (Each line contains one hex digit for key; three bits for status FRC.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

Note: The top line on the screen indicates the mask bits for a label.

ADDR: An addressable line number.

FRC: Indicates a fetch, reference, and change bit (see note).

KY: The key in storage (see note).

2K KEYS: Indicates that each key stack array entry is associated with a 2K page of main storage (16 megabytes or less of main storage).

4K KEYS: Indicates that each key stack array entry is associated with a 4K page of main storage (more than 16 megabytes of main storage). Two keys exist for each 4K page.

(QVAS) Cache Swap Buffer

```
*INSERT/EXTRACT*   CACHE SWAP BUFFER (QVAS00 - 0F)      0 CCERO
 --------------    00  0000 0000 0000 0000  *01  0000 0000 0000 0000
|              |   02  0000 0000 0000 0000  *03  0000 0000 0000 0000
|  See the QV  |   04  0000 0000 0000 0000  *05  0000 0000 0000 0000
|  screen for  |   06  0000 0000 0000 0000  *07  0000 0000 0000 0000
| omitted text.|
|              |   08  0000 0000 0000 0000  *09  0000 0000 0000 0000
|              |   0A  0000 0000 0000 0000  *0B  0000 0000 0000 0000
|              |   0C  0000 0000 0000 0000  *0D  0000 0000 0000 0000
 --------------    0E  0000 0000 0000 0000  *0F  0000 0000 0000 0000
  COMMAND: QVAS00                                PUx ==>
```

Use the QVAS command to display, save, and change data in the cache swap buffer array. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: PU0 must be selected to perform this function.

Displaying Cache Swap Buffer Data

To display cache swap buffer data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAS and a hex address (00 to 0F) next to COMMAND. If you do not specify an address, the default is address 00.
5. Press the ENTER key. This displays a 128-byte area of the cache swap buffer (the address you specified is contained in this display).

Substitute Hardware for the Cache Swap Buffer

If the primary hardware in the cache swap buffer fails, the processor substitutes other hardware for the failing position(s). This is indicated on the display by:

- Intensified headings above those data columns that are now using substitute hardware.
- Message: RECONFIGURATION ACTIVE (V).

Changing Cache Swap Buffer Data

To change cache swap buffer data, use either of the following methods:

Method 1:

1. Display the desired area of the cache swap buffer (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAS next to COMMAND followed by:
   a. A cache swap buffer address (00-0F)
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAS, an address (00-0F), an OP code, and the new (replacement) hex data (up to eight bytes).

Using the screen on the preceding page as an example, QVAS04=..F2F3F4 changes the first four bytes of data in the cache swap buffer at address X'04', from 00000000 to 00F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits in address X'04' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAS command.

Saving Cache Swap Buffer Data

Key QVASxx? in a block (see "Saving Data" on page 313). xx represents a cache swap buffer address (00 to 0F). (The eight bytes to be saved are at this address.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

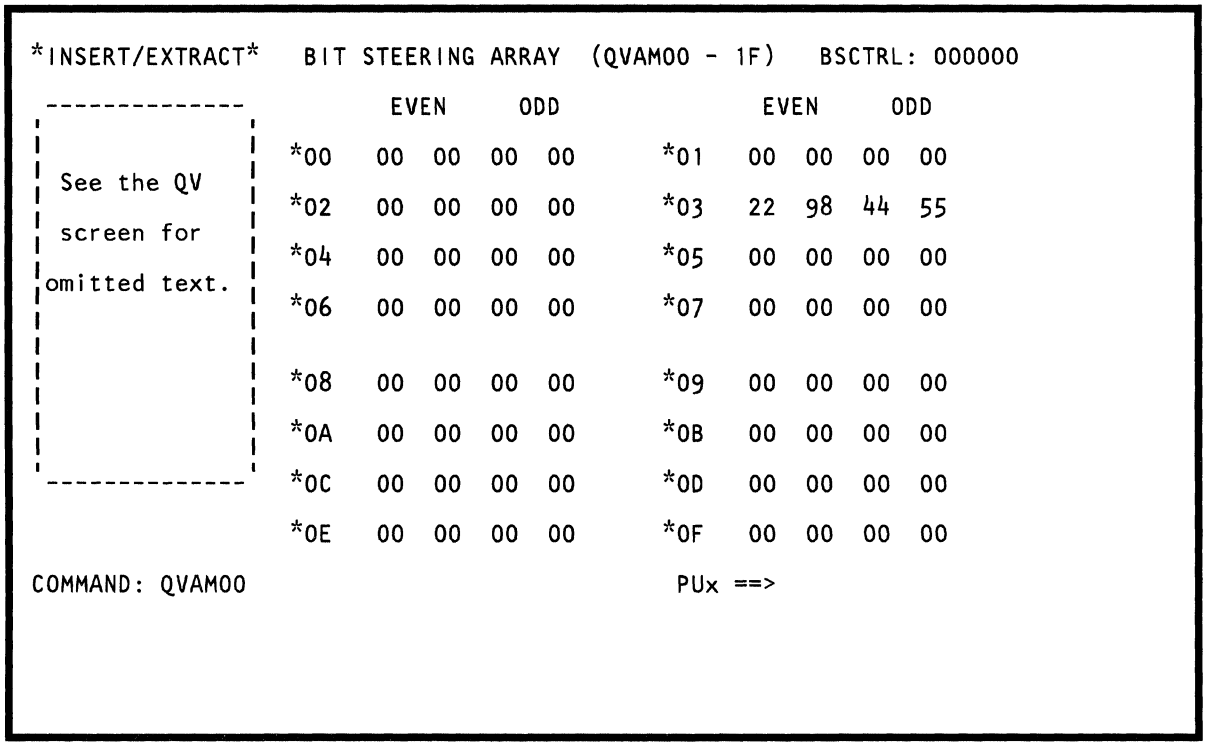
To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

CCER0: Cache control external register bit 0 equal to:

- 0 indicates 16K cache
- 1 indicates 32K cache.

(QVAM) Bit Steering Array



Note: The QVAM screen is for engineering use only.

Use the QVAM command to display, save, and change bit steering array data. An intensified field indicates that the field contains a parity error.

A data value of:

- X '98' or X '99' indicates that bit steering is active.
- X 'FE' or X 'FF' indicates that bit steering is **not** active.

Note: PU0 must be selected to perform this function.

Displaying Bit Steering Data

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAM and a hex address (00 to 1F) next to COMMAND. If you do not specify an address, address 00 is the default.
5. Press the ENTER key.

Note: You can use the PAGE key with this screen.

Changing Bit Steering Data

To change bit steering array data, use either of the following methods:

Method 1:

1. Display the bit steering array data (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 below if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAM next to COMMAND followed by:
   a. A bit steering array address (00-1F)
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAM, an address (00-1F), an OP code, and the new (replacement) hex data (up to four bytes).

Using the screen on the preceding page as an example, QVAM03=F1..F3F4 changes the data in address X'03' of QVAM to F198F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the third and fourth hex digits in address X'03' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAM command.

Saving Bit Steering Array Data

Key QVAMxx? in a block (see "Saving Data" on page 44). The xx represents the address (00 to 1F) of the data to be saved (up to four bytes of data can be saved). The question mark (?) indicates that this is a save operation.

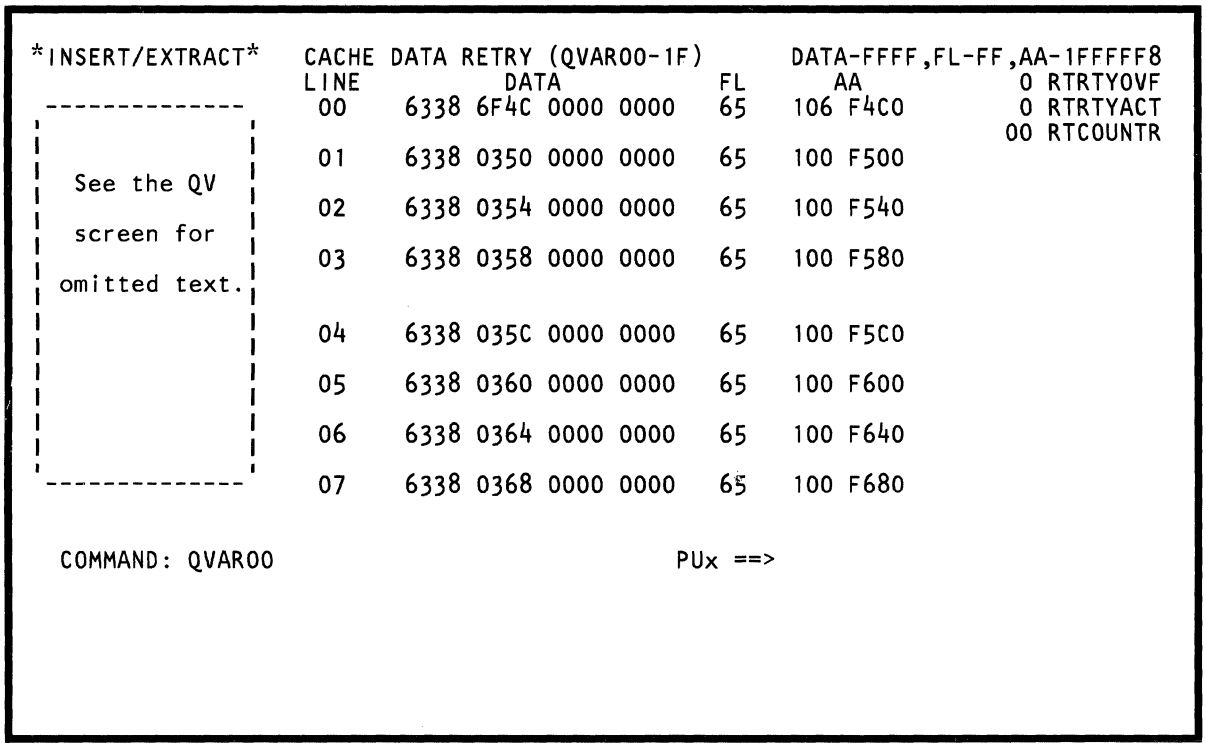
Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label identification

BSCTRL: General field to aid in decode of bit steering (nonalterable).

(QVAR) Cache Data Retry



Use the QVAR command to display, save, and change cache data retry. The data is in hex. An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Cache Data Retry

To display cache data retry:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAR and a two-digit line number (00 to 1F) next to COMMAND. If you do not specify a line number, the default is line number 00.
5. Press the ENTER key. This displays eight of 32 line numbers (the line number you specified is in this range).

Note: You can use the PAGE key with this screen.

Changing Cache Data Retry

To change cache data retry, use either of the following methods:

Method 1:

1. Display the desired area of cache data retry (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAR next to COMMAND followed by:
   a. A line number (00-1F)
   b. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is from the line number you selected in step 4.
7. Change the data as desired, and press the ENTER key.

You can also change data on a line number by keying: QVAR, a line number (00-1F), an OP code, and the new (replacement) hex data (up to 25 hex digits).

Using the screen on the preceding page as an example, QVAR04=..F2F3F4 changes the first four bytes on line number 04 from 6338035C to 63F2F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the first two hex digits on line number 04 to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAR command.

Saving Cache Data Retry

Key QVARxx? in a block (see "Saving Data" on page 313). xx represents a line number (00 to 1F). (Each line contains 13 bytes.) The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

Note: The top line on the screen indicates the mask bits for a label.

AA: Absolute address of the corresponding doubleword (see note).

DATA: Cache retry doubleword (see note).

FL: Contains read/write flags (see note).

The bit meanings are:

0 Flag for byte 0
1 Flag for byte 1
2 Flag for byte 2
3 Flag for byte 3
4 Flag for byte 4
5 Flag for byte 5
6 Flag for byte 6
7 Flag for byte 7

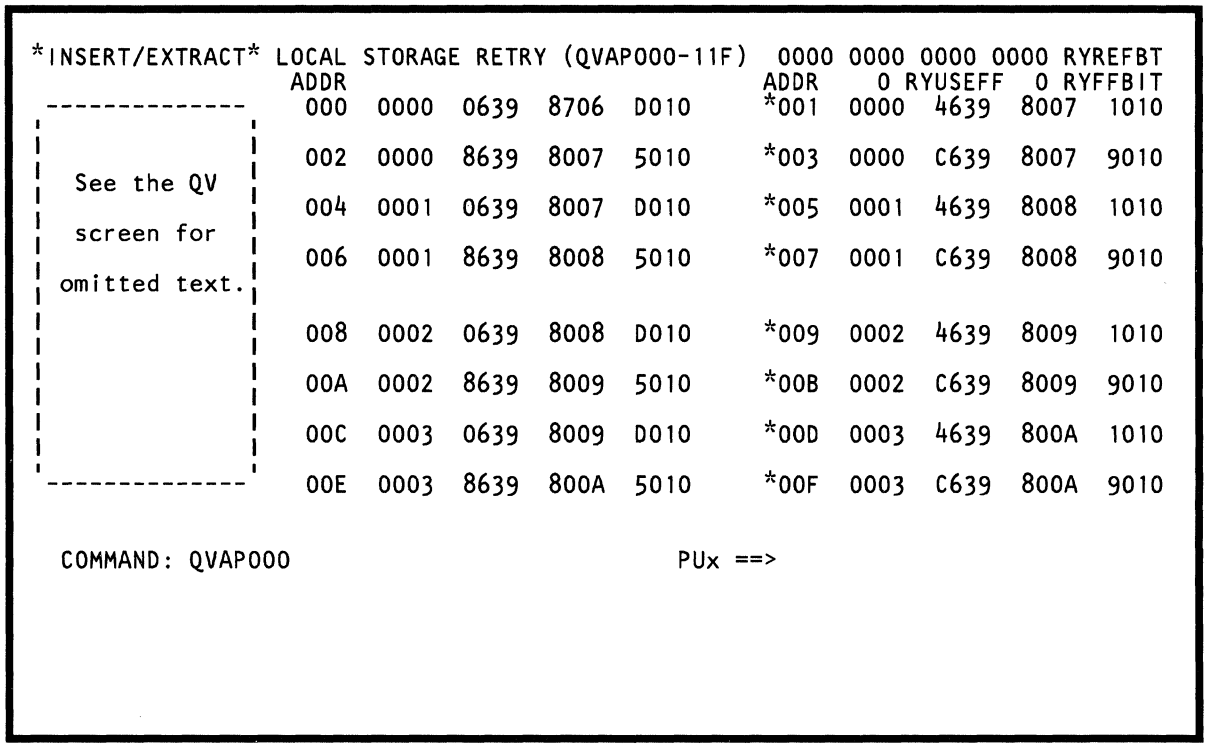
LINE: The line number of the cache data retry.

RTCOUNTR: Retry counter that contains the address for the storage retry array (bits 0-2 are unused; bits 3-7 are the address).

RTRTYACT: If 1, indicates that storage retry is active (one retriable write was performed since storage retry was last reset).

RTRTYOVF: If 1, indicates that a storage retry overflow occurred (more than 32 retriable writes were performed before storage retry was reset). This condition is now unretriable.

(QVAP) Local Storage Retry



Use the QVAP command to display, save, and change data in the local storage 0 retry or local storage 1 retry array (each array is 8-bytes wide by 32 addresses deep). These two arrays store the data that is read out of local storage. The data is in hex.

An intensified field indicates that the field contains a parity error.

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

Displaying Local Storage Retry Data

To display LS retry data:

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAP, 0 or 1 (for LS retry array 0 or 1), and a hex address (00-1F).
5. Press the ENTER key. This displays a 128-byte area (the address you specified is in this area).

Note: You can use the PAGE key with this screen.

Changing Local Storage Retry Data

To change LS retry data, use either of the following methods:

Method 1:

1. Display the local storage data (see above).
2. Place the cursor under the location(s) to be changed, and key the new (replacement) hex data.
3. Press the ENTER key (do not change the COMMAND line).

Method 2: Omit steps 1 and 2 if the PU clock is already stopped.

1. Set the CE Mode switch to CE Mode.
2. Key QOM next to COMMAND, and press the ENTER key. This stops the PU clock.
3. Install DIAG1 diskette into diskette drive 2.
4. Key QVAP next to COMMAND followed by:
   a. 0 or 1 (for LS retry array 0 or 1)
   b. 00 to 1F (represents an eight-byte Retry array segment)
   c. An op code: = (MOVE); & (AND); / (OR).
5. Press the ENTER key.
6. Verify that the data displayed after the OP code is the data to be changed.
7. Change the data as desired, and press the ENTER key.

You can also change data in a field by keying: QVAP, the array number (0 or 1), an address (00 to 1F), an OP code, and the new (replacement) hex data (up to eight bytes).

Using the screen on the preceding page as an example, QVAP004=F1..F3F4 changes the first four bytes of data in retry array 0 (address X'04') from 00010639 to F101F3F4. The periods in the command are used as "do not care" characters; they indicate that you want the third and fourth hex digits in address X'04' to remain the same.

Note: Spaces between characters on the COMMAND line are deleted by the QVAP command.

Saving Local Storage Retry Data

Key QVAPrxx? in a block (see "Saving Data" on page 313). r represents retry array 0 or 1 and xx represents the address (00 to 1F) of an eight-byte segment of the retry array. The question mark (?) indicates that this is a save operation.

Continuing Normal Operation

To continue normal operation, key QON next to COMMAND, and press the ENTER key. Install FUNC2 diskette into diskette drive 2. Then press the START key.

Label Identification

ADDR: Identifies an eight-byte area of local storage retry.

RYFFBIT: Selects retry array 0 or retry array 1 except during retry mode. If in retry mode, RYUSEFF selects the retry array.

RYREFBT: Sixty-four reference bits used to indicate which addresses from 64 locations of the retry array have been written to or from local storage.

RYUSEFF: When in retry mode, this bit selects retry array 0 or retry array 1. If not in retry mode, RYFFBT selects the retry array.

(QB) Block/Patch Screens

```
*BLOCKS*           BLOCK LIST
TP PATCH LIST       ID   NAME                          ID   NAME
F  EDIT            9540 --------                      9550
R  ERASE           9541 --------                      9551
A  ACTIVATE        9542 --------                      9552
                   9543 --------                      9553
S  SAVE AREA       9544 --------                      9554
H  HALT            9545 --------                      9555
K  TRANSFER        9546 --------                      9556
                   9547 --------                      9557
X  INIT INDEX
M  IML NAMES       9548 RETRY1                        9558
                   9549 BSM        MATCH-WAIT         9559
Q  GENERAL SELECT  954A MVP                           955A
Z  RTN TO PROG SYS 954B MVP2       SPECIAL            955B
                   954C RETRY2                        955C
                   954D --------                      955D
                   954E --------                      955E
                   954F --------                      955F
COMMAND: QBT                                         ==>
```

```
 *EDIT MODE COMMANDS*              01 DO.01.SAMPLE
  S SAVE, END EDIT               _ 02 *.APPLIES.FUNC1.AFFECTS.FUNC2.
  N END EDIT, NO SAVE            _ 03
                                 _ 04
  X DELETE LINE                  _ 05
  A ADD BEFORE LINE              _ 06
  D DUPLICATE LINE               _ 07
  M MOVE BEFORE > LINE           _ 08
                                 _ 09
  = EXECUTE LINE, END EDIT (N)   _ 0A
                                 _ 0B
                                 _ 0C
                                 _ 0D
                                 _ 0E
                                 _ 0F
                                 _ 10
                                 _ 11
                                 _ 12
                                 _ 13 END.0000.1.LASTNAME.mm/dd/yy
COMMAND: QBFSAMPLE                                   ==>
```

Block Facility

Use the block facility to write programs (of up to 17 commands) that can:

- Aid you in solving problems.
- Save information from the Insert/Extract or Display/Alter screens (see "Saving Data" on page 313).
- Be run automatically after a successful IML (see "Automatically Running a Block at IML (QBM)" on page 312).

These programs (called blocks) do not affect normal processing unless an address match occurs or the block itself is running.

You can specify two types of commands with the block facility:

- Those commands that you specify to write or change a block or to control the running of a block (see "Block Control Commands").
- Those commands that you specify within a block itself (see "Commands Within a Block" on page 312).

How to Write a Block

Do the following:

1. Decide what name you want the block to have.
   - The block name can have up to eight characters.
   - The first character in the block name cannot be a P.
2. Key QBF and the desired block name next to COMMAND. An edit screen is displayed (see the QBFSAMPLE screen on the previous page for an edit screen example).
3. Specify your commands on the edit screen (see "Commands Within a Block" on page 312).
4. Save the block with the S edit command.
   - If you did not specify a name and date in the END command, the S command requests it.
   - Also if you did not specify a CRC value in the END command, the S command provides it (press the ENTER key to write the CRC value).
5. Activate the block. See "Activating Blocks (QBA blockname)" on page 310.

Block Control Commands

Displaying the Block List (QBT)

To display the list of existing blocks, enter QBT next to COMMAND.

The QBT screen displays block names, module IDs, and block status. Block status is either blank for no status, SPECIAL, or MATCH-WAIT.

MATCH-WAIT indicates that block execution ended when an address compare occurred.

SPECIAL Indicates that the block, when active, changes the original data to new data. The new data is changed back to the original data when the block is deactivated.

The following commands are permitted in a SPECIAL Block:

NOP, DO, END, QDD, QDM, QDV, QDYB, QDYW, and QVAC.

Note that the QBT example on the previous page has dashes in the NAME column. This indicates that a patch name exists for that specific ID (see "(QBTP) Patch Facility" on page 316).

Editing Blocks (QBF blockname)

Note: While editing a block, neither the COMMAND line nor the MODE SEL key is active. The only way to end a block edit is to key the =, N, or S Block Control commands.

To write a block or to change an existing block, enter QBF followed by a block name next to COMMAND. This displays the edit screen (see screen example on the preceding page). You can now write or change the block.

To write a block, place the cursor to the right of the line numbers on the screen and enter your block commands. To change a block, specify the desired edit commands given below (enter them to the left of the line numbers on the screen). Note that blanks entered in a line of data are deleted by the code. Therefore, to make the data easy to read, separate the data with periods.

After you write or change a block, press the ENTER key. If you made an error, the cursor is placed under the error. (If you do not know the four-digit CRC value in the END command, press the ENTER key again; this writes the correct value for you.)

Command	*Edit Function*
A	Inserts a blank line before this line.
D	Copies this line to the next line.
M	Moves a line. Use the M command, in combination with the > command, to move the "M" line just before the ">" line.
N	Ends edit immediately (no data is saved.)
S	Saves data and ends edit. Use this command to write the block on the FUNC diskette and to save the block name in the block index.
X	Deletes the line. The remaining lines move up one.
>	Inserts a line. See the M command.
=	Runs this line only and ends edit immediately. The line must start with a Q command. (This command helps you diagnose any errors that occur when you try to activate a patch.)

Erasing Blocks (QBR blockname)

To erase a block from the diskette and its name from the block index, enter QBR followed by a block name next to COMMAND.

Activating Blocks (QBA blockname)

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To start a block running, enter QBA followed by a block name next to COMMAND. The block runs until:

- An error occurs.
- The MATCH command is encountered. (At this time, the block facility releases control and unlocks the keyboard so that normal processing can continue or start. The block facility regains control when an address match occurs.)
- The MODE SEL key is pressed (the block facility releases control).
- The block successfully terminates.

Block Status

Information about the block's status is displayed above the command line as follows:

FFF : SSS SAVE
LN nn LP nn

- FFF is the block function.

  ACT The block is being activated.

  CHK The block is being checked to verify that it activates or deactivates.

  DAC The block is being deactivated.

- SSS is the block status.

  END The block successfully completed.

  ERR An error occurred on LN nn.

  HLT The block was stopped by the user.

  MAT Waiting for an address match to occur.

  RUN The block is running.

  XFR Transfer in progress.

- SAVE is set to SAVE if the QBS area is full (QBS save area overflow); or blank if the QBS area is not full.
- LN nn is the line number in hex.
- LP nn is the loop number (always loop 01).

Displaying the Block Save Area (QBS)

Note: Processing unit selection is required to perform this function (see "T TARGET PU-SWITCH" on page 9).

To display the block save area:

1. Key QBS and a one-digit page number next to COMMAND. If you do not specify a page number, the default is zero.
2. Press the ENTER key. This displays up to a 16-item Block Save Area. (See sample screen on page 311.) If more than 16 items have been saved, use the PAGE key to display them.

Address: Indicates where the data is stored.

Data: Indicates the saved data.

Type: Indicates the Display/Alter and Insert/Extract commands used to save the data.

```
*BLOCKS*            SAVE AREA PUx DATE: yy/mm/dd hh:mm:ss              PAGE 0
TP PATCH LIST         TYPE ADDRESS  DATA
F  EDIT               QDG  04       A5A5 A5A5
R  ERASE              QDP           FF00 0000 4000 2222
A  ACTIVATE           QDM  004672   3A00 2680 2B90 04F0
                      QDK  004672   0007 0000
S  SAVE AREA          TOD           yy/mm/dd hh:mm:ss
H  HALT
K  TRANSFER

X  INIT INDEX
M  IML NAMES

Q  GENERAL SELECT
Z  RTN TO PROG SYS



COMMAND: QBS                                        ==>
```

```
*BLOCKS*            IML NAMES
TP PATCH LIST
F  EDIT             *PU0*                          *PU1*
R  ERASE            CORELOAD  BLOCK NAME       CORELOAD  BLOCK NAME
A  ACTIVATE
                    S/370:                     S/370:
S  SAVE AREA
H  HALT             S/370XA:                   S/370XA:
K  TRANSFER

X  INIT INDEX
M  IML NAMES

Q  GENERAL SELECT
Z  RTN TO PROG SYS



COMMAND: QBM                                        ==>
```

Halting Blocks (QBH)

To clear an active block, enter QBH next to COMMAND. Note that the QBH command has no affect when the block is running; QBH is effective only when the block is in MATCH-WAIT state.

Even though you stop the block, the address compare remains active (you can clear it with the QAN command).

Transferring Blocks (QBK blockname1 <.blockname2>)

Use the QBK command to:

- Transfer (copy) a block from one diskette to another.
- Write a second copy with a different block name.

Specify (next to COMMAND) QBK followed by one or two blocknames. The QBK command:

1. Searches the block index for blockname1. It then finds the block and reads it into storage.
2. Prompts you to switch diskettes.
3. Searches the block index on the to-be-copied-to diskette for blockname2 (if you specified blockname1 only, it searches for this name). If it finds the block name, it writes over the old block data with the new block data. If it does not find the block name, it enters this new block name into the block index and writes the block in the first available area on the diskette.

Note: If you mistakenly press the COPY key while transferring a block, respecify the QBK command.

Initializing the Index (QBX)

This command applies to those blocks written on the diskette with the Module Transfer function. If you think any block names are missing from the block index, enter QBX next to COMMAND to automatically write them in the block index.

Automatically Running a Block at IML (QBM)

To have a block run automatically after an IML, enter QBM next to COMMAND. This displays the IML Block screen. Now enter the desired block name in the correct system mode and processing unit field on the QBM screen. (See sample screen on page 311.) You can enter only one block name per IML. If you need to run more than one block, specify the XFER Block command in the block.

To run the block, answer YES to the RUN BLOCK question that appears after a successful IML. Next, press the ENTER key.

Note: The processor is placed in a clock-stop state if a Block is invoked at IML time. With the DIAG1 diskette installed into diskette drive 2, this allows the use of Insert/Extract (QV) functions. If a Block requires that the processor be in instruction-stop state, ensure that the KEY.START.01 command is used in the Block.

If IML COMPLETE appears, the block ran correctly; if PATCH ERROR appears, the block failed to run.

Commands Within a Block

Specify the following commands in the body of a block. Note that blanks in a line of data are deleted by the microcode. Therefore, to make the data easy to read, separate the data with periods.

Q Command

Use the Q-type commands to either:

- Change some condition of the machine. For example, QAASA4FF0 causes an instruction stop if, during processing, storage address 4FF0 is encountered.
- Save information (see "Saving Data" on page 313).

The QT command can be used in a block to change processing unit selection (see "T TARGET PU-SWITCH" on page 9).

Note: Before running a block that contains a QA or QD command, either press the STOP key on the console, or put a KEY.STOP command in the block.

DO.xx.blockname

This command is always the first command in a block. xx is the number of times you want the block to run. Because the name of the block is automatically inserted in the DO command, do not change the name.

NOP<.comment>

Use this command only for spacing or commenting.

* comment

Use this command only for spacing or commenting.

TOD<.comment>

Use this command to set the time-of-day clock in the save area.

END.xxxx<.name.date>

This command is always the last command in a block. *xxxx* is a four-digit CRC (cyclical redundancy check) value (sometimes called CHECKSUM). (If you do not know the CRC value or you make an error specifying it, the correct value is displayed when you specify the S (save) edit command. Press the ENTER key one more time; this writes the correct CRC value for you.)

You can enter *name.date* either when you first key the END command or when the S (save) edit command requests it.

HALT <.comment>

Use the HALT command to stop immediately the running of a block even if more loops remain to be run. *Do not confuse this HALT command with the QBH command which stops the running of a block at MATCH-WAIT only.*

MSG <.text>

Use this command to enter informational messages in a block. When the *MSG* command is encountered during the running of a block, the message is displayed on line 23 of the screen.

GOTO.line <.comment>

Use the *GOTO* command to go to the line number specified and to continue processing from there.

Saving Variable Data

The block facility gives you two methods of saving variable data. Five separate save areas (S1 to S5) are available to you (each can contain up to four bytes).

Method 1: Sn=<x> Q command

Use the following two examples as an aid in understanding method 1.

S2=QDM000078? — This example indicates that the data stored at locations 78 through 7B of main storage is to be saved in a save area named S2 (recall that the save area can hold up to four bytes of information).

S3=2QDM000078? — In this example, the number 2 immediately after the equal (=) symbol indicates that the first two bytes in main storage address 78 (that is, bytes 78 and 79) are not to be saved. Therefore, the save area named S3 contains the data stored at storage locations 7A through 7D.

The second example shows how you can save the data in a field when it contains more than four bytes. For example, when you specify a main storage address (as in this example), eight bytes are available to you, but you can save only four of them. (The number immediately following the equal (=) symbol indicates the number of bytes to be skipped, going from left to right. If the saved data is less than four bytes long, the save area is padded with zeros to the right of the data.)

Method 2: Sn=aaa <opcode aaa><.comment>

Use method 2 to store a constant or a calculated result in a save area.

For example if you specify S2=00000006 (in a block), the constant 00000006 is stored in save area S2. If you specify S3=S1+00000008, the constant (00000008) is added to the value stored in save area S1, and then this result is itself stored in save area S3.

In the above command, substitute 1 through 5 for n, substitute S1 through S5 or an eight-digit value for aaa, and substitute one of the following symbols for opcode.

+ (add)
- (subtract)
& (and)
/ (or)

Saving Data

QD...?
QV...?

Use the QD or QV commands to save information displayed on the Insert/Extract or Display/Alter screens. (The QD or QV save commands can only be specified within the block facility.)

The question mark (?) in the command indicates this is a save operation. For example, QDGE? copies the data in general register E into a block save area. (You can see what has been saved in the block save area by using the QBS command.)

Verifying Data Before Changing It: Before you change data at a specified address with the QD command, you can use the question mark (?) to verify that the data is what you assume it to be. Use the following example as a guide.

QDYA3FFF?F1F2=C1C2

This command verifies that address 3FFF contains F1F2 before changing it to C1C2. If F1F2 is not at address 3FFF, a block error occurs.

Block Save Area: The block save area stores data that you point to with the QD, QV, or Sn commands. (Use the QBS command to display the block save area.)

Comparing Data

COMP.aaa.bbb.line1 line2 line3<.comment>

Use this command to compare aaa with bbb and then go to line1, line2, or line3.

If aaa < bbb, go to line1
If aaa = bbb, go to line2
If aaa > bbb, go to line3.

aaa and bbb can be either S1 through S5 or an eight-digit constant. Line1, line2, and line3 are two-digit line numbers (hex) that identify a line in the block.

Example: COMP.S2.00000002.0A110.CHECK.S2

In this example, the data in area S2 is compared with constant 00000002. Running continues at line 0A if S2 is 0 or 1, at line 11 if S2 is 2, and at line 0 if S2 is greater than 2. CHECK.S2 is an optional comment.

Simulating the Start or Stop Key

KEY.START.xx<.comment>
KEY.STOP<.comment>

This command simulates pressing the START or STOP key on the console. If you specify START, you must also supply a two-digit hex number to indicate the number of times the key is to be activated. You can also supply an optional comment.

Note: The value of xx does not always ensure that you will run xx times; you must have previously set the operation rate (QOI or QOM) correctly.

Transferring Control from One Block to Another

XFER.blockname

Use this command to transfer control to the specified block. XFER ends the present block without error, regardless of how many loops are yet to run.

The new block is activated and starts running as though it were started from the COMMAND line. Any data saved in the Block Save Area is not cleared when the new block starts running; this data is saved from one block to another.

MATCH <.comment>

Use the MATCH command together with the QAA command to do an address compare operation (see "Match Command Example"). The QAA command indicates the address to be stopped at.

When a MATCH command is encountered, the block goes into MATCH-WAIT status (starts to wait for an address match) and the following occurs:

- The block stops running.
- The keyboard unlocks.
- Control returns to the processor so that normal processing can continue (the block is now transparent to the user).

When an address-match does occur, the block starts running again at the command immediately following the MATCH command. If the block resumes running when the keyboard is in manual mode, the keyboard remains locked until the block facility releases control. (During this time, the screen that was displayed does not change.)

The MATCH command does not need to follow immediately the QAA command. Also, once you specify an address compare in a block, you do not need to specify another match that uses the same conditions.

MATCH COMMAND EXAMPLE

KEY.STOP	Ensures PU is stopped
QAAHA8600	Stops the clock if storage address is 8600 **Note:** Do not insert a QD or QV command between the QAA and MATCH commands.
KEY.START.01	Starts PU running
MATCH	Waits for match to occur
QOM	Sets op rate to microword step
KEY.START.02	Runs two microwords
QVAL10?	Records data in local storage
QAAN	Sets address compare to normal
QON	Sets op rate to normal
KEY.START.02	Starts PU running again

Running a Block

See "Activating Blocks (QBA blockname)" on page 310.

Stopping a Block

If a block is running, you can stop it by pressing the CNCL key (if inhibited, the keyboard must be reset first). If a Q command is running, it completes its operation before termination occurs.

If a block is waiting for a match to occur (MATCH-WAIT condition), use the QBH command. This stops the block from running but leaves the address compare active (you can clear the active address compare with the QAN command).

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QBTP) Patch Facility

```
*PATCHES*          PATCH LIST
T  BLOCK LIST       ID   NAME                          ID   NAME
F  EDIT            9540 P897R122  ACTIVE             9550
R  ERASE           9541 P897R123  ACTIVE             9551
A  ACTIVATE        9542 P897R124  ACTIVE             9552
D  DEACTIVATE      9543 P897S114  ERROR              9553
                   9544 P897R130  ACTIVE             9554
                   9545 P897R555  ACTIVE             9555
K  TRANSFER        9546 P897S130  ACTIVE             9556
L  ACTIVATE ALL    9547 P897D016  INACTIVE           9557

                   9548 --------                     9558
                   9549 --------                     9559
Q  GENERAL SELECT  954A --------                     955A
Z  RTN TO PROG SYS 954B --------                     955B
                   954C --------                     955C
                   954D P897DIAG  INACTIVE           955D
                   954E P897SRCS  ACTIVE             955E
                   954F P897SRCV  INACTIVE           955F
COMMAND: QBTP                                       ==>
```

The patch facility lets you patch (make changes to) microcode and store the change(s) on the FUNC diskette. Two types of patch commands are available:

- Commands that install, change, and control the running of a patch (see "Patch Commands").
- Commands that are run by the patch (see "Commands Within a Patch" on page 318).

Patch Name Description

- The patch name has eight characters.
- The first character in the patch name is a P.
- The next three characters are the last three digits of the microcode EC number.
- The next character should be an M.
- The last three characters are a three-digit numbering scheme.

Patch Commands

Displaying the Patch List (QBTP)

To display a list of the patches written on the FUNC diskette, enter QBTP next to COMMAND. Displayed are patch names, module IDs, and patch status (see the QBTP screen on the previous page). The dashes on the QBTP screen indicate that a block name exists for that specific module ID (see "(QB) Block/Patch Screens" on page 308).

The patch status can be:

ACTIVE Indicates that the patch is applied to the microcode and that its name is in the patch index.

INACTIVE Indicates that the patch name is in the patch index, but that the patch no longer affects the microcode.

ERROR Indicates that an error occurred while a patch was being activated. The patch name remains in the patch index even though the patch is not activated.

Editing Patches (QBF patchname)

To install a patch or to change an existing inactive patch, enter QBF followed by a patch name next to COMMAND. This displays the edit screen. (See sample screen on page 308.) You can now use the edit commands to install or change a patch.

For a step-by-step installation procedure, see Volume A06 Service Aids, "Patch Aids." To change an inactive patch, specify the desired edit commands (enter them to the left of the line numbers on the screen.) Note that blanks entered in a line of data are deleted by the microcode. Therefore, to make the data easy to read, separate the data with periods. (See sample screen on page 308.)

After you have modified a patch, press the ENTER key. If

Command	*Edit Function*
A	Inserts a blank line before this line.
D	Duplicates a line. Use the D command to duplicate the line that contains the D command.
M	Moves a line. Use the M command, in combination with the > command, to move the "M" line just before the ">" line.
N	Ends edit immediately (no data is saved).
S	Saves data, ends edit, and activates the patch. This command writes the patch on the system diskette, enters the patch name in the patch index, applies the patch to the microcode, and sets the patch status to active. (If you enter incorrect patch data, the patch is not applied to the microcode nor set to active status).
X	Deletes the line. The remaining lines move up one.
>	Inserts a line. See the M command.
=	Runs this line and ends edit immediately. Use this command to run the line as if it were entered from the COMMAND line. The line must start with a Q command. (This command helps you diagnose any errors that occur when you activate a patch.)

Erasing Patches (QBR patchname)

To erase a patch from the diskette and its name from the patch index, enter QBR followed by a patch name next to COMMAND.

Activating Patches (QBA patchname)

To install a patch on the microcode, enter QBA followed by a patch name next to COMMAND. The patch runs until an error occurs or the patch successfully terminates.

Line two of the patch indicates the diskette to which the patch applies. If the correct diskette is not installed, an error occurs (see "Patch Status" on page 318).

Activate All (QBL)

To install a group of patches on the microcode, enter QBL next to COMMAND. You are prompted to reenter the L because there is no cancel function. When activation starts it continues until an error occurs, a diskette change is needed, or activation is completed.

Line two of each patch is checked to see if the correct diskette is installed. If the correct diskette is not installed, you are prompted to install it.

Deactivating Patches (QBD patchname)

To remove a patch from the microcode, enter QBD followed by a patch name next to COMMAND. The patch name remains in the patch list; however, its status becomes inactive.

Line two of the patch indicates the diskette to which the patch applies. If the correct diskette is not installed, an error occurs (see "Patch Status").

Patch Status: While the patch is running (because of the save, activate, or deactivate commands), the screen indicates the fo7llowing above the COMMAND line:

FFF : SSS
LN nn LP nn

- FFF is the patch function.

  ACT The patch is being activated.

  CHK The patch is being checked to verify that it activates or deactivates.

  DAC The patch is being deactivated.

- SSS is the patch status.

  END The patch successfully completed.

  ERR An error occurred on LN nn.

  RUN The patch is running.

- LN nn is the line number in hex.

- LP nn is the loop number (always loop 01).

Transferring Patches (QBK patchname)

To transfer (copy) a patch from one diskette to another, enter QBK followed by a patch name next to COMMAND.

If a patch with the same name exists on the diskette and it is active, the transfer is not made. If the same patch name is found and it is not active, the old patch data is overwritten with the new patch data. If it is not found, the new patch name is entered into the patch list, and the patch is written in the first available area on the diskette.

Commands Within a Patch

Specify the following commands in the body of a patch. Note that blanks in a line of data are deleted by the microcode. Therefore, to make the data easy to read, separate the data with periods.

DO.01.patchname

This command is always the first command in a patch. Because the name of the patch is automatically inserted in the DO command, do not change it.

QDD

This command changes the microcode on the diskette.

NOP<.comment>

This command is used only for spacing or commenting.

* comment

This command7 is used only for spacing or commenting.

END.xxxx<.name.date>

This command is always the last command in a patch. *xxxx* is a four-digit value (sometimes called CHECKSUM) that is used by the system to determine if you made any keying errors. You must know this four-digit value to write the patch on the diskette.

You can enter *name.date* either when you first key the END command or when the S (save) edit command requests it.

Running a Patch

Start to run a patch with the S (save) or A (activate) commands.

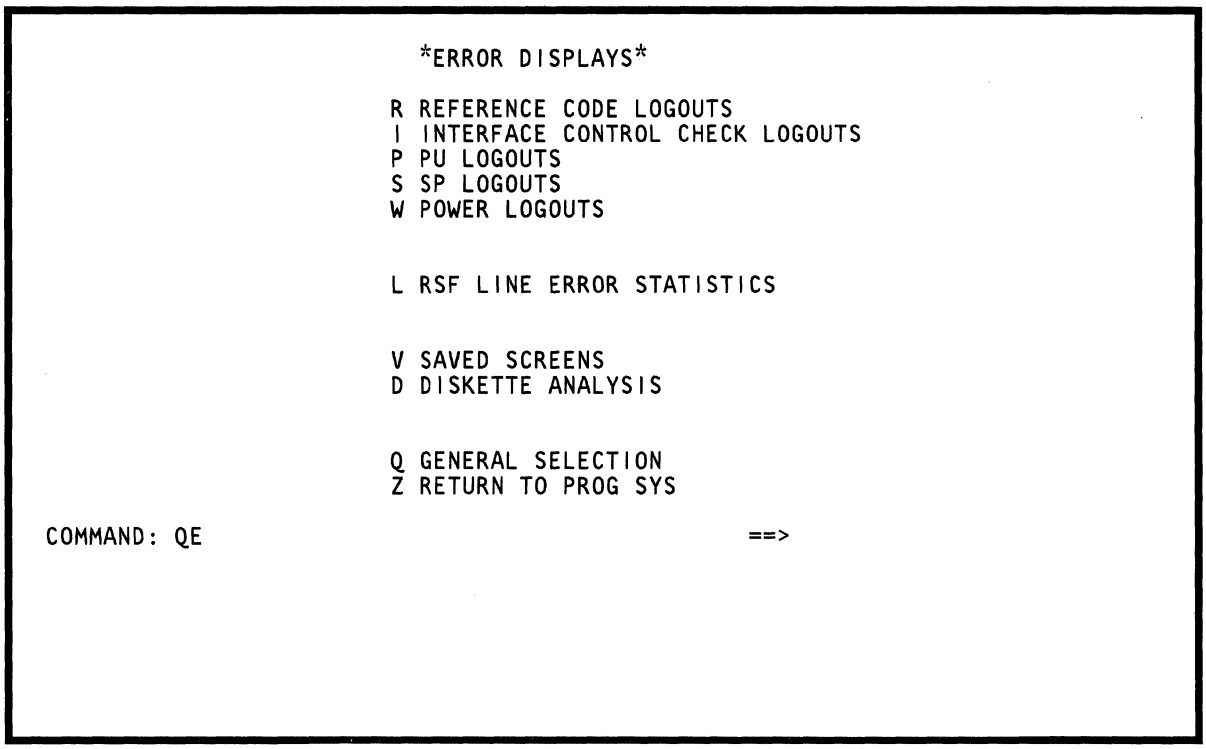
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QE) Error Display/Logout Screens



Use the Error Display/Logout screens to:

- Display error information that has been saved in a log area.
- Display RSF error statistics.
- Display saved screens.
- Perform diskette analysis.

Displaying the Error Log Options

To display the error log options key QE next to COMMAND, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QER) Reference Code Logouts

```
                    *REFERENCE CODE LOGOUTS*

                    D   DISPLAY REFERENCE CODES

                    DP  PURGE ALL LOGS

                    Q   GENERAL SELECTION

                    Z   RETURN TO PROG SYS


COMMAND: QER                                    ==>
```

Use the Reference Code Logout screens to display reference codes or to clear the reference code logout file.

(QERD) Reference Code Logout File

```
 **REFERENCE CODE LOGOUT FILE**      CURRENT TODC EQUIVALENT: yy/mm/dd hh:mm:ss
================================================================================
RN CT ---TODC EQUIV-- REF CODE RC EXTN.  RN CT ---TODC EQUIV-- REF CODE RC EXTN.
0  01 mm/dd  hh:mm:ss EC517464 00000000  16 00 mm/dd  hh:mm:ss 00000000 00000000
1  01 mm/dd  hh:mm:ss EC517A64 00000000  17 00 mm/dd  hh:mm:ss 00000000 00000000
2  00 mm/dd  hh:mm:ss 00000000 00000000  18 00 mm/dd  hh:mm:ss 00000000 00000000
3  00 mm/dd  hh:mm:ss 00000000 00000000  19 00 mm/dd  hh:mm:ss 00000000 00000000
4  00 mm/dd  hh:mm:ss 00000000 00000000  20 00 mm/dd  hh:mm:ss 00000000 00000000
5  00 mm/dd  hh:mm:ss 00000000 00000000  21 00 mm/dd  hh:mm:ss 00000000 00000000
6  00 mm/dd  hh:mm:ss 00000000 00000000  22 00 mm/dd  hh:mm:ss 00000000 00000000
7  00 mm/dd  hh:mm:ss 00000000 00000000  23 00 mm/dd  hh:mm:ss 00000000 00000000
8  00 mm/dd  hh:mm:ss 00000000 00000000  24 00 mm/dd  hh:mm:ss 00000000 00000000
9  00 mm/dd  hh:mm:ss 00000000 00000000  25 00 mm/dd  hh:mm:ss 00000000 00000000
10 00 mm/dd  hh:mm:ss 00000000 00000000  26 00 mm/dd  hh:mm:ss 00000000 00000000
11 00 mm/dd  hh:mm:ss 00000000 00000000  27 00 mm/dd  hh:mm:ss 00000000 00000000
12 00 mm/dd  hh:mm:ss 00000000 00000000  28 00 mm/dd  hh:mm:ss 00000000 00000000
13 00 mm/dd  hh:mm:ss 00000000 00000000  29 00 mm/dd  hh:mm:ss 00000000 00000000
14 00 mm/dd  hh:mm:ss 00000000 00000000  30 00 mm/dd  hh:mm:ss 00000000 00000000
15 00 mm/dd  hh:mm:ss 00000000 00000000  TIME OF LAST PURGE: yy/mm/dd hh:mm:ss
 COMMAND: QERD                                    ==>
```

The QERD command displays the last 31 PU, SP, and power reference codes.

For more information about the QERD screen, see Volume A07 "Logs."

(QEI) Interface Control Check Logouts

```
*ERROR DISPLAYS*                    *INTERFACE CONTROL CHECK LOGOUTS*
XXY=CHNLXX,L Y
                                                  LAST
                                  PU/    IFCC     IFCC     PU/    IFCC
 DXXY DISPLAY                     CHNL  LOGGED    SAVED    CHNL  LOGGED
                                                   03
                                   00      00               10      00
                                   01      02               11      00
 P    PURGE IFCC LOGOUTS           02      00               12      00
                                   03      01               13      00
                                   04      00               14      00
                                   05      00                [illegible]  00
 Q    GENERAL SELECT               06      00               16      08+
                                   07      00               17      00
                                   08      00               18      00
 Z    RTN TO SYSTEM

 LAST PURGE: yy/mm/dd hh:mm
COMMAND: QEI                                  ==>
```

Use the QEI screen to display the number of failures (IFCC logs) that occurred on each channel. The channel number of the latest failure is displayed under LAST IFCC SAVED.

For more information about the QEI screen, see Volume A07 "Logs."

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QEID) Channel Interface Logout Detail

```
*ERROR LOGOUTS*     *CHANNEL 00 INTERFACE LOGOUTS*    TOD: yy/mm/dd hh:mm:ss
       ---ADDR--- -TAGS--      --BUS--      CAT                    ENGINEERING
L TYPE DEVA SCHID IN  OUT SQ  IN  OUT CNT NUM        TOD            DATA
1 370X 0233 7777  44  32  11  55   77  FF  55 yy/mm/dd hh:mm:ss 00000000000000

2 370  000E ****  00  02  44  00   00  04  42 yy/mm/dd hh:mm:ss 0E00F01C20

3 370  000E ****  00  02  44  00   09  09  42 yy/mm/dd hh:mm:ss 2400201C92

4 370  000E ****  00  02  44  00   00  03  42 yy/mm/dd hh:mm:ss 0E00F01C20

5 370  000E ****  00  02  44  00   09  05  42 yy/mm/dd hh:mm:ss 2400201C92

6 370  000E ****  00  02  44  00   00  02  42 yy/mm/dd hh:mm:ss 0E00F01C20

7 370X 0233 8657  44  32  77  55   77  64  55 yy/mm/dd hh:mm:ss 00000000000000

8 370  000E ****  00  02  44  00   09  03  42 yy/mm/dd hh:mm:ss 2400201C92
TAGIN= REQ OPL DIS ADR SEL STA SRV/DAT  TAGOUT= ADR CMD DAT SRV SUP OPL SEL
COMMAND: QEID001                                ==>
```

Use the QEID screen to display detailed IFCC information for a given channel (up to eight lines can be displayed).

For more information about the QEID screen, see Volume A07 "Logs."

(QEP) Processing Unit Logouts

```
*ERROR DISPLAYS*      *PROCESSING UNIT LOGOUT SELECTION*

                              D LOGOUT DIRECTORY DISPLAY
                              M MICROWORD DIRECTORY DISPLAY
                              DP PURGE PU LOGOUT
                              R RECONFIGURATION DATA DISPLAY
                              S0 PU0 SUMMARY DISPLAY
                              S1 PU1 SUMMARY DISPLAY
                              Q GENERAL SELECTION
                              Z RETURN TO PROG SYS

COMMAND: QEP                                        ==>
```

Use the QEP screen to display the processing unit logout selections.

(QEPD) Processing Unit Logout Directory

```
     PROCESSING UNIT LOGOUT DIRECTORY   MODEL: 4381   SERIAL NUMBER: 012345
ID  PU TODC  EQIVALENT   REF CODE ERR STG ADRS MACH STATUS          CHANNEL RST
00C9 1 yy/mm/dd hh:mm:ss 5DD218AF              UNSUCCESSFUL RETRY   ------------
00C8 0 yy/mm/dd hh:mm:ss 5D272CAE KEY xxxxxxxx UNSUCCESSFUL RETRY   ------------
00C7 1 yy/mm/dd hh:mm:ss 5D03BCAF              EXIGENT MACH CHK     ------------
00C6 0 yy/mm/dd hh:mm:ss 5D03BCAE              EXIGENT MACH CHK     ------------
00C5 0 yy/mm/dd hh:mm:ss 60A3A6AE              CHANNEL ERROR        --2---------
00C4 1 yy/mm/dd hh:mm:ss 46E24FAF FSS xxxxxxxx CHECK STOP           ------------
00C3 1 yy/mm/dd hh:mm:ss 46D1F8AF DBE xxxxxxxx UNSUCCESSFUL RETRY   ------------
00C2 0 yy/mm/dd hh:mm:ss 7093CBAE              UNSUCCESSFUL RETRY   ------------
00C1 0 yy/mm/dd hh:mm:ss 60A3D6AC              CHANNEL ERROR        -----5------
00C0 1 yy/mm/dd hh:mm:ss 5DD218AD              SUCCESSFUL RETRY     ------------




 COMMAND:   QEPD                                  ==>
```

The QEPD command displays up to nine lines of information about a PU error.

For more information about the QEPD screen, see Volume A07 "Logs."

(QEPM) Processing Unit Microword Logout Directory

```
 PROCESSING UNIT MICROWD LOGOUT DIRECTORY    MODEL:4381 SERIAL NUMBER:012345
ID   PU  CREG      CREGSVA  CREGSVB  CREGSVC   CSARBU  SAVERG CK STOP RTY FLAG
01B5 1   020057F1 *D0800000 00000000 00000000  008004  000004 00400000 85428810
01B4 0   7FF97FFB *D0800000 00000000 00000000  008004  000004 00400000 C4008800
01B3 0   020057F1 *D0800000 00000000 00000000  008004  000004 00400000 84200000
01B2 1   020057F1 *D0800000 00000000 00000000  008004  000004 00400000 84010000
01B1 0  *B8B06A30  F2001F00 FFFFFFFF B8B06A30 *01702C  01702C 00400000 84000000
01B0 1   020057F1 *D0800000 00000000 00000000  008000  000004 00400000 84000000
01AF 0   020057F1 *D0800000 00000000 00000000  008000  000004 00400000 84010000
01AE 1   02105079 *02105079 91423B78 1C005B71  017678  017678 00400000 84200000
01AD 1   02105079 *02105079 91423B78 1C005B71  017678  017678 00400000 84010000




 COMMAND: QEPM                                          ==> PRESS ENTER
```

The QEPM command displays up to nine lines of information about a PU error.

For more information about the QEPM screen, see Volume A07 "Logs."

(QEPR) Processing Unit Reconfiguration Data

```
 PU.RECONFIGURATION DATA MODEL: 4381    SERIAL: 012345  TOD: yy/mm/dd hh:mm:ss
ID   PU  TOD EQUIVALENT     RECONFIGURATION DATA

0008 0  yy/mm/dd hh:mm:ss  SWAP BUFF. BYTE      --23------------  ADDR 0017E7C0
0007 0  yy/mm/dd hh:mm:ss  CDB         CHANNEL   X03 Y05          ADDR 00103EC0
0006 1  yy/mm/dd hh:mm:ss  MULT.       RECONFIG                   ADDR 00087E00
0005 0  yy/mm/dd hh:mm:ss  CACHE       BYTE      -1------         ADDR 00000048
0004 1  yy/mm/dd hh:mm:ss  CNT. STG    BYTE      2/6 20=1         ADDR 00103A00
0003 1  yy/mm/dd hh:mm:ss  CACHE DIR. CONG. CL  10    SLOT 00     ADDR 0007AC00
0002 0  yy/mm/dd hh:mm:ss  STG. DBE.             SS  NC  --  --    ADDR 001FCFC0




LATEST LOGID: 0008
 COMMAND: QEPR                                    ==>
```

The QEPR command displays PU reconfiguration data.

For more information about the QEPR screen, see Volume A07 "Logs."

(QEPS) Processing Unit Log Summary

```
 PU LOG SUMMARY  MODEL: 4381  SERIAL: 012345  LOCAL TOD EQU: yy/mm/dd hh:mm:ss
001D 001D SUCCESSFUL RTY    0064 0064 CS CONTROL        000B 000B CH DATA BUFFR
0006 0006 UNSUCCESS. RETRY  0018 0018 CS ARRAY 0        001D 001D CH CONTROL
0022 0022 UNRTY (RETRY 1)   0014 0014 CS ARRAY 1        0015 0015 CH INTERFACE1
0014 0014 UNRTY (RETRY 2)   0015 0015 CS ARRAY 2        0019 0019 CH INTERFACE0
0000 0000 UNRTY (NO RETRY)  0011 0011 CS ARRAY 3        C01D 001D ST CACHE 0
001B 001B CK ST (RETRY 1)   002D 002D IPU DATA FLOW L   000F 000F ST CACHE 1
0030 0030 CK ST (RETRY 2)   001E 001E IPU DATA FLOW H   0009 0009 ST CACHE 2
0010 0010 CK ST (SKIP LOG)  0016 0016 IPU SHIFTER       000F 000F ST CACHE 3
00E7 00E7 CK ST (MC RESET)  0027 0027 IPU SAR           0002 0002 ST CTL/ECC1 E
0007 0007 KEYS              0015 0015 IPU I-CYCLES      000B 000B ST CTL/ECC1 0
0000 0000 DBE HARD-HARD     001E 001E IPU INTRUPT       001E 001E ST BSM/ECC2 E
0000 0000 DBE HARD-SOFT     0012 0012 IPU TIMER         001E 001E ST BSM/ECC2 0
0002 0002 DBE SOFT-SOFT     0021 0021 IPU LS/EXT        000C 000C ST SAR
0002 0002 DBE UNCORRECTED   0017 0017 CL CONTROL 0      000B 000B ST KEYS
0000 0000 DBE CORRECTED     0000 0000 CL CONTROL 1      0035 0035 ST DLAT
00D8 00D8 TOTAL RETRY       0000 0000 UNSUCCESSFUL I/O  0000 0000 SUCCESS. I/O
 000000   HARDWARE COUNTER

 COMMAND: QEPS1                                  ==>
```

The QEPS command displays PU error statistics.

For more information about the QEPS screen, see Volume A07 "Logs."

(QES) SP Logouts

```
                          *SP LOGOUTS*


                          E    EVENT COUNT SUMMARY
                          ER   RESET EVENT COUNTERS

                          D    DIRECTORY DISPLAY
                          DP   PURGE SP LOGS
                          DXX  DETAIL DISPLAY (XX = 00-15)


                          Q    GENERAL SELECTION

                          Z    RETURN TO PROG SYS



COMMAND: QES                                    ==>
```

Use the SP Logout screens to display:

- SP error summaries
- SP error details
- SP event counters.

(QESE) SP Event Counters-Error Log Display

```
*ERROR LOG DISPLAY*          *SP EVENT COUNTERS*
     0  TOTAL POWER ON HOURS              CURRENT TODC EQUIV: yy/mm/dd hh:mm:ss
     0  DELTA POWER ON HOURS            LAST RESET TODC EQUIV: yy/mm/dd hh:mm:ss
 TOTAL  DELTA                            TOTAL  DELTA
     0      0 TIMES POWERED ON               0      0 TIMES POWERED OFF
     0      0 POWER FAULTS                   0      0 HOURS IN CE MODE
     0      0 HOURS IN DIAGNOSTIC MODE
     0      0 SP PARITY ERR HARD RECOV       0      0 SP PARITY ERR HARD UNREC
     0      0 SP PARITY ERR SOFT RECOV       0      0 SP PARITY ERR SOFT UNREC

     0      0 SP REIML                       0      0 AUTO SP-REIML
     0      0 SP RESETS                      0      0 AUTO SP-RESET

     0      0 SUCCESSFUL LCA RETRY           0      0 UNSUCCESSFUL LCA RETRY
     0      0 LCA CYCLE STEAL ERROR

     0      0 SUCCESSFUL DCA RETRY           0      0 UNSUCCESSFUL DCA RETRY
     0      0 DCA CYCLE STEAL ERROR

  COMMAND: QESE                                    ==>
```

```
*ERROR LOG DISPLAY*          *SP EVENT COUNTERS*
     0  TOTAL POWER ON HOURS              CURRENT TODC EQUIV: yy/mm/dd hh:mm:ss
     0  DELTA POWER ON HOURS            LAST RESET TODC EQUIV: yy/mm/dd hh:mm:ss
 TOTAL  DELTA                            TOTAL  DELTA
     0      0 SUCCESSFUL CCA RETRY           0      0 UNSUCCESSFUL CCA RETRY
     0      0 SUCCESSFUL DDA RETRY           0      0 UNSUCCESSFUL DDA RETRY
     0      0 DDA CYCLE STEAL ERROR

     0      0 SUCCESSFUL PCA RETRY           0      0 UNSUCCESSFUL PCA RETRY
     0      0 SUCCESSFUL SBA RETRY           0      0 UNSUCCESSFUL SBA RETRY

     0      0 PU-IML XA-MODE                 0      0 PU-IML S370
     0      0 PU-IPL
     0      0 PU  SUCCESSFUL RETRY           0      0 PU1 SUCCESSFUL RETRY
     0      0 PU  UNSUCCESSFUL RETRY         0      0 PU1 UNSUCCESSFUL RETRY
     0      0 PU  CHECK STOP                 0      0 PU1 CHECK STOP
     0      0 PU  EXIGENT MACHINE CHECK      0      0 PU1 EXIGENT MACHINE CHECK
     0      0 PU  CHANNEL RESET              0      0 PU1 CHANNEL RESET

  COMMAND: QESE                                    ==>
```

The QESE command displays the number of times various SP actions occurred.

For more information about the QESE screen, see Volume A07 "Logs."

(QESD) SP Logout Summary

```
     ***SP LOGOUT SUMMARY***       CURRENT TODC EQUIVALENT: yy/mm/dd hh:mm:ss
================================================================================
LN EVNT CT TODC EQUIVALENT  LVL MM MC --MSW--- C-IC INST ADPT SIC- LMR- REF.CODE
00 0003 01 mm/dd  hh:mm:ss  07 00 12 63402F2E 6340 EE05 0000 0000 3900 EC517464
01 0002 01 mm/dd  hh:mm:ss  07 00 12 63402F2E 6340 EE05 0000 1856 96C8 EC517A64
02 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
03 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
04 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
05 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
06 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
07 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
08 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
09 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
10 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
11 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
12 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
13 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
14 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
15 0000 00 mm/dd  hh:mm:ss  00 00 00 00000000 0000 0000 0000 0000 0000 00000000
 COMMAND: QESD                                  ==>
```

The QESD command displays a summary of the last 16 SP logs.

For more information about the QESD screen, see Volume A07 "Logs."

(QESDxx) SP Detail Log xx

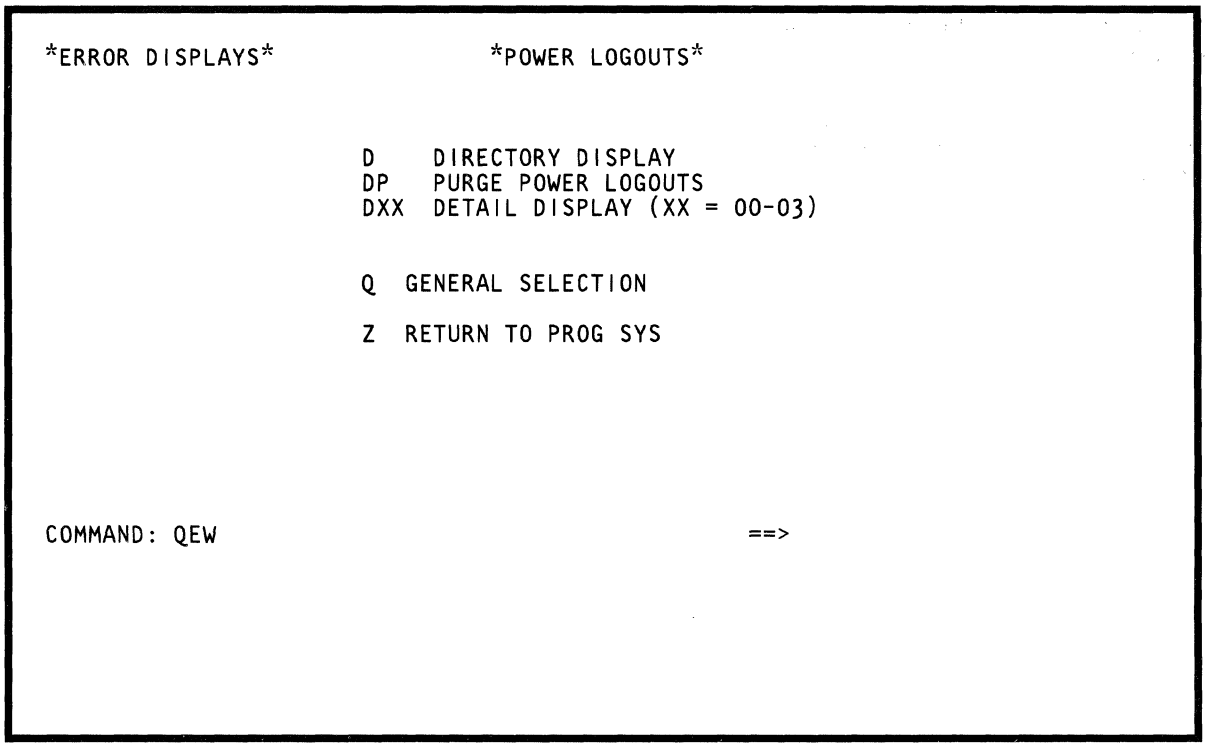
```
 SP LOG:00  TODC EQUIV:yy/mm/dd  hh:mm:ss ID:0000000000  EC:866898   EVENT:002D
================================================================================
LEVEL 03  IOIRR 48  IC   7F00  CNFG:AB0000000000A201ED00   RC:FE400324 00000000
MMASK 01  MIRR  13  C-IC 7F00          DLAT    LVL     MSW          LVL    MSW
CMASK DF  IOADT 00  LMR  9309        DATA 85     0   3010 2120       1  60DE 2322
SPCK  12  IOCMD 00  LMRB 9309        INST 80     2   0800 2524       3  7F04 2726
LOMC  00            INST EE05 4010   CHAN 85     4   9404 A928       5  208E AB2A
------BURST MODE------               STAT 00     6   60DE AD2C       7  89A4 AF2E
LCA 8500D0 DISK 811000 --------I/O STATUS----------  ----------PLDA----------
DCA 85FA52  85FB80     DISK1  02   LCA   002000      C1 0000  C2 0000  C3 8000
DCA 85FC80  85FD80     DISK2  38   CCA   0000000000  0P 0000  CK 0000  BF 0000
DCA 85EB80  85FC00     PWR    01   DCA   0493        C4 00  DS 40  IM 90  PG 80
DCA 85FD02  85FE00     SBA    03   PU    00000000    TM 04  TP 8000  CB QLM
REGISTERS:             SBA2   02   PU1   00000000
PP:26  0111 4200 2334 0000 8080 9978 0020 3AF0
SP:27  2000 1170 2020 3030 8400 8420 8440 8460
---------------------------DEVICE CONTROL BLOCK-------------------------------
2080 0000 0000 0000 0080 00F8 0000 0000 0000 0400 0000 0000 0200 0000 0000 0000
0000 A900 0000 0000 408C 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000
 COMMAND:  QESD00                                  ==>
```

```
 SP LOG:01  TODC EQUIV:yy/mm/dd  hh:mm:ss ID:0000000000  EC:866898   EVENT:0002
================================================================================
LEVEL 07  IOIRR 00  IC   6344  CNFG:AB0000000000A201ED00   RC:EC517464 00000000
MMASK 00  MIRR  01  C-IC 6344          DLAT    LVL     MSW          LVL    MSW
CMASK DF  IOADT 00  LMR  9000        DATA 81     0   3010 2120       1  60DE 2322
SPCK  12  IOCMD 00  LMRB 9000        INST 84     2   0800 2524       3  B068 2726
LOMC  00            INST EE05 8C60   CHAN 85     4   9304 A928       5  208E AB2A
------BURST MODE------               STAT 00     6   60DE AD2C       7  6348 2F2E
LCA 8500D0 DISK 810800 --------I/O STATUS----------  ----------PLDA----------
DCA 85FABE  85FB70     DISK1  02   LCA   000000      C1 0000  C2 0B00  C3 8000
DCA 85FC70  85FD70     DISK2  00   CCA   0000008000  0P 0000  CK 0000  BF 0000
DCA 85FE7C  85FBF0     PWR  C 02   DCA   0002        C4 00  DS 40  IM 90  PG 80
DCA 85FCF0  85FDF0     SBA    02   PU0   300068E0    TM C4  TP 8000  CB QLIM
REGISTERS:             SBA2   10   PU1   3C100000
PP:2E  C901 5201 F00A 62E0 8262 90F6 10EE 8493
SP:2F  00DC 00D6 8000 88DC 3E00 00D8 00D0 663C
-------SPIL CURRENT INSTRUCTION------     --------SPIL LAST INSTRUCTION--------
ADDR:00DC    DATA:00EE 04F0 01A2 04F0      ADDR:00D6   DATA:5201 0000 0494 00EE
SPIL BRN TABLE 0722 00D0 007A 002C 000C 26DC 268E 266C 2646 2628 260C 0A66 0A54
 COMMAND: QESD01                                    ==>
```

The QESDxx command displays detailed error information about log number xx.

For more information about the QESDxx screen, see Volume7 A07 "Logs."

(QEW) Power Error Logouts



Use the Power Logout screens to:

- Display a list of power errors (QEWD).
- Display details about a specific power error (QEWDxx).
- Clear (purge) the power log entries (QEWDP).

(QEWD) Power Error Logout Directory

```
POWER LOGOUT DIRECTORY              CURRENT TODC EQUIVALENT: yy/mm/dd hh:mm:ss

LINE  TODC EQUIVALENT   REFERENCE CODE
 00   yy/mm/dd hh:mm:ss 11A0920E
 01   yy/mm/dd hh:mm:ss 11D1600E
 02   yy/mm/dd hh:mm:ss 1141300E
 03   yy/mm/dd hh:mm:ss 11D1920E
 04   yy/mm/dd hh:mm:ss 00000000
 05   yy/mm/dd hh:mm:ss 00000000
 06   yy/mm/dd hh:mm:ss 00000000
 07   yy/mm/dd hh:mm:ss 00000000
 08   yy/mm/dd hh:mm:ss 00000000
 09   yy/mm/dd hh:mm:ss 00000000
 10   yy/mm/dd hh:mm:ss 00000000
 11   yy/mm/dd hh:mm:ss 00000000
 12   yy/mm/dd hh:mm:ss 00000000
 13   yy/mm/dd hh:mm:ss 00000000
 14   yy/mm/dd hh:mm:ss 00000000
 15   yy/mm/dd hh:mm:ss 00000000          TIME OF LAST PURGE: yy/mm/dd hh:mm:ss
 COMMAND:  QEWD                                  ==>
```

The QEWD command displays the last 16 power errors.

For more information about the QEWD screen, see Volume A07, "Logs."

(QEWDxx) Power Error Logout

```
 POWER LOGOUT: 00          REFERENCE CODE = 11D1350E   TOD = yy/mm/dd hh:mm:ss

                       CONTROL LATCHES ON AT TIME OF ERROR:

01) PICK K3               06) -1.5 PS111 START
02) PICK K4               07) -4.3 PS112 START
03) -2.2V PS103 START     08) +5V PS109 START
04) -1.5V PS105 START     09) +8.5V PS108 START
05) -4.3V PS106 START     10) +6V PS107 START

                                    POWER ERRORS:

+6V PS107 CURRENT LIMIT




 COMMAND: QEWD00                                          ==>
```

The QEWDxx command displays detailed error information about log number xx.

For more information about the QEWDxx screen, see Volume A07, "Logs."

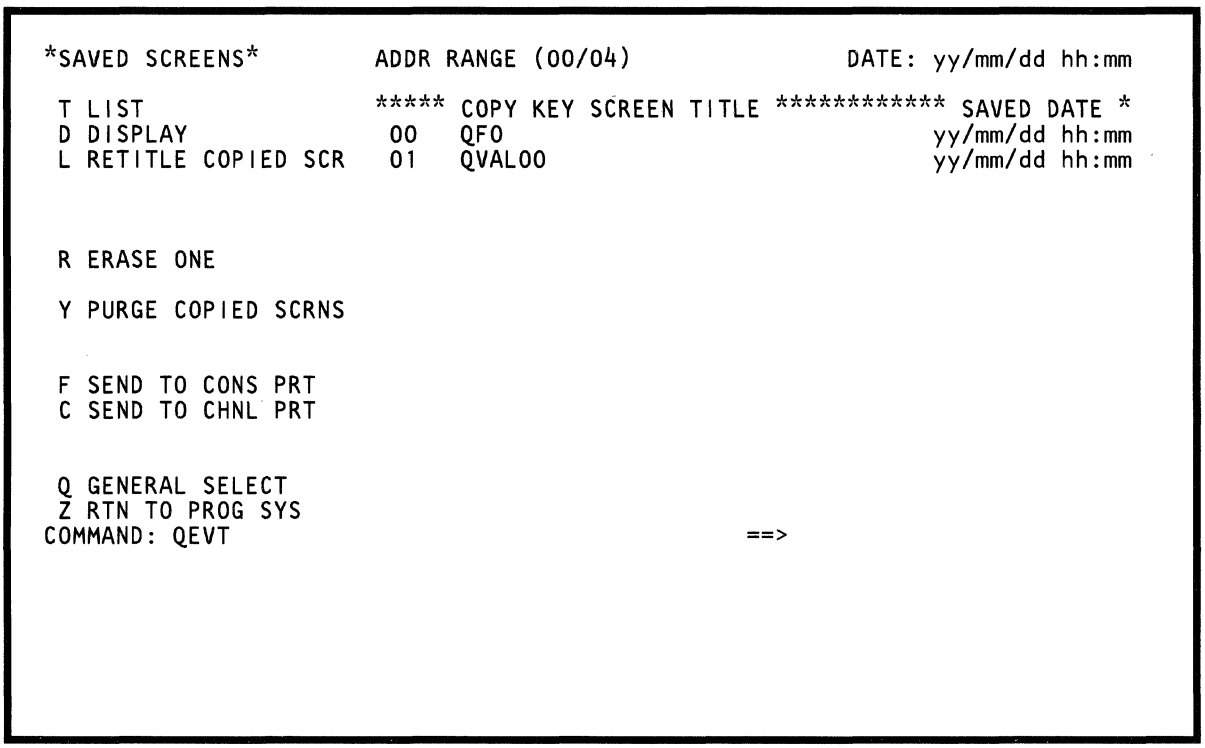
(QEL) RSF Line Error Statistics

```
*CNFG/REMOTE*            *RSF LINE ERROR STATISTICS*


                              SEND         RECEIVE
NUMBER OF OPERATIONS          0000          0000
NUMBER OF ERRORS              0000          0000

NUMBER OF UNDERRUNS/OVERRUNS         0000


 Q GENERAL SELECTION
 Z RETURN TO PROG SYS




 COMMAND: QEL                                        ==>
```

The QEL command displays RSF error statistics.

For more information about the QEL screen, see Volume A07 "Logs."

(QEV) Display the Saved Screens



Use the QEV screen to display screens previously saved on the diskette with the COPY key.

Displaying the QEV Screen

To display the QEV screen:

1. Key QEV next to COMMAND.
2. Press the ENTER key.

This displays a list of screens saved with the COPY key (QEVT00 is displayed next to COMMAND).

QEV Screen Description

The QEV screen displays:

- The commands that you can use (on the left side of the screen).
- The two-digit identifying number, the title, and the saved date of the screens saved by the COPY key.

QEV Commands

The following describes the QEV commands.

T LIST

To display the screens saved with the COPY key, enter QEVT next to COMMAND.

D DISPLAY

To display a specific saved screen, enter QEVDxx next to COMMAND. xx is the identifying number (00-04) of the screen. The message SAVED-xxx appears on line 20 to indicate that the screen being displayed is a copy of a screen that was saved earlier (do not attempt to use its function).

Note that lines 20 to 24 of the present (QEV) screen are displayed together with lines 1 to 19 of saved screen xx. To display lines 20 to 24 of the saved screen, press the PAGE forward key.

You can also use the PAGE key to page forward through all the saved screens, starting with the specified screen.

L RETITLE COPIED SCR (CE Mode only)

To retitle a screen saved with the COPY key, key QEVLxx next to COMMAND, and press the ENTER key. This puts the saved screen title next to COMMAND where you can change it. xx is the identifying number (00-04) of the screen.

R ERASE ONE (CE Mode only)

To erase one of the screens saved with the COPY key, enter QEVRxx next to COMMAND. xx is the identifying number (00-04) of the screen.

Y PURGE COPIED SCRNS (CE Mode only)

To purge all the screens saved with the COPY key, key QEVY next to COMMAND and then respond to the prompting message.

F SEND TO CONS PRT

To print a saved screen on the console printer:

1. Enter QFO next to COMMAND, and press the ENTER key. This displays the System Configuration screen.
2. Ensure that Y is entered next to CONSOLE PRT (if not, enter it).
3. Specify a port (P1-P3).
4. Enter DISC (disconnect) next to CONSOLE ADDRESS for the specified port.
5. Press the ENTER key.
6. Enter QEVFxx next to COMMAND.

   xx is the identifying number(s) of the screen; it can be one number (for example, 01), a range of numbers (00-02), or the word ALL (QEVFALL) to indicate the screens you want printed.
7. If the print operation was successful, the QEVT screen is displayed (otherwise you get an error message).

C SEND TO CHNL PRT

To print a screen on the channel printer:

1. Ensure that the processor is IMLed but not IPLed.

   Warning: Customer data can be lost with this selection.

2. For S/370 mode, enter QEVCxxzyyy next to COMMAND and press the ENTER key.

   xx is the identifying number(s) of the saved screen; it can be one number (for example, 02), a range of numbers (00-03), or the word ALL (QEVCALL) to indicate the screens you want printed.

   yyy is the channel unit address of the printer. If you omit yyy, the default is the channel printer assigned on the System Configuration (QFO) screen.

   z is the processing unit number.

3. For S/370XA mode, enter QEVCxxzzzz next to COMMAND and press the ENTER key.

   xx is the identifying number(s) of the saved screen; it can be one number (for example, 04), a range of numbers (00-03), or the word ALL (QEVCALL) to indicate the screens you want printed. zzzz is a device number (0000-FFFF). If you omit zzzz, the default is the channel printer assigned on the System Configuration (QFO) screen.

4. If the print operation was successful, the QEVT screen is displayed (otherwise you get an error message).

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QED) Diskette Analysis

```
*ERROR DISPLAYS*            *DISKETTE ANALYSIS*

        TO START: 1) SELECT STARTING CYLINDER AND RECORD NUMBER
                     (DEFAULT IS RECORD 1 ON CYLINDER 0).
                  2) SELECT DISK DRIVE FOR ANALYSIS (DEFAULT IS DRIVE 2).
                  3) INSERT DISK TO BE ANALYZED INTO SELECTED DRIVE.
                  4) PRESS THE ENTER KEY.

                  00 STARTING CYLINDER NUMBER (00 - 4C)
                  01 STARTING RECORD NUMBER (01 - 1A BACK-HEAD)
                                            (81 - 9A FRONT-HEAD)
                   2 TARGET DRIVE FOR ANALYSIS (1 - 2)

        TO EXIT:   1) MAKE SURE ORIGINAL DISKETTES ARE INSTALLED.
                   2) SELECT ANY SCREEN.

                          NOTE: ALL NUMBERS IN HEX
Q GENERAL SELECTION
Z RETURN TO PROG SYS
COMMAND: QED                                          ==>
```

```
*ERROR DISPLAYS*            *DISKETTE ANALYSIS*

          LINE CYLINDER HEAD    RECORD MODULE  DEVICE
          NUMB  NUMBER          NUMBER   ID    STATUS
            0     09    FRONT     03    4351     42
            1     23    BACK      01    FFFF     42
                                                      PARAMETERS ARE
                                                       GIVEN IN HEX




    IF SCREEN IS FULL AND ANALYSIS IS NOT COMPLETE: PRESS ENTER
    TO CANCEL ANALYSIS: INSTALL ORIGINAL DISKETTES, PRESS CNCL KEY
    IF ANALYSIS IS COMPLETE: INSTALL ORIGINAL DISKETTES, SELECT ANY SCREEN

COMMAND: QED                                          ==>
```

Use the QED command to test whether the data on a diskette can be read. If the test detects bad data, error information is displayed on the screen for your diagnosis.

Using the QED Screen

To use the QED screen:

1. Key QED next to COMMAND, and press the ENTER key.

2. Note that a starting cylinder number (00), starting record number (01), and drive number (2) are given. Either use these default values or specify your own values for the cylinder, record, and drive number.

3. Insert the diskette to be analyzed (into the diskette drive chosen above).

4. Press the ENTER key to start the diskette analysis.

5. Any error that occurs is displayed on the screen.

   To continue the analysis if error information fills the screen, press the ENTER key. To cancel the analysis, press the CNCL key.

6. To leave the analysis routine after the diskette has been analyzed, reinstall the original diskette and key any Q command.

Note: If module-ID FFFF appears, one of the following occurred:

- The module ID is beyond the end of the written data.
- Cylinder 0 was read.
- A cylinder index or master index was read.

Device Status Meanings

18 Busy
28 Time-out
38 Diskette Not Ready

The following device status codes are sometimes combined to supply multiple meanings; for example, status code 42 indicates that a CRC error occurred and interrupt was enabled.

Code	*Interrupt Status*
01	Interrupt Request
02	Enable Interrupt
04	Machine Check

Code	*Operational Status*
08	Control Operation Complete
20	Overrun or Underrun
30	Record Not Found

Code	*Error Status*
40	CRC Error
80	Command Error
C0	Hardware Error

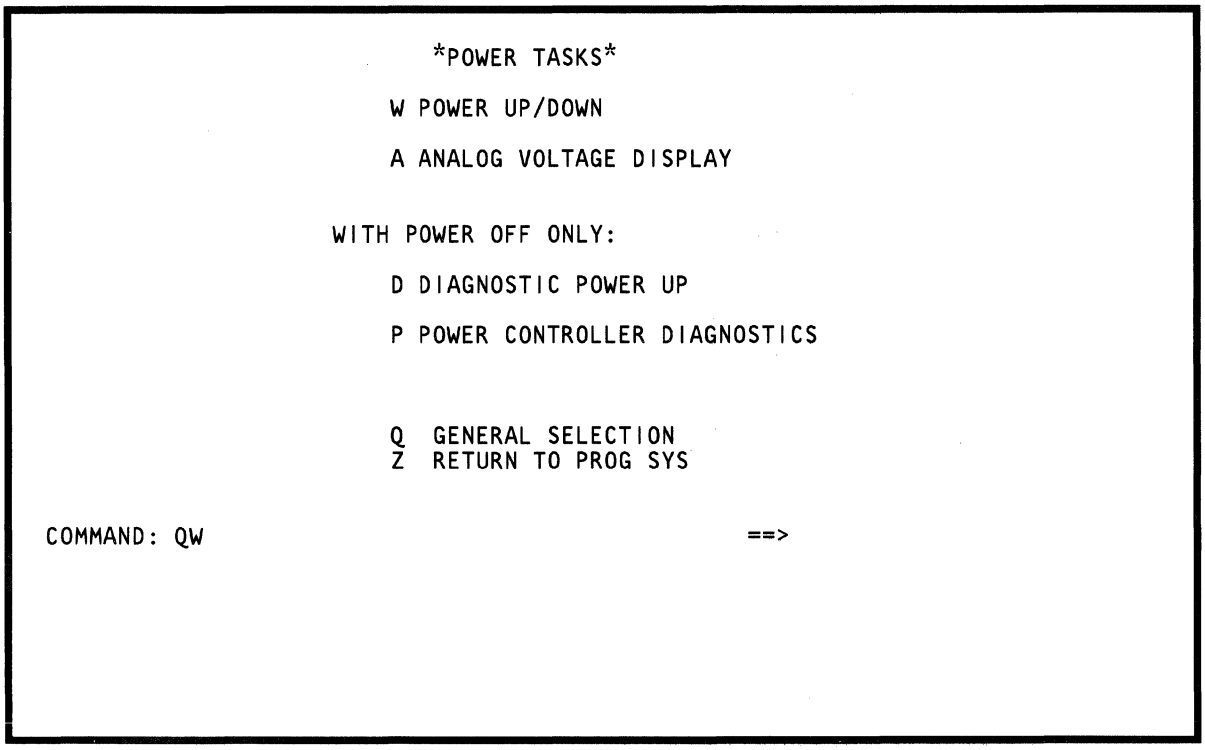
Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QW) Power Task Screens



The QW screen lists the options you can use to diagnose power faults. For a description of each optttion, see the desired screen.

Displaying the Power Task Screen

To display the Power Task screen:

1. Set the CE Mode switch to CE Mode.
2. Key QW next to COMMAND, and press the ENTER key.

Return to General Selection (Q)

Key Q next to COMMAND, and press the ENTER key.

Return to Prog Sys (QZ)

Key QZ next to COMMAND, and press the ENTER key.

(QWW) Power-Up/Down

```
                              POWER UP/DOWN
                              -------------
USE THIS SCREEN AS FOLLOWS:

      1) NEXT TO ACTION: KEY U FOR POWER UP
                         KEY D FOR POWER DOWN (MSS DOES NOT
                               POWER DOWN USING THIS SCREEN)

      2) NEXT TO UNIT  : KEY C FOR PROCESSOR AND I/O
                         KEY P FOR PROCESSOR ONLY
                         KEY I FOR I/O ONLY

      3) PRESS ENTER KEY

                           ACTION:_          UNIT:_

                        PROCESSOR STATUS: POWER IS OFF
                        I/O STATUS      : POWER IS OFF

 COMMAND: QWW                                      ==>
```

The QWW screen gives you several power-up or power-down choices. Use the QWW command while diagnosing a failure on the system.

Displaying the QWW Screen

To display the QWW screen:

1. Set the CE Mode switch to CE Mode.
2. Key QWW next to COMMAND, and press the ENTER key. Respond to the directions displayed on the screen.

(QWA) Analog Voltage Display

```
                              ANALOG VOLTAGE DISPLAY

                    +
MAXIMUM   * * * * *  * * * * *  * * * * *  * *  *  *  *  *
                    +                                -
CE CALL   * * * * *  * * * * *  * * * * *  * *  *  *  *  *
                    +                                -
                    +                          -     -
          + - -     -                +   +     - -   -
          + - - - -     + + +  + + + +  -   - -   -
ANALOG    0 0 1 1 1  2 2 3 3 3  5 6 6 6 6  1 1  1  0  2  5
SENSOR    1 2 0 1 8  6 9 0 1 2  8 1 2 3 4  2 3  4  9  5  7

POWER     1 1 1 1 1  1 1 1 1 1  1 1 1 1 1  1 1  1  1  1  1
SUPPLY    0 0 0 0 0  0 0 0 0 0  0 0 0 0 0  0 0  0  0  1  1
NUMBER    3 3 3 3 3  5 5 5 5 5  6 6 6 6 6  7 7  8  9  1  2

                                        INTENSIFIED SENSORS ARE NOT ADJUSTABLE

COMMAND: QWA                                      ==>
```

Use this screen to check that the voltage to each power supply is in tolerance.

The screen example indicates that power supply 103 (measured by sensor 18) is beyond the maximum permitted limit. Also, sensor 14 for power supply 108 indicates that the voltage at this point is in the Call-CE range.

All other voltage sense points in the example indicate that the voltage levels are in tolerance and do not need adjusting.

Displaying the QWA Screen

To display the QWA screen:

1. Set the CE Mode switch to CE Mode.
2. Key QWA next to COMMAND, and press the ENTER key.

(QWD) Diagnostic Power-Up

```
                          DIAGNOSTIC POWER UP
                          -------------------

TO STOP THE POWER UP SEQUENCE AT A SELECTED POINT USE THIS SCREEN AS FOLLOW:
 1) NEXT TO SELECTION: KEY IN LETTER WHERE THE POWER UP SEQUENCE SHOULD STOP.
 2) PRESS ENTER KEY.

                      A = STOP AFTER K3 PICK            (INTERLOCKS IGNORED)
                      B = STOP AFTER K4 PICK            (INTERLOCKS IGNORED)
                      C = STOP AFTER -2.2V START              (PS103)
                      D = STOP AFTER -1.5/-4.3V STARTS  (PS105/PS106)
                      E = STOP AFTER -1.5/-4.3V STARTS  (PS111/PS112)
                      F = STOP AFTER +5V START                (PS109)
                      G = STOP AFTER +8.5V START              (PS108)
                      H = STOP AFTER +6V START                (PS107)
                      I = STOP AFTER POWERING UP I/O    (INTERLOCKS IGNORED)


                                SELECTION _

 COMMAND: QWD                                    ==>
```

```
                          DIAGNOSTIC POWER UP
                          -------------------

                POINTER       SEQUENCE
                -------       --------
                   ===>  (A) PICK K3                 (INTERLOCKS IGNORED)
                   ===>  (B) PICK K4                 (INTERLOCKS IGNORED)
                   ===>  (C) -2.2 START                   (PS103)
                   ===>  (D) -1.5/-4.3V STARTS       (PS105/PS106)
                   ===>  (E) -1.5/-4.3V STARTS       (PS111/PS112)
                   ===>  (F) +5V START                    (PS109)
                   ===>  (G) +8.5V START                  (PS108)
                   ===>  (H) +6V START                    (PS107)
                         (I) I/O START               (INTERLOCKS IGNORED)


                             SELECTION H


   THE POWER UP SEQUENCE IS STOPPED. PRESS ENTER KEY TO END DIAGNOSTIC STOP.

 COMMAND: QWD                                    ==>
```

Use this screen to stop the power-up sequence at a specific point.

Displaying the QWD Screen

To display the QWD screen:

1. Set the CE Mode switch to CE Mode.
2. Key QWD next to COMMAND, and press the ENTER key. Respond to the directions displayed on the screen.

(QWP) Power Controller Diagnostics

```
                    POWER CONTROLLER DIAGNOSTICS                    STOPPED



                         END OF DIAGNOSTICS
                         NO ERRORS DETECTED


                    TO RERUN DIAGNOSTICS, PRESS ENTER



COMMAND: QWP                                  ==>
```

```
                    POWER CONTROLLER DIAGNOSTICS                    STOPPED



                         DIAGNOSTICS FAILED
                         REFERENCE CODE IS BELOW


                    TO RERUN DIAGNOSTICS, PRESS ENTER



COMMAND: QWP                                  ==>



                                                     RC=F61402FA
```

Use this screen to test the power controller card. To run the power controller diagnostics:

1. Set the CE Mode switch to CE Mode.
2. Key QWW next to COMMAND, and press the ENTER key.
3. Power down the processor and I/O (ACTION=D UNIT=C).
4. Key QWP next to COMMAND, and press the ENTER key. Respond to the directions displayed on the screen.

(QG) Diagnostic Mode General Selection Screen

```
                              DIAGNOSTIC MODE
                        PU DIAGNOSTIC SELECTION SCREEN
                                 EC xxxxxx

        I - RUN DIAGNOSTICS TO ISOLATE FAILURE BEFORE EXCHANGING FRUS

        V - RUN DIAGNOSTICS TO VERIFY REPAIR AFTER EXCHANGING FRUS

        C - RUN SPECIAL CHANNEL INTERFACE DIAGNOSTICS

        T - RUN DIAGNOSTICS FOR INSTALLATION TEST

        F - RUN DIAGNOSTICS IN FIELD SUPPORT CENTER MODE

R - RETURN TO GENERAL SELECTION SCREEN


 COMMAND:                        ====>
 OPTIONS IN EFFECT:
```

For information about the Diagnostic Mode screens, see Volume A07, "Diagnostics."

Display Console

This section gives general information about display consoles. Display consoles (which can be either the 3278 Display Console Model 2A, the 3205 Color Display Console, or the 3279 Color Display Console Model 2C) consist of:

- An operator control panel
- A display screen
- A display keyboard.

Note: 3205 Color Display Consoles cannot be mixed with 3278-2A Display Consoles or 3279-2C Color Display Consoles.

Operator Control Panel (OCP)

The OCP for the 3278-2A and the 3279-2C is integrated in the display keyboard, and the OCP for the 3205 is a stand-alone unit.

The OCP has the following keys and indicators (located on the upper portion of the display console keyboard).

OCP Keys

Power On/IML

This key has two purposes. When you first power-on, it:

- Applies power to the processor and to those I/O devices that are set to power on with the processor (takes 15 seconds of warm-up time).
- IMLs the support processor (SP).
- IMLs the instruction processor (PU) if you specified IML AT POWER-ON on the QFO screen.

After initial power-on, press Power On/IML if:

- A processing error occurred and you want to re-IML the SP without powering down the processor (the re-IML does not reset any PU errors).
- Channel 0 failed because of an intermittent problem, and you want to clear channel 0.

Note: After initiating power on or re-IML, do not perform any other functions or press any key until the power on or re-IML has completed. (If you make an error, you must wait for the sequence to be completed.)

Power Off

This key removes power from the system under control of the power sequencing program.

Note: Wait approximately 30 seconds after powering off to press Power On/IML; otherwise, a BASIC CHECK results (the cooling fans must have time to stop).

Channel To Channel

This key applies only to processors with the channel-to-channel adapter feature. Activate Channel To Channel to logically connect two processors together for data sharing purposes. Normally, you activate this key twice each day:

- After power up has completed. This makes the channel-to-channel feature operational (Chan-Chan Disabled indicator is not on).
- Before powering off. Do not power off until the Chan-Chan Disabled indicator turns on.

Lamp Test

Use this key to check that all the indicators go on.

Logic Reset

Note: This pushbutton is not located on the OCP; instead, it is on the service panel near the diskette drive.

This pushbutton invokes a process that tries to get the SP to operate correctly without reloading any code. After the process resets all adapters and specific control blocks, the General Selection (Q) screen appears.

OCP Indicators

Power In Process

This indicator turns on when you press Power On/IML and remains on through the power-on sequence. It turns off when the Power Complete indicator turns on.

Power Complete

This indicator turns on when the power-on sequence successfully ends.

Chan-Chan Disabled

This indicator is associated with the Channel To Channel key and is on when the processor logical interface is not connected. When this indicator is on, you can power down the processor and not lose data or hang up the other processor.

Basic Check

This indicator is on if the CE Mode switch is set to CE Mode or if a hardware problem exists in the basic power (hardwire sequence) or in the display console.

System

This indicator is on when either processing unit is active (for example, during instruction processing). The system status area on the display screen indicates which processing unit is active.

Wait

This indicator is on when either processing unit is idle (the processor clock is running but no instruction processing is taking place). The system status area on the display screen indicates which processing unit is idle.

Display Screen

The display screen (and its associated keyboard) lets you communicate with the system. All information is displayed on the screen either in hexadecimal, binary, or EBCDIC.

Console Attributes

All three display consoles have a screen size of 1920 characters, 24 lines at 80 characters per line. Both uppercase and lowercase characters can be displayed.

The 3205 and 3279-2C have four different colors: red, blue, green, and white; the 3278-2A is a monochrome display.

Screen Area

The screen area has three functional areas:

- A program area
- A system status area
- A console indicator area.

Program Area

Lines 1-20 display the operator input and system output messages.

System Status Area

Lines 21-24 display system status information.

Console Indicator Area

Line 25 displays the console and keyboard status.

Display Console Indicators and Controls

3278-2A and 3279-2C indicators and controls are located on both sides of the display screen face. 3205 indicators and controls are located below the screen and on the display base.

Power On/Off

To power on the display console, set the Power On/Off switch to the On (|) position. After a delay of a few seconds, the cursor appears in the first character position on line one. To power off the display console, set the Power On/Off switch to the Off (O) position.

The Power On/Off switch is used together with the Normal/Test switch to make the display ready or not ready. ON together with Normal causes a ready condition; either OFF or Test causes a not ready condition. If the display is not ready, an intervention-required sense bit is set and Start I/O commands to the display are rejected. When a not-ready-to-ready transition occurs, a blank program area screen appears.

Screen Brightness Control

Adjust the brightness of the characters by turning the brightness control knob. Turn it clockwise to make them brighter; counterclockwise to make them dimmer. If held all the way clockwise, a raster pattern is displayed for test purposes (this raster pattern can vary between consoles).

Screen Contrast Control (3278)

Use the contrast control knob to adjust the display for comfortable viewing.

Intensity Override (3279)

When you turn the brightness control fully counterclockwise, the brightness circuits are set to maximum and the screen shows full rasters of red, blue, and green. These are converged if the Normal/Test switch on the 3279 is set to Normal and unconverged when set to the Test position.

Base/Monochrome 0000/00 (3279 and 3205)

In the base color position (0000), the colors red, blue, green, and white are displayed. In the monochrome position (00), the colors blue and red are replaced by green and white (the original green and white fields are not affected).

Audible Alarm Volume Control

Turn the control clockwise to increase the sound level of the alarm; counterclockwise to decrease the sound level.

The 3205 has this control located at the rear of the display pedestal.

Normal/Test

For normal operation of the display console, put this switch in the Normal position.

If a problem exists on the display console, put this switch in the Test position and then perform the Problem Determination Procedures.

The Normal/Test switch is also used together with the Power On/Off switch to cause ready and not-ready conditions. See "Power On/Off" on page 375.

Status Light (3205)

This indicator is on when the 3205 Display Console is in Normal mode and blinks when the display console is in Test mode.

Dual Case/Mono Case (A,a/A)

When this switch is set to dual case (Aa), both uppercase and lowercase alphabetic characters are displayed on the screen.

When the switch is set to monocase (A), all alphabetic characters are displayed in uppercase only.

Power On (3278 and 3205)

This indicator turns on when you set the Power On/Off switch to the On position; it indicates that power is on in the display console.

Indicator 1 (3278 and 3279)

This indicator turns on when you press the top portion of the Power On/Off switch; it indicates that internal console circuits for the display image are ready.

Indicator 2 (3278 and 3279)

This indicator turns on a few seconds after you press the top portion of the Power On/Off switch; it indicates that the high-voltage circuits in the display console are on.

Indicator 3 (3279)

This light indicates that the Normal/Test switch is in the Test position.

Keyboard Setup Switch (3205)

This control, located on the underside of the keyboard, selects numeric lock mode and keyboard language configuration.

Switch position 1 ***must*** be set to the Off (O) position. Switch position 2 controls numeric lock mode. Switch positions 4 through 8 select the keyboard language configuration desired. For more information see, *3205 Color Display Console Maintenance Information*, SY18-2121.

Security Keylock

The Security Keylock (optional for 3278-2A and 3279-2C, standard for 3205) has the following attributes:

- It needs a hardware feature on the display console.
- The security keylock microcode is present on all systems, but is only activated when the Security Keylock feature is installed.
- All functions are normal when either the:

  Security keylock feature is not installed
  Security key is turned to the ON position.

- When the security key is turned to OFF:

  The keyboard is locked
  The console is blank
  The SEC-KEY OFF message is displayed on the screen

Intervention required is the response to application programs
No Power On/IML can be done from that console.

Note: If the main display console is off and you press Power On/IML, you are prompted to press the CHG DPLY key on the console from which you want the Power On/IML to continue. The console security key must be in the ON position for Power On/IML to occur.

Display Console Keyboard

Keyboard Description

The Display Console keyboard has 26 alphabetic characters (both uppercase and lowercase), 10 numeric characters, and 32 symbols and punctuation marks. The keyboard also has input control keys, cursor control keys, program function (PF) keys, and system function keys.

If a key has two characters on its top, you can display either one. The lower character displays if you do not press (or lock) the Shift key; the upper character displays if you press (or lock) the Shift key as you press the character key.

The functions that appear on the front face of some keys on the 3278 or 3279 keyboard are either program functions (PF) or system functions. To select a function, hold the ALT key down as you press the desired key.

Typematic Keys

Most of the keys have the typematic feature (if you hold the key down, the character or function repeats until you release the key). The typematic keys are:

- Character keys (alphabetic, numeric, and special characters)
- Cursor control keys
- Symbol and punctuation mark keys
- Enter keys.

Character Keys

Pressing one of these keys displays the indicated character and advances the cursor. No character is stored until after you press the ENTER key; this decreases possible incorrect data.

If you press a character key while the cursor is in an area that is closed to data (this area is called a protected field), the INHIBITED message appears on the display screen. Press the RESET key to clear the INHIBITED message.

Cursor Control Keys

The cursor keys control the vertical and horizontal movement of the cursor. These keys move the cursor without affecting the information on the screen.

The two types of cursor control keys are:

- Those that move the cursor to the first character location in an input (unprotected) field.
- Those that move the cursor one character position at a time.

Moving Cursor More Than One Character Space

New Line Key: ↵ Pressing this key moves the cursor to the first unprotected character location of the next line.

If all character positions of the next line are protected (no input permitted), the cursor moves to the first input field. If all character positions are protected, the cursor moves to the first character location on line 1. The New Line key is typematic.

Tab Key: →| Pressing this key moves the cursor to the first character location of the next input (unprotected) data field.

If there are no unprotected data fields or the screen is not formatted, pressing the Tab key moves the cursor to the first character location on line 1. The Tab key is typematic.

Back Tab Key: |← Pressing this key moves the cursor back to the first character position in an input (unprotected) field.

If the cursor is already in the first character position of an input field, pressing the Back Tab key moves the cursor to the first character position of the preceding input field.

If there are no unprotected data fields or the screen is not formatted, pressing the Back Tab key moves the cursor to the first character position on line 1.

Home Key: Pressing this key moves the cursor to the first input (unprotected) character position on the screen.

If there are no unprotected character positions on the screen, the cursor moves to the first character position on line 1.

Moving Cursor One Character Space

Horizontal Locating Keys: Pressing either of the two horizontal keys (right → or left ←) moves the cursor in the direction of the arrow, one character position at a time. These keys can cause the cursor to wrap (this moves the cursor to the next or preceding line of characters) and are typematic.

Vertical Locating Keys: Pressing either vertical cursor key (cursor up ↑ , cursor down ↓) moves the cursor in the direction of the arrow, one line at a time. The cursor remains in the same character column. These keys can cause the cursor to wrap vertically and are also typematic.

Backspace Key: ← Pressing this key moves the cursor one character space to the left. This key operates exactly as the horizontal (left) key and it is also typematic.

Input Control Keys

Insert: a Pressing the Insert key puts the keyboard in the insert mode (the word INSERT appears on the display screen). This lets you insert a character(s), into an input (unprotected) field without disturbing the information already there.

All the keyboard control keys perform normally when in insert mode.

Delete: Pressing the Delete key (when the cursor is located in an unprotected field) deletes the character at the cursor position. All characters in the field to the right of that position and on the same line are shifted left one position and a null character (X'00') is added to the end.

ERASE INPUT: Pressing the ERASE INPUT key erases all input fields on the screen. On a permanently displayed document with blanks to fill in, only those areas where you can enter data are erased. The cursor moves to the first character position in the first field in which you can key input data.

Pressing the ERASE INPUT key for a screen with no input fields does not erase anything. The cursor moves to the first character position on line 1.

Pressing the ERASE INPUT key for an unformatted screen erases all character positions. The cursor moves to the first character position on line 1.

ERASE EOF: Pressing the ERASE EOF (Erase to End of Field) key erases the characters from the cursor location to the end of the field, that is, it replaces the characters with null characters (X'00'). The cursor, however, does not move. If the screen is unformatted, all characters from the cursor to the last character position of the bottom line are erased.

For example, if you have keyed incorrect information into a field, press the Back Tab key to return the cursor to the start of the field, press the ERASE EOF key to erase the incorrect information, and then key the correct information.

RESET: Pressing the RESET key resets the keyboard to its normal mode of operation; it removes the inhibited condition (indicated by the message INHIBITED on the display screen).

If you press a character key while the keyboard is inhibited, nothing occurs; you must first press the RESET key.

ENTER (Display Mode): Pressing the ENTER key in display mode signals an attention status and sets an attention identifier (AID). (The software performs a Read command to obtain the AID and any entered data.)

Note: Before the ENTER key is pressed, the keyed-in data is displayed on the screen and can be changed or corrected.

ENTER (Printer/Keyboard Mode): Pressing the ENTER key in printer/keyboard mode indicates that data entry is complete and transfers the input data to the channel. The data is read and the input area is cleared and protected. If no Read is in progress, the ALARM indicator is cleared and the keyboard is unlocked.

Note: Before the ENTER key is pressed, the keyed-in data is displayed on the screen and can be changed or corrected.

ENTER (Manual Mode): Pressing the ENTER key in manual mode causes the specified operation to be performed.

Note: Before the ENTER key is pressed, the keyed-in data is displayed on the screen and can be changed or corrected.

CNCL (Display Mode): Pressing the CNCL (cancel) key in display mode generates an attention interrupt to the operating system.

CNCL (Printer/Keyboard Mode): Pressing the CNCL key in printer/keyboard mode starts a cancel response to the channel (the cancel response is a channel end with exception). The input area is cleared and protected, and an asterisk (*) is written in the display area. No data is transferred across the channel. If no Read is in progress, the ALARM indicator is cleared and the keyboard is unlocked.

CNCL (Manual Mode): Pressing the CNCL key in manual mode displays message FUNCTION KEY IGNORED.

REQ (Display Mode): Pressing the REQ key in display mode generates an attention interrupt to the operating system.

Note: Do not confuse the REQ key with the INTR key. Pressing the red INTR key causes an EXTERNAL INTERRUPT.

REQ (Printer/Keyboard Mode): Pressing the REQ key in printer/keyboard mode starts communication with the operating system by sending an attention status (X'80'). If the device is busy, the REQUEST indicator is displayed and the attention status is queued. When the device becomes not busy, the attention status is sent and the REQUEST indicator is cleared.

REQ (Manual Mode): Pressing the REQ key in manual mode displays message FUNCTION KEY IGNORED.

Program Function Keys

To activate a programmable function on a 3278-2A or 3279-2C, hold down the ALT key and then press the desired key (PF1 through PF12).

The 3205 program function keys (PF1 through PF24) are arranged in two rows at the top of the keyboard.

Display Mode: In addition to the functions permanently assigned to system function keys, application programs can define action that occurs with any of the PF (program function) keys.

Pressing a PF key in display mode generates an attention interrupt with the appropriate AID value.

Printer/Keyboard Mode: Pressing a PF key in printer/keyboard mode clears the ALARM indicator and unlocks the keyboard.

Manual Mode: In manual mode, use of the PF keys is determined by the current screen displayed.

System Function Keys

CHG DPLY: Pressing the CHG DPLY key switches you back and forth between manual mode and the last-displayed operating system screen. If you attempt to put a console in manual mode when another console is already in manual mode, the console keyboard locks and message USAGE CONFLICT is displayed on the screen. Press the RESET key to clear this message.

CHG DPLY Restrictions:

- Pressing the CHG DPLY key while displaying some screens causes the INHIBIT indicator to be set; to clear INHIBIT, press the RESET key.
- When the momentary or error status screens are displayed, pressing the CHG DPLY key displays the Power-Up/Down screen (QWW).

MODE SEL: Pressing the MODE SEL key invokes manual mode and displays the Q screen. To return to the operating system, key QZ next to COMMAND and press the ENTER key.

If you press the MODE SEL key when another console is already in manual mode, the console keyboard locks and message USAGE CONFLICT is displayed on the screen.

DIAG (CE-Mode only): Pressing the DIAG key while holding the ALT key down invokes the Test Case Monitor (TCM). (To return to manual mode, press the MODE SEL key.)

SPM/O (CE-Mode only): You must hold down the ALT key and be in manual mode to use the SPM/O (support processor manual operations) key. (To return to manual mode, enter 7 and press the ENTER key, then, enter G and press the ENTER key.)

Note: Use the SPM/O key only under the guidance of your support center.

INTR (Interrupt): Pressing the INTR key requests an external interruption. This key is active from any display console in normal operation.

If you are in manual mode, this key only works on the display console that is in manual mode. Pressing this key on any other console causes the USAGE CONFLICT message to be displayed. Press the RESET key to unlock the keyboard.

START: Pressing the START key on any console when all consoles are in normal operation processes instructions at the present operation rate.

Note: Pressing the START key by itself starts all configured processing units. Pressing the START key while holding down the SHIFT key only starts the processing unit selected by the QT function.

Operating Restrictions:

- When the operation rate control is other than NORMAL, only one instruction is processed each time you press the START key.
- When you press the START key after a normal stop, the processor continues instruction processing as if no stop occurred if the operation rate function is at NORMAL.
- The START key has no effect when instruction processing is in progress, or the system is in the wait or check-stop condition.

- The START key is inactive if a maintenance or log display program is running.
- The START key is active only on the console that is in manual mode. Pressing this key on any other console causes the USAGE CONFLICT message to be displayed. Press the RESET key to unlock the keyboard.

STOP: Pressing the STOP key places the processor in manual mode after the present instruction has been processed and waiting interrupts have been serviced. (Note that no I/O operations are processed from any internal queues when you press the STOP key.) This key is active on any display console.

Note: Pressing the STOP key by itself stops all configured processing units. Pressing the STOP key while holding down the SHIFT key only stops the processing unit selected by the QT function.

Operating Restrictions:

- If you press the STOP key while the console printer is printing, the printer completes its operation.
- The STOP key is inactive if a maintenance or log display program is running.
- The STOP key has no affect during PSW looping (only a system reset or an IPL can cause the looping to stop).
- Normally, when you press the STOP key, the ADDR and DATA fields on the screen are updated. However, they may not be updated if the message CHANNEL 0 UNAVAILABLE is on the screen.
- Normally, when you press the STOP key, the words INSTR STOP appear on the screen in a few seconds.
- The STOP key may be inactive during IFCC logging. Press the Stop key again to stop the processing unit.
- The instruction trace buffer is updated every time the STOP key is pressed.

PAGE: The Page function (manual mode only) lets you look at blocks of storage by increasing or decreasing storage addresses. The amount the storage address increases or decreases relies on the function being performed.

To increase or decrease an address, hold down the ALT key and press the correct PAGE key.

If the address generated by paging is too high or too low for the function or if the preceding command had a nonpaging error, the message PAGING KEY IGNORED appears if the PAGE key is not relevant to the function being performed.

Note: You may have to press the PAGE key twice while using the Copy-to-Diskette or the Copy-to-Channel-Printer options.

Remote Facility Keys

COMM REQ (Communications Request): Pressing the COMM REQ key while holding the ALT key down starts voice or terminal communication between an on-site service representative and a remote specialist. The initiation of COMM REQ can be done by either the on-site service representative or the remote specialist.

LINE DISC (Line Disconnect): Pressing the LINE DISC key while holding the ALT key down disconnects the data link. This can also be used to end the RSF (Remote Support Facility) operation. Use this key if an RSF fails to initialize and the support processor appears to be in a loop.

COPY

Pressing the COPY key copies a display screen to either:

- A console printer
- The system diskette
- A channel printer.

You must hold the ALT key down when using this key on a 3205. For more information about the COPY key, see "Using the COPY Key" on page 57.

System Console Printers (Optional)

Up to three printers (3268 Model 2 or 3287) can be attached as the console printers (the standard configuration is no console printers). If a console printer is installed, it must be configured on the System Configuration screen (QFO).

Copying a Display Screen to the Console Printer

Pressing the COPY key copies a display screen to a console printer when all the following conditions are met:

- The printer is operational.
- The printer is not busy.
- The printer has been configured as the output device (do the following procedure).

    1. Display the System Configuration screen (enter QFO next to COMMAND, and press the ENTER key).
    2. Select the desired console port (P1 to P3) by entering Y next to INSTALLED and HARDCOPY.
    3. Enter Y next to CONSOLE PRT and N next to DISKETTE and CHANNEL PRT.
    4. Specify port P1, P2, or P3 (next to PORT).
    5. Press the ENTER key.

The console printer is now configured as the output device; that is, whenever you press the COPY key, the displayed screen is printed on the console printer (port P1, P2, or P3). If a field on the display screen is intensified, it appears on the printout with the > (greater than) symbol preceding the field.

Printer Audible Alarm

The audible alarm sounds when the printer is in the end-of-form condition or when a host-started request is received. The audible alarm is also operational in offline mode.

To reset the alarm, press HOLD PRINT, and then press ENABLE PRINT.

The audible alarm knob, located under the left platen access cover, controls the alarm volume.

Display Console Modes of Operation

The display console has the following modes of operation:

- Manual Mode
- Printer/Keyboard Mode
- Display Mode.

Manual mode, which you can enter any time, lets you control basic system functions. The printer/keyboard mode and display modes are controlled by the operating system.

Manual Mode

You can enter manual mode by pressing the MODE SEL key. This displays the General Selection (Q) screen (all the manual mode facilities are displayed on this screen for your selection). For detailed information, see "(Q) General Selection" on page 6.

Printer/Keyboard Mode

Printer/keyboard mode (sometimes called printer/keyboard emulation mode) permits the processor to run operating systems and programs designed for devices such as the 1052 or 3210. Although physically different, these devices receive and respond to commands in a similar fashion.

Printer/keyboard mode needs one display console. Three additional devices can be attached to the support processor and configured as needed.

If a printer is coupled as an output device, all data read from or written to the main display console is also printed on the printer.

Both the display console and the printer appear to the operating system as one device. The device addresses used are selected by the operator and can be modified any time. You can configure a maximum of two printer/keyboard devices at a time.

In printer/keyboard mode, the display console receives printer/keyboard commands and responds with status and sense information. The data received or sent with the commands is formatted to appear on the display console and optional printer in a way similar to the actual devices being emulated.

Display Console

In printer/keyboard mode, you can only enter data on the screen under control of the Read command; at all other times, the complete display screen is protected from operator action.

Display Area

The display area starts in line 1, column 1 and ends on line 18, column 79. Lines 1-18 display the last 18 lines written or read to the display console.

The data is organized into lines corresponding to lines of printer/keyboard printer output. Each new line starts in column 1 of a display area line. A line longer than 80 characters (the display area line length) wraps to the next line in the display area, to a maximum of 126 characters (the printer line length). When the 18-line display area is filled, the next new line causes the display area to be scrolled by 6 lines. Lines 1-6 are erased and lines 7-18 move to the top of of the screen.

To permit the maximum amount of data to be displayed in the display area, multiple New Line characters (NL=X'15') in a write data stream result in only one blank line on the display. This prevents data from being scrolled off the screen when NL characters are added to space the printer output.

Note: The bottom line of the display console is used exclusively to indicate status.

Input Area

Lines 19 and 20 are the operator input area. Up to 126 characters are permitted for each read operation (part of line 20 displays 1052 keyboard indicators). You can enter data into the input area only when a Read command is in progress (PROCEED displayed). At all other times, this area is protected from operator action.

When you press the ENTER or CNCL (cancel) key, the data in the input area is transferred across the channel. Data received by the channel is moved to the display area and printed. (If the channel stops the data transfer before all the data is sent, only the received data appears in the display area.)

The input area initially contains all nulls (X'00'). If you want to enter a space (X'40') in the input area, you must use the SPACE BAR to enter it and not a cursor movement key (the cursor movement keys leave the null characters in the input area). All the nulls that remain in the input area are compressed (removed) before the read data is transferred to the channel.

Indicator Area

The indicator area (applies to printer/keyboard mode only) is a brightened field on line 20 that displays the following indicators:

PROCEED: Indicates that you can enter data into the input area. The PROCEED indication is cleared by any of the following:

- Normal ending caused by ENTER or CNCL key
- A system or selective reset
- A Halt Device or Halt I/O instruction sent to the device.

REQUEST: Indicates that a REQ key attention status has been stacked because the device is busy. When the present operation is completed, the attention status is presented to the channel, and the REQUEST indicator is cleared. A system or selective reset also clears the REQUEST indicator.

ALARM: This indicator appears and the audible alarm sounds when the Alarm command is received. The indicator is cleared:

- By pressing (at any time) a Program Function (PF) key
- By pressing the ENTER or CNCL key (only if PROCEED is not displayed)
- If a system or selective reset occurs.

INTV-REQD: Indicates that the printer (coupled as an output device) is not ready. This can occur when end-of-form, power-off, or other check conditions are present. Reset the indicator by clearing the check condition.

Printer/Keyboard Mode Commands

The printer/keyboard mode commands and the normal status responses are:

Command	Hex Value	Initial Status	Ending Status	Async. Status
Write	01	00	CE	DE
Write-ACR	09	00	CE	DE
Rd-Inq'ry	0A	00	CE	DE
Sense	04	00	CE+DE	---
Sense I/O	E4	00	CE+DE	---
NOP	03	CE+DE	---	---
Alarm	0B	CE+DE	---	---

The following section has a short summary of each command. In the descriptions, a printer is assumed to be coupled as an output device. If no printer is coupled, ending status for a command is presented to the channel after the data has been placed in the display console area.

Command Definitions

Alarm: This command sounds the audible alarm on the display console and displays the ALARM indicator. If the display console is NOT READY, the command functions as a NOP (no operation). Immediate Channel End (CE) and Device End (DE) are presented as initial status for this command. The command is received even if an intervention-required condition exists.

NOP (No Operation): This command results in an immediate Channel End (CE) and Device End (DE). No operation is performed by the device. This command can be used to clear any outstanding status or to cause a command chain to end with a combined Channel End and Device End.

Read-Inquiry: This command turns on the PROCEED indicator and lets you enter data in the input area. The command then waits until you signal that data entry is complete (by pressing the ENTER or CNCL key).

If you press the ENTER key, the data is read from the input area and transferred to the channel. Channel End is presented after data transfer. Then the data received by the channel is written to the display area and printed on the printer.

If you press the CNCL key, a Channel End with unit exception status is presented to the channel, and an asterisk (*) is written to the display area and printed.

After printing is completed in either event, Device End status is sent to end the command.

Sense: This command transfers one byte of sense information. After the sense byte is received, Channel End and Device End are presented as ending status and the sense byte is reset. The sense byte is reset at the initiation of any command except a NOP. The sense byte is defined below:

Bit	Code	Explanation
0	CR	Command Reject
1	IR	Intervention Required
2	BOC	Bus-Out Check
3	EC	Equipment Check
4	---	Not used; always 0
5	---	Not used; always 0
6	---	Not used; always 0
7	---	Not used; always 0

Sense I/O: This command identifies the device type. If the device is not busy or not ready, it presents a fixed seven bytes of data: X'FFnnnn00105200'.

Write: This command transfers data from the channel to a buffer and displays it, one line at a time, on the display console and prints it on the 3287 Printer. When all the data has been received, Channel End status is returned, and the last line is processed. If the last line is not complete (ends with new-line character or 126 bytes long), Device End status is sent after the data has been placed in the display area and saved in the printer buffer without printing. If the command ends with a complete line, Device End status is sent when printing is completed.

The Write command continues requesting data from the channel until the channel stops data transfer (occurs when the CCW counter reaches zero). Therefore, incorrect length channel status is always indicated with a zero residual count unless the Suppress Incorrect Length Indicator (SILI) CCW flag is on.

Write-ACR (Automatic Carriage Return): This command is similar to the Write command except that at the end of processing, printing of the last line is started, and an automatic carriage return (ACR) occurs.

Restrictions and Deviations

Timing: In printer/keyboard mode, the time a command runs differs from the emulated devices. Typically, the time from SIO to Channel End is much shorter. However, the time from Channel End to Device End is longer because of buffering (printing printing is not started until a complete line is received). When running in uncoupled mode (display console without a console printer), a timing delay of 0.5 seconds per line is added to keep the display area from changing quicker than it can be read.

Keyboard Deviations: The 3205, 3278-2A, 3279-2C, and emulated keyboards differ in both the number of keys and the keyboard layout. Because all the keys on the 3205, 3278-2A, and 3279-2C can be used even if the emulated printer/keyboard does not have a corresponding key, it is possible to read and write characters that are not implemented on the emulated device.

Note that the Carriage Return key on the emulated keyboard is not implemented. Programs that need this key are not supported in printer/keyboard emulation mode.

Display Mode

Display mode permits the processor to run operating systems and programs designed for the 3270. For detailed information on the IBM 3270, see *IBM 3270 Information Display System Component Description,* Order No. GA27-2749.

The console devices appear to the software as local channel attached devices that support the 3272 command set. Each console device appears as a separate address to the operating system.

The device addresses are selected by the operator through the System Configuration screen (QFO).

Display Console

When the display console is in display mode, the complete 20-line user buffer is controlled by software. The user buffer may be accessed by 3270 Read, Write, and Control commands. Lines 21 through 24 display the processor status. (If you attempt to access lines 21 through 24, the operation check sense bit is set.) Line 25, separated from the other lines by a solid line, displays console status indicators (line 25 is also unavailable to you). The display console keyboard is for communicating with the system. In display mode, the display contains an operating system or user-defined screen that may be formatted or unformatted. Formatted screens contain fields that can be protected or unprotected from key actions, intensified for important details, or nondisplayed for security reasons.

Display Area

Lines 1 through 20 on the display are system input and output areas. This area is organized and used as defined by the operation of the system.

Display Mode Commands

In display mode, the display console and printer receive and run all commands valid for a 3272 Control Unit. The valid commands and the normal status responses received are:

Command	Hex Value	Initial Status	Ending Status	Async. Status
Write	01	00	CE	DE
Erase/Write	05	00	CE	DE
Rd Buffer	02	00	CE+DE	---
Rd Modified	06	00	CE+DE	---
Sense	04	00	CE+DE	---
Sense I/O	E4	00	CE+DE	---
NOP	03	CE+DE	---	---
Select	0B	CE	---	DE
EAU	0F	CE	---	DE

A short description of each command is summarized in the following section. In the descriptions, the device is assumed to be ready and no programming or device errors occur.

Command Definitions (Display Mode)

EAU (Erase All Unprotected): This command erases all unprotected fields in the device buffer. The Modified Data Tags (MDT) are reset to zero for each unprotected field, and the cursor is moved to the first unprotected character location on the screen. Channel End status is presented as initial status to the SIO, and Device End status is sent when the erase is completed.

Erase/Write: This command does a buffer erase operation and a write operation. The erase operation clears the device buffer to nulls and sets the cursor and buffer address to location 0. The write operation is performed exactly as the Write command.

NOP: This command results in an immediate Channel End and Device End. No action is performed in the device. This command can be used to cause a command chain to end with a combined Channel End and Device End or to change the initial buffer address position for a following command in a chain.

Read Buffer: This command causes all data in the device buffer to be transferred to main storage. The data stream consists of a read heading followed by the device buffer data. The read heading is three bytes: a one-byte Attention Identification (AID) character followed by a two-byte cursor address. The buffer data has a Start Field (SF) character inserted before each attribute byte to identify the start of each field.

Read Modified: The Read Modified command performs one of two functions based on the value of the AID character. A Short Read is performed if the AID character is from a REQ (PA1) or CNCL (PA2) key. The Short Read only transfers the AID byte to identify which key was pressed (no data is included). The read modified data function is performed for all other AID characters. The data stream consists of a read heading and the data from changed fields. The read heading consists of the AID character and the two-byte cursor address. The data for each changed field is preceded by a Set Buffer Address order code with a two-byte buffer address of the first character position in the field (the attribute address + 1). An unformatted screen results in a read modified data stream consisting of the read heading and all data in the buffer because modification of data cannot be determined. All null characters are suppressed from the data transferred.

Select: This command is implemented for 3270 compatibility, and no internal function is performed. Channel End status is presented as initial status to the SIO, and Device End status is generated immediately after.

Sense: One byte of sense information is transferred in response to a Sense command. After the sense byte is received, Channel End and Device End are presented as ending status. The sense byte is reset at the initiation of any command except a NOP. The sense byte is reset after the Sense operation ends. The sense byte is defined below:

Bit	Code	Explanation
0	CR	Command Reject
1	IR	Intervention Required
2	BOC	Bus-Out Check
3	EC	Equipment Check
4	DC	Data Check
5	US	Unit Specify
6	CC	Control Check
7	OC	Operation Check

Sense I/O: The Sense I/O command aids device-type identification. If the device is not busy, the data transferred (in display mode) is a constant seven bytes: X'FFnnnn0032782A' for 3278-2A or 3205 Display Console; FFnnnn0032792C for 3279-2C Display Console; and X'FFnnnn00328700' for a 3287 or 3268 Printer. This command runs even when the device is not ready.

Write: When the Write command is received, the data is transferred from the channel to an internal buffer and then processed to the device. When all of the data has been received, Channel End status is returned, and the last buffer is processed. Device End status is sent after the last buffer has been processed.

The Write command continues requesting data from the channel until the channel stops data transfer when the CCW counter reaches zero. Therefore, incorrect channel status is always indicated by a zero residual count unless the Suppress Incorrect Length Indicator (SILI) flag is on in the CCW.

Restrictions and Deviations (Display Mode)

Timing: The time taken to process a command may differ from other 3270 control units/devices; therefore, a command cannot be assumed to operate correctly in display mode.

Keyboard Deviations: The display console keyboard differs from a standard keyboard layout. Several keys are either not in the standard position or not implemented. Programs requiring the keys that have not been implemented may not be able to use the display console for a input device. For the following keys a difference exists between the display console and other display units.

- CNCL (PA2) key — Moved to a different position
- REQ (PA1) key — Moved to a different position
- CLEAR key — Not implemented
- TEST REQ key — Not implemented
- DUP key — Not implemented
- FIELD MARK key — Not implemented.

Several functions involving control units also differ between the display console and a standard display unit.

- Cursor blinking and reverse functions are not available.
- The keyboard clicker is set to click when the keyboard unlocks and cannot be changed.
- Local print function keys and matrix are not available.
- Insert mode reset 3277-compatible, instead of 3278, 3279-compatible.
- Line 25 indicators patterned after 3277 indicators, not 3278 symbols.
- Keys used for SNA/SDLC functions (SYS REQ and ATTN) not implemented.

Display Console Buffer: The display console buffer is not completely available for use by the operating system or user program. Lines 21 through 24 are unavailable for programmed use. Therefore, programs written for a 24 line 3270 terminal do not run correctly without some changes. Generally, an attempt to use such a program results in an error if lines 21 through 24 are accessed. The error causes Unit Check status to be presented and Operation Check sense to be set.

Console/Printer Sensing Conditions

The following sensing conditions can occur while operating the system.

Not Ready: When the device is not ready, all commands except Sense are rejected.

Power Off: When the device is not powered on, an intervention-required condition exists and is reported to a Sense command.

Test Mode: When the device is in test mode (Normal/Test switch in Test position), an intervention-required condition exists and is reported to a Sense command.

Device Not Functional: An intervention-required or equipment-check condition exists and is reported to a Sense command if the device hardware is failing, or the device is not connected or configured correctly.

End-of-Forms: When the End-of-Forms key indicates no paper is in the printer and a one-minute time-out condition occurs, an intervention-required condition exists and is reported to a Sense command. This delay lets you correct the end-of-forms condition before an error is reported. The end-of-forms condition causes the audible alarm to sound until the Hold Print key is pressed. Clear the end-of-forms condition by pressing the Hold Print key, replacing the forms, and pressing the Enable Print key to permit printing to continue.

Hold-Print Timeout: When the hold-print condition remains on 10 minutes, an intervention-required condition exists and is reported to a Sense command.

Operation Check (Display Mode)

An operation-check occurs when not valid data is received in the data for a Write or Erase/Write command. This error is a programming error that cannot be recovered from by software retry. A programmer must inspect the data to locate the not valid condition. The following conditions may cause an operation check:

- Not valid buffer address specified in a SBA, RA, or EUA order. A buffer address is not valid when it references a location past the end of the user buffer area.
- Not completed order sequence for SBA, RA, EUA, or SF order. An order requiring multiple data bytes was not complete at the end of the data stream.
- The start print bit was set in the WCC for a Write or Erase/Write command and chaining is indicated. Printing is suppressed and command chaining is canceled.

An operation check sets Unit Check and Device End status to be sent, combined with Channel End, if it has not already been sent. The residual count in the channel status word is not predictable and cannot be used to determine the location of the not valid order. The device buffer is modified with all data processed before the not valid order.

Appendix A. Messages

Messages contained in this section apply to any manual mode screen. They indicate hardware failures, information, status, or errors (such as operator, system, or I/O).

These messages are displayed on:

- Line 20 (system error)
- Line 23 (support processor error)
- Line 25 (display console and keyboard status)
- An alternate message area (for a specific screen function).

The messages are printed in alphabetical sequence. Recovery information is given on how to correct that error condition, if applicable, or information that may be of help in the understanding of the message. References may also be given for additional information that applies to the error situation.

ACB VALUE CHANGED BY xxK: The ACB (address check boundary) value is changed by xxK bytes because you assigned more than 128 UCWs. One hundred and twenty-eight UCWs are standard and occupy 8K bytes of user storage. Whenever you assign an additional block of 64 UCWs, user storage is reduced by 4K bytes (this change of storage size is reflected in the ACB generated at the next PU IML).

ADDR COMP REMAINS: An address-compare match has not occurred yet even though you issued the QBH command.
Recovery: To reset the address compare condition, key QAN and press the ENTER key.

ADDR COMPARE NOT NORMAL: Compare/trace is not set to normal.
Recovery: Perform a QAN, and retry the function.

ADDR USED AS CONSOLE PORT: The intended address is already assigned to a console port device.
Recovery: Use another address in your assignment procedure.

ADDR xxx ALREADY ASSIGNED: An attempt was made to assign a device (UCW) to an address already assigned.
Recovery: Assign the device to an unused address or unassign the device that is at the address, and then do the device assignment.

ADDRESS ALREADY USED: The intended address is already assigned.
Recovery: Use another address in your assignment procedure.

ADDRESS OUT OF RANGE: The selected address (byte offsets, etc.) is too high or too low, or the address is larger than the physical storage size.
Recovery: Enter the correct address.

ADDRESS RESERVED: An attempt was made to assign an address that is reserved for an internal function.
Recovery: Use another address in your assignment procedure.

ADDRESS TOO LARGE: The specified address is too large.
Recovery: Correct the address parameter, and reenter the function.

ALARM: An alarm was received, and the audible alarm sounded.
Recovery: Clear the alarm by:

- Pressing a Program Function (PF) key.
- Pressing the ENTER or CNCL key when PROCEED is not displayed.
- Using either the system or selective reset condition.

ALL LOGS PURGED: The logs were purged (status message).

ALL LOGS RESET: The logs were reset (status message).

ALPHA: (Katakana keyboard only) A prompting message to press the ALPHA key. Pressing this key puts the terminal in alphanumeric mode.
Recovery: Press another shift key to leave this mode.

ALPHA|: (Katakana keyboard only) A prompting message to press the ALPHA| key. Pressing this key is the same as pressing the shift key on a English keyboard.
Recovery: Press another shift key to leave this mode.

ALTER IGNORED: Attempt to alter data was ignored because the processor is in a state that prevents an alter from occurring, or the COMMAND line on a full screen alter was changed.
Recovery: Press the STOP key to instruction-stop the machine, or repeat the desired alter function.

ANALOG VOLTAGE DISPLAY IS BLANK BECAUSE PROCESSING UNIT POWER IS OFF: To view the analog voltage display, power up the processor.
Recovery: Press Power On/IML.

ANALYSIS CANCELLED: User cancelled the diskette analysis program.

ANALYSIS COMPLETE: Diskette analysis program is completed. Any diskette errors are noted on the screen.
Recovery: Install original diskettes and select any screen.

ANALYSIS HALTED: The diskette analysis program encountered an irrecoverable disk error (for example, diskette drive door open).
Recovery: Check for reference code and retry.

ANALYSIS IN PROGRESS: The diskette analysis program is in progress.

ANALYSIS PROCEEDING: A machine check has occurred and the problem is being analyzed.

AUTOMATIC CONVERGING ONLY: A color display function was requested from a display unit that does not have color capability or does not require convergence adjustments.

BLOCK: A block is being processed or waiting for an address-match to occur.

BLOCK AT MATCH-WAIT: A block is at a match command and is waiting for an address compare. Do not activate another block or patch while the message is displayed.
Recovery: Enter QBH to halt the block.

BLOCK ERROR: Selected block failed to run at IML.
Recovery: Verify that the block has been entered correctly, and retry. Use the Activate (QBA) command to run the block if processor is IMLed.

CALL LOCAL SERVICE: The data transfer was not successfully completed. Either the machine is not registered with the support system, system space was not available to receive log data, or the data link was disconnected after successive TP retries.
Recovery: Review the Service Transmission History (QP9) screen for any errors. If the failure persists, go to Volume A01, "START Repair Procedure."

CHANGES REQUIRE IML: AN IML is required to put the changes into effect.
Recovery: Perform an IML.

CHANNEL NOT CONFIGURED: The displayed screen may have invalid channel data.
Recovery: Verify that the channel is configured (installed) properly. For more information, see Volume A06, Service Aids, "System Configuration—Service (QFS)."

CHANNEL NOT INSTALLED: The displayed screen may have invalid channel data.
Recovery: Verify that the channel number you entered is physically installed.

CH__CCA INVALID IN LOGMODE: The data displayed at label CH__CCA is not valid when the QVH command is used in combination with Log Display mode (QLV). There is no way to display valid data for this label in Log Display mode.

CHECK CONTROL NOT NORMAL: Check control not set to normal.
Recovery: Perform a QKN, and retry the function.

CHECK DISKETTE DRIVE _____PRESS ENTER TO RESTART: The diskette drive is not ready because the diskette drive door is open or the diskette is not inserted properly. DISKETTE _____ NOT READY message also appears with this message.
Recovery: Ensure the diskette drive door is closed and that the diskette is inserted properly. If the error persists or a reference code is displayed, go to Volume A01, "START Repair Procedure."

CHECK STOP: The processor is in the check-stop state.

CHNL xx HAS NO IFCCS: There are no channel interface control checks on channel xx.

CLEAR COMPLETE: Successful system reset clear (QCLEAR) has been performed.

CLEAR RESET REQUIRED

- The COPY key to channel printer function was attempted while the system is IPLed.
- A check stop occurred and a data integrity problem exists.
- A storage operation was unsuccessfully interrupted when a QNORMAL or IPL-NORMAL was attempted.

Recovery: Enter QCLEAR next to COMMAND, and press ENTER. Retry the previous function.

Warning: Performing a QCLEAR alters storage and requires an IPL. Customer data is lost.

CLOCK DFZ & DTLS IGNORED: The attempt to alter protected scan rings was ignored because the requested function requires that the refresh clock be stopped.
Recovery: Issue QVW2B maintenance command, and retry the function.

Warning: Stopping the refresh clock alters storage and requires an IML/IPL; therefore, a loss of customer data results.

CLOCK DFZ & DTLS INVALID: The attempt to display protected scan rings is invalid because the requested function requires that the refresh clock be stopped.
Recovery: Issue QVW2B maintenance command, and retry the function.

Warning: Stopping the refresh clock alters storage and requires an IML/IPL; therefore, a loss of customer data results.

CLOCK STEP: The processor is in microword or clock cycle step mode.

CLOCK STOP: The processor is in clock stop mode.

CLOCK STOP REQUIRED: The function selected requires the machine to be in clock stop mode.
Recovery: Enter QOM or QOC to stop the clock, and retry function. If QOM does not stop the clocks of both processing units, use QOC. If customer data is lost, the message STORAGE ERR - REIPL NEEDED is displayed when the system is started.

COMMAND SENT xx TIMES: Maintenance command has been sent xx times.

COMMANDS START WITH Q: Entered command did not begin with a Q.
Recovery: Reenter the command beginning with a Q.

COMM REQ: The COMM REQ (communication request) key was pressed.

COMPARE DATA MISMATCH: The patch data on the diskette does not match the data expected during the patch deactivation.
Recovery: Ensure FUNC1 and FUNC2 are from the same set (primary or backup). Retry the function. If the same error occurs, patches may have to be deactivated in a special order. Invoke your support structure.

COMPARE/TRACE NOT RESET: A QAN was performed with an existing active compare/trace. The system is not capable of a complete reset.
Recovery: Perform a System Reset Normal (QNOR) and then a QAN.

CONFLICT WITH CHAN COMP: Selected compare is not a clock-stop compare and a clock-stop compare is already on a channel.
Recovery: Reset channel compare before setting new compare/trace selection.

CONFLICTING C/T ACTIVE: An active compare/trace selection conflicts with the selection you are trying to perform.
Recovery: Use information on the screen (see "STORAGE C/T ACTIVE ON QA__") to determine the active storage compare/trace that is conflicting with your selection.

CONSOLE CHECK: An attempt has been made to intermix 3278-2A/3279-2C devices with 3205 devices or the primary console has changed from a 3278-2A/3279-2C to a 3205 or vice versa. All consoles must match the primary console on the first active port (prioritized from P0 to P3). All consoles with this message displayed have a locked keyboard. In addition, those consoles that do not match the primary console are disabled.

This message may appear briefly during IML if language configuration is not correct.
Recovery: Starting with the first console (going from P0 to P3) with the message displayed, press the RESET key to unlock the keyboard. If the message is not erased, the console is disabled. If the message is erased, go to the language support screen (QFL) and enter the correct number next to CURRENT CONSOLE LANGUAGE CODE. Follow the message prompts.

CONS PRT NOT CONFIGURED: The console printer is not configured.
Recovery: Assign COPY key on the QFO screen to a console printer and repeat the original command.

CONSOLE DISK FAILURE: Ten errors occurred on the same record during IML.
Recovery: If the failure persists or is accompanied by a reference code, go to Volume A01, "START Repair Procedure."

CONSOLE DISK I/O ERROR: An error occurred during an attempt to read a program from the disk.
Recovery: Go to Volume A01, "START Repair Procedure."

CONSOLE I/O WAITING: The console is in manual mode and an I/O operation has been requested by the operating system.
Recovery: To leave manual mode, key Z next to COMMAND and press ENTER, or press the CHG DPLY key.

CONTACT YOUR PROGRAM SUPPORT PERSON: A customer message displayed when running Problem Analysis.

CONTROL STORAGE FAILURE: A control storage failure occurred:

- During an IML.
- While running the Verification test (V1) of the Program Load screen. This error may be accompanied by a reference code.

Recovery: Retry the IML. If it fails again, IML with the backup diskette. If the failure persists or a reference code is displayed, go to Volume A01, "START Repair Procedure."

CONV CHECK: The color convergence of the display console is out of tolerance.
Recovery: Press the RESET key. If the keyboard can be reset, either the battery has failed or the color convergence hardware has failed. (Refer to *3279 Display Terminal Maintenance Analysis Procedures.*)

COPY TO CHNL PRT DONE: Copy of the saved screen has completed printing on the channel printer.

CRC ERROR ON DRIVE ONE: Cyclic redundancy check occurred while using the FUNC1 backup diskette.
Recovery: Go to Volume A01, "START Repair Procedure."

CRC ERROR ON DRIVE TWO: Cyclic redundancy check occurred while copying from one diskette to another.
Recovery: Retry the function; if the error persists, go to Volume A01, "START Repair Procedure."

CSAR: xxxxx: The clock is stopped. The address displayed (xxxxx) is the current control storage address.

DATA BANK MODE ACTIVE: The Remote Data Bank mode is active. All PU operations are terminated and the SP acts like a 3275.
Recovery: To deactivate Data Bank mode, power off and then power on.

DATA CROSSES DWORD BNDRY: Address in your data/compare selection causes the doubleword to cross boundary.
Recovery: Change your address or use "do not care" characters in the address.

DATA: hhhh ADDR: xxxxxxxx: Displays the data (hhhh) at address (xxxxxxxx) when in instruction stop or match stop mode. The address displayed for a stop condition is the location of the next instruction.

DATA: hhhh R-ADDR: xxxxxxxx: Displays the data (hhhh) at address (xxxxxxxx) when in instruction stop or match stop mode. The address displayed for a stop condition is the location of the next instruction. R-ADDR indicates the processor is operating with real addresses.

DATA: hhhh V-ADDR: xxxxxxxx: Displays the data (hhhh) at address (xxxxxxxx) when in instruction stop or match stop mode. The address displayed for a stop condition is the location of the next instruction. V-ADDR indicates the processor is operating with virtual addresses.

If no data is displayed for a given V-ADDR, the virtual address is not translatable at this time.

DATA LINE TIMEOUT: The telephone connection between the support structure and the support processor has been disconnected because of a time-out error. No data was transferred in the last four to five minutes.

DATA LINK DISCONNECTED: The data link was disconnected because:

- The DISC key was pressed and ended all remote service.
- A SPIL program requested RSF access to disconnect the data link.
- Data link disconnect signal received from the remote location.

DATA LINK TIME-OUT ERROR: Data transmission has not occurred in the last five minutes. The program assumes a line error and displays this message. The program is terminated.
Recovery: Reinitiate the operation.

DATA LINK UNRECOV. ERROR: An error has occurred during the transmission of data that could not be recovered. The program is terminated.
Recovery: Reinitiate the operation.

DATA NOT ACCESSIBLE: The PU could not be stopped to perform the function.
Recovery: Retry the function.

DATA NOT AVAILABLE: The virtual storage address is not available to the display/alter function or the UCW data cannot be accessed now because the processor is busy.
Recovery: Either change the virtual storage address, retry later, or stop the attempt to display/alter. If UCW data cannot be accessed now, retry later.

DATA NOT ON TAPE: The diskette image cannot be found on the tape.
Recovery: Ensure that you are using the correct tape and that you have specified the correct drive number and part number.

DATA SAVED: Data on the screen has been altered, but the password was not changed.

DATA SENT OK, INCnnnn: This is a status message to show that the information was transmitted to the support system and assigned an incident number.

DATA SET SAVED: The data has been saved, see "SAVE DATA SET (Y/N)."

DATA SET NOT SAVED: The data has been purged, see "SAVE DATA SET (Y/N)."

DATA SET x EMPTY: Requested data set is empty or the information contained in the data set is invalid. x can be a 0 or 1.
Recovery: Retry the function; if the error persists, go to Volume A01, "START Repair Procedure."

DATA SET x SELECTED: Data set x has been selected.

DEBUG MODE OFF - NO ALTER: The attempt to alter data was ignored because debug mode is not enabled.
Recovery: Invoke your support structure.

DEBUG MODE OFF - NOT SAVED: The attempt to save data was ignored because debug mode is not enabled.
Recovery: Invoke your support structure.

DEG: Processor is operating in degraded mode because of reconfiguration.
Recovery: Invoke your support structure.

DEVICE BUSY: A function cannot be performed because the device is busy.
Recovery: Retry the function.

DEVICE NOT ASSIGNED: Address specified does not have a UCW assigned to it.
Recovery: Verify that the correct address was specified and that a valid UCW is assigned to that address. For more information, see Volume A06, Service Aids, "UCW Verification."

DEVICE NOT AVAILABLE: The device is located on a channel that is attached to a processor that is not configured.
Recovery: Configure the correct processor to access this device.

DEVICE NUMBER NOT FOUND: Device number specified is not in the requested data set.
Recovery: Verify that the correct device number was specified and the right data set is being used. Use the IOCP listing to verify correct entry.

DEVICE xxx IS BUSY: The addressed device is busy with an I/O operation.
Recovery: Press the ENTER key on the display of the coupled-pair that has the PROCEED light on. Rekey the changes.

DIAGNOSTICS FAILED REFCODE IS BELOW PRESS ENTER TO RERUN DIAGNOSTICS: This is a prompting message.
Recovery: Press ENTER to rerun diagnostics or MODE SEL to exit.

DISABLE REMOTE TOD: Remote TOD is enabled on the System Configuration—Customer (QFO) screen, and you attempted to remove the REMOTE TOD assignment on the System Configuration—Service (QFS) screen.
Recovery: Disable REMOTE TOD mode on the System Configuration—Customer (QFO) screen, and then remove REMOTE TOD assignment on the System Configuration—Service (QFS) screen.

DISABLE ROCF MODE: ROCF mode is enabled on the Remote Operator Console Facility (QFB) screen, and you attempted to remove the ROCF AUTO Modem assignment on the System Configuration—Service (QFS) screen.
Recovery: Disable ROCF mode on the Remote Operator Console Facility (QFB) screen, and then remove ROCF AUTO Modem assignment on the System Configuration—Service (QFS) screen.

DISCONNECT ON CNFG SCREEN: An attempt to print a saved screen was made using the QEVF function, but the console printer is configured to the COPY key on the System Configuration—Customer (QFO) screen.
Recovery: Disconnect the console printer from the COPY key, and retry the function. For more information, see Volume A06, Service Aids, "System Configuration—Customer."

DISCONNECTED: The display console is unavailable because it is not logically connected to the processor. This condition exists if you do not assign (with the System Configuration screen) a unit address to the display console.
Recovery: Ensure that the device is configured. For more information, see Volume A06, Service Aids, "System Configuration—Customer."

DISKETTE BUILD STARTED - SUCCESSFUL BUILD WILL TAKE APPROXIMATELY __ MIN: Displayed during a diskette build process.

DISKETTE COPY STARTED - SUCCESSFUL COPY WILL TAKE APPROXIMATELY __ MIN: Displayed during a diskette copy process.

DISKETTE DRIVE ONE NOT WORKING: A request to diskette drive 1 was specified, but the diskette drive is not functional.
Recovery:

1. Ensure that the FUNC1 diskette is in diskette drive 1 and that the latch is fastened.

2. Press Power On/IML on the operator control panel.

3. If the error persists, the screen indicates diskette drive 1 is not working and prompts you to install the FUNC1 diskette into diskette drive 2.

4. Install the FUNC1 diskette into diskette drive 2, and press Power On/IML. The screen lists the functions not available to you at this time.

5. If the listed functions are not required at this time, press the ENTER key; processing continues. Schedule a repair action at the customer's convenience.

6. If the error persists, Go to Volume A01, "START Repair Procedure."

DISKETTE DRIVE TWO NOT WORKING: A request to diskette drive 2 was specified, but the diskette drive is not functional.
Recovery:

1. Ensure that the FUNC2 diskette is in diskette drive 2 and that the latch is fastened.

2. Press Power On/IML on the operator control panel.

3. If the error persists, the screen indicates diskette drive 2 is not working and prompts you to press ENTER if you want to continue in one diskette mode. The screen lists the options that are not available if you are to operate in this mode.

4. If the listed functions are not required at this time, press the ENTER key; processing continues. Schedule a repair action at the customer's convenience.

DISKETTE DRIVE _____ NOT READY: Diskette drive _____ has been accessed, but is not ready.
Recovery: Ensure that the proper diskette is in diskette drive and that the latch is fastened. Retry the function; if the error persists, go to Volume A01, "START Repair Procedure."

DISKETTE IMAGE NOT FOUND ON TAPE - PLEASE CHECK PART NUMBER: The diskette image cannot be found on the tape.
Recovery: Ensure that you are using the correct tape and that you have specified the correct diskette drive number and part number.

DISKETTE NOT ALLOWED: The wrong diskette was installed into the diskette drive.
Recovery: Install the required diskette, and retry the function.

DISKETTE _____ CHECK: A diskette or diskette drive failure occurred.
Recovery: Ensure the diskette is undamaged and the diskette drive is operational. If the error persists or a reference code is displayed, go to Volume A01, "START Repair Procedure."

DISKETTE _____ NOT READY: The diskette drive is not ready because the diskette drive door is open or the diskette is not inserted properly. CHECK DISKETTE DRIVE _____ PRESS ENTER TO RESTART message also appears with this message.
Recovery: Ensure the diskette drive door is closed and that the diskette is inserted properly. If the error persists or a reference code is displayed, go to Volume A01, "START Repair Procedure."

DISPLAY CONSOLE FAILURE: A display to the screen failed during IML. An error was detected from the console display.
Recovery: Retry the IML. If the error persists or a reference code is displayed, go to Volume A01, "START Repair Procedure."

DISPLAY MODE: The display console is in display mode.

DONE, NO READ ERRORS: Diskette analysis completed with no errors.
Recovery: Install original diskettes.

DONE, PRESS ENTER: Prompting message to press ENTER upon completion of the function.

DUPLICATE PORT ADDRESS: Entered port address has already been assigned.
Recovery: Use another port address in your assignment procedure.

EDIT COMMAND ERROR: An invalid entry has been placed in the editing input area.
Recovery: Select the correct function and retry.

END OF DIAGNOSTICS NO ERROR DETECTED PRESS ENTER TO RERUN DIAGNOSTICS: This is a prompting message.
Recovery: Press ENTER to rerun diagnostics or MODE SEL to exit.

ENGINEERING DATA ERROR: The engineering level of the hardware is not compatible with the microcode. This error may be accompanied by a reference code.
Recovery: Ensure that you have the proper EC level cards to match the diskettes.

ENTER DATE MM/DD/YY: This is a prompting message to enter the date.
Recovery: Enter the date.

ENTER NEW PASSWORD: This is a prompting message to enter the new password.
Recovery: Enter the new password.

ENTER NODE IDENTIFICATION: A prompting message to enter the node identification.
Recovery: Enter the node identification.

ENTER OLD PASSWORD: A prompting message to enter the old password.
Recovery: Enter the old password.

ENTER P TO PURGE, Q TO QUIT: A prompting message to enter P to complete the purging function or a Q to quit.
Recovery: Enter a P or Q depending on the desired action.

ENTER PASSWORD: A prompting message to enter the password.
Recovery: Enter the password.

ENTER P0 P1 P2 P3: A prompting message to enter the console device number.
Recovery: Enter the console device number.

ENTER 2 DIGIT MAINT CMD: Two-digit maintenance command omitted from the selection.
Recovery: Enter the missing data, and retry function.

ENTER 1-5 DIGIT ADDRESS: One- to five-digit address required to complete selection.
Recovery: Enter the missing data, and retry function.

ENTER 4 DIGIT LOG ID: Four-digit log identification omitted from the log mode selection.
Recovery: Enter the missing data, and retry function.

ENTER 8 DIG AND V,R, OR M: Valid eight-digit main storage address followed by V (virtual), R (real), or M (absolute) has been omitted from the QVT command.
Recovery: Enter the missing data, and press ENTER key.

ERASE?title: A save screen operation using the COPY key was attempted but the Save Screen area is full.
Recovery:

- If you want to save the screen, either erase a saved screen or purge all saved screens (see the QEV command).
- If you do not want to overlay the indicated screen, leave this procedure by entering a different command or by pressing the MODE SEL key.

ERR - BLOCK AT MATCH-WAIT: The patch being transferred cannot be activated because a block is running and a match command is waiting for an address compare.
Recovery: Enter QBH to halt the block.

ERR - CS RECONFIGURE ACTIVE: A mutually exclusive condition exists between control storage reconfiguration and the multiply function reconfiguration. The control storage hardware has been deconfigured to use the control storage reserved reconfiguration area (one or the other, but not both).
Recovery: Enter a new command, or press MODE SEL to exit.

ERR - DISK ERROR: A diskette error occurred.

ERR - MULTIPLY DECONFIGURED:: The multiply function hardware has been deconfigured to use the microcode routines. These routines are resident in the control storage reserved reconfiguration area. A mutually exclusive condition exists between control storage reconfiguration and the multiply function reconfiguration (one or the other, but not both).
Recovery: Enter a new command, or press the MODE SEL key to exit.

ERR - NO SPACE IN LIST: The patch or block list space on the **TO** diskette is full.

ERR - NOT FOUND IN LIST: A block or patch to be transferred is not on the **FROM** diskette.

ERR - PATCH EC NAME WRONG: The patch name does not follow the naming convention.
Recovery: Ensure that the **TO** diskette is the correct one.

ERR - PATCH ACTIVE: The patch being transferred is already active on the **TO** diskette.
Recovery: If you want to transfer this patch, deactivate the patch on the **TO** diskette and repeat the operation.

ERR - PUT IN ORIGINAL DISK: An error occurred during the transfer of data. To get more information about the error, press the ENTER key.
Recovery: Insert the original diskette (the diskette that was present when you first entered the transfer function).

ERROR ON SELECTED TAPE
CSW=xxxxxxxxxxxxxxxx: An error occurred while the PU was transferring data from the tape unit.
Recovery: Check the unit status and channel status to determine if the problem is with the tape drive, tape control unit, or channel.

ERROR BUILDING DISKETTE: An error occurred while trying to write onto the diskette.
Recovery: Ensure that the diskette drive is operational. To verify that the diskette is usable, run the Diskette Readability Test (QED).

ERROR DURING DATA XFER: An error occurred while transferring data from the PU to the SP.
Recovery: Go to Volume A01, "START Repair Procedure."

ERROR OR SLOW PRINTER: A printer error occurred, or the SP is waiting for a complete signal.
Recovery: Retry the function and check printer operation.

ERROR WHEN STARTING PU: An error occurred in starting the processing unit.
Recovery: Go to Volume A01, "START Repair Procedure."

ERROR WHEN STOPPING PU: An error occurred while trying to instruction stop the processing unit.
Recovery: Run the SBA diagnostics to determine the problem.

EXECUTION TIME xx MINUTES: This gives the approximate run time for the selected diagnostics.

FAILED - HARDWARE PROBLEM: Hardware problem has occurred with the diskette drive adapter or the diskette drive hardware.
Recovery: Go to Volume A01, "START Repair Procedure."

FAILED - SYSTEM ERROR: A system error has occurred.
Recovery: Go to Volume A01, "START Repair Procedure."

FAILURE INITIALIZING RCS: Initialization of the Remote Console Support (RCS) facility failed.
Recovery: Verify that all options on the Remote Operator Console Facility (QFB) screen and Remote Console Initialization (QFR) screen are properly selected, and retry the function. For more information, see Volume A06, Service Aids, "Remote Operator Console Facility" and "Remote Console Initialization."

FAILURE INITIALIZING RDB: Initialization of the Remote Data Bank (RDB) facility failed.
Recovery: Verify that all options on the Data Bank Initialization (QFD) screen are properly selected, and retry the function. For more information, see Volume A06, Service Aids, "Data Bank Initialization."

FULL COMMAND REQUIRED: A full command entry is required. The COMMAND line displays the full command as it should be entered.
Recovery:

- To perform the function, press the ENTER key.
- If you do not want to perform the function, clear the COMMAND line and key in your desired function or press the MODE SEL key.

FUNCTION KEY IGNORED: A function key other than a paging key was pressed.

FUNCTION NOT AVAILABLE: Requested function not found on installed diskettes. The function you requested could not be found because the diskette that contains the requested function is not installed, the diskette drive door is open, or the diskette drive is not operational.

If the door is open (not latched) or if the the diskette drive is not operational, an additional message (DISKETTE _____ NOT READY) also displays. This message indicates which diskette drive is having the problem.
Recovery: Ensure that both diskette drives have the correct diskettes installed, and retry the function. If the error persists, go to Volume A01, "START Repair Procedure."

FUNCTIONAL ONE DISKETTE NOT IN DISKETTE DRIVE ONE: Request made to the diskette in diskette drive 1 that is not available.
Recovery: Install FUNC1 diskette in diskette drive 1 and retry the function.

FUNC1 MODULES SELECTED: Modules on the functional 1 diskette are selected for transfer.

FUNC2 IS IN DRIVE TWO - IF YOU WANT IT ERASED PRESS ENTER TO PROCEED: Prompting message to press ENTER to complete the function.

HDWE LVL OF LOG UNCURRNT: A mismatch was detected between the current hardware level found in the engineering data, and the hardware level indicated in the retry control block for the requested log.
Recovery: The displays using the requested log may not be valid. This can occur when a log has been copied to a new diskette because of a diskette change. If possible, obtain the previous diskette containing the correct hardware engineering level for the requested log.

I/O HOLD ON: Displayed when the I/O Power Hold switch is placed in that position on the service panel.

IF ERROR: PRESS ALT AND LINE-DISC KEYS: If an error in the Remote Support Facility (RSF) occurs, this message describes the disconnect procedure.

IML COMPLETE: IML execution is complete.

IML ERROR: An error was detected during an IML.
Recovery: Perform an IML.

IML IN PROG: Displayed during the execution phase of IML.

IML REQUIRED: A function was requested or changes were made that require an IML of the processor.
Recovery: Press Power On/IML, and retry the function.

IML REQUIRED (SP & PU): A SP and PU IML are required to reflect the updates made.
Recovery: To make the screen alterations effective, press Power On/IML, and perform a QLM.

IML S/370 CORELOAD: Requested function or changes were made which require a S/370 IML.
Recovery: Ensure that the system mode is set for S/370 (W1) on the IML Parameter (QLI) screen and then perform a QLM.

IML STEP _____: Displayed during a processor IML. The _____ field continually updates with a sequential number to indicate the progress of the loading procedure.

INCOMPATIBLE SELECTIONS: The selected combination is not permitted.
Recovery: Erase the entry, and rekey the correct commands on the COMMAND line. The selections made are not valid together.

INCOMPLETE COMMAND: The command was not fully specified. The cursor is positioned ready for the missing input.
Recovery: Specify the missing data.

INCOMPLETE INPUT: The required input was not fully specified. The cursor is positioned ready for the missing input.
Recovery: Specify the missing input.

INCORRECT CURRENT PASSWORD, PLEASE REENTER: This message is displayed if the password was entered incorrectly.
Recovery: Enter the correct password.

INHIBITED: All keys except the RESET, START, STOP, and INTR are inactive. INHIBITED appears if you:

- Attempt to change protected data.
- Try to press two keys at the same time.
- Press keys faster than they can be processed.
- Insert a character into an input field that is full (no null characters).
- Press one of the function keys (PF keys, ENTER, CNCL or PA2, REQ or PA1, MODE SEL, CHG DPLY or the DIAG key).

Recovery: Press the RESET key.

INITIALIZATION COMPLETE: Teleprocessing link to the support system is complete, and ready for use.

INITIALIZING RSF-LINK: The support processor is waiting for a response from the support system to indicate that the TP-Link hookup is complete.

INPUT IGNORED: Attempt to change data cannot be performed. The processor may have changed states since displaying the screen making the display invalid. It can also occur when changing the COMMAND line and attempting a full screen alter at the same time.
Recovery: Enter the command to display the desired screen, and repeat the alter function.

INPUT _____—OUTPUT _____: Status message displaying the input and output addresses.

INSERT FROM DISKETTE ON DRIVE 1 TO DISKETTE ON DRIVE 2 AND PRESS ENTER: Prompting message to install **FROM** diskette into diskette drive 1 and the **TO** diskette into diskette drive 2, and then press ENTER.

INSERT MODE: The INSERT key has been pressed.
Recovery: Press the RESET key.

INSTALL xxxxx IN DRIVE 2: Patch activation needs the specified diskette to continue.
Recovery: Install the specified diskette and press ENTER.

INSTR STEP: The processor is in instruction step mode.

INSTR STOP: An instruction-stop occurred (pressing the STOP key can cause this condition).

INSTR STOP REQUIRED: Requested function requires the processor to be in instruction stop mode.
Recovery: Press the STOP key, and retry function.

INSTRUCTION STOP OCCURRED - PRESS ENTER TO RESTART BUILD: An instruction-stop occurred during the build process. You are prompted to press ENTER to restart the function.

INTERFACE CONTROL CHECK: An interface control check occurred while in manual mode.
Recovery: Go to Volume A01, "START Repair Procedure."

INTERNAL CONFG DATA ERROR: The modules on the diskette contain redundant configuration information that does not agree. The fields in conflict are marked with an asterisk.
Recovery: Key in valid information.

INTERRUPT KEY PROCESSED: Processor has acknowledged that the INTERRUPT key has been pressed, and the interrupt has been passed to the processor for processing.

INTV-TIMER: Interval timer is on.

INTV-REQD: The Printer coupled as a hard-copy device is not ready (end-of-form, power off, or other check conditions are present).
Recovery: Clear the check condition, and ready the printer.

INVALID ADDRESS: The address field contains an invalid character, or the address specified is beyond the valid range for this screen. The cursor is positioned under the address.
Recovery: Enter a valid address, and retry the command.

INVALID BLOCK NAME: An invalid block name was specified. The block name must not begin with a P or be longer than eight characters.
Recovery: Respecify the block name.

INVALID CHANNEL ADDRESS: The channel address of the input/output device(s) is not a valid number.
Recovery: Enter the valid channel address.

INVALID CHAR.CODES: An invalid character or an invalid combination of characters was used in the characteristics field.
Recovery: Enter the correct character(s).

INVALID DATE: Date parameters entered are not valid.
Recovery: Verify that parameters entered meet the month, day, and year field requirements.

INVALID DATA ON PDI TAPE: Wrong tape installed or the tape was built improperly.
Recovery: Install the correct tape, and retry the function.

INVALID DEVICE NUMBER: The device number of the input/output address is already reserved.
Recovery: Enter a valid device number.

INVALID DISKETTE FORMAT: An invalid control record was found on the diskette.

INVALID ENTRY, REENTER: An incorrect character was entered, an incomplete field specified, or an entry not made where an entry is required. The cursor is positioned at the error location.
Recovery: Verify the specific screen field requirements, and retry the function.

INVALID—FULL RANGE REQD: Entire device address range was not removed for a control unit.
Recovery: Remove the complete address range for the control unit.

INVALID HEX CHARACTER: Invalid hex character entered on the COMMAND line.
Recovery: Enter the correct hex character, and retry the function.

INVALID INPUT: An invalid character or more than the allowed number of characters was entered. The cursor appears under the first character in the error field.
Recovery: Specify valid information, and press the ENTER key.

INVALID INPUT IN LOG MODE: (QVL) Log Display Mode is active. Selected function not allowed while this mode is active.
Recovery: Reset the log function by entering QVL, and retry the desired function.

INVALID INPUT, CE ONLY: The selection requires that the CE Mode switch be in the CE Mode position.
Recovery: Select the correct function letter, or set the CE Mode switch to CE Mode and reselect the letter.

INVALID INPUT, S/370 ONLY: The selection requires that the system be operating in S/370 mode.
Recovery: IML the system in S/370 mode, and retry the function.

INVALID INPUT, S370XA ONLY: The selection requires that the system be operating in S/370XA mode.
Recovery: IML the system in S/370XA mode, and retry the function.

INVALID LOG ID:

- Requested log ID was not present in the existing retry control blocks, or
- The status of the requested log ID indicated the log was not available.

Recovery: Enter a valid four-digit log ID, and retry function.

INVALID NAME: The name is invalid; it has too many characters, or a name was not specified.
Recovery: Specify a valid name.

INVALID OPERATION: The operation specified is not valid for the screen. The cursor is positioned under the operation character.
Recovery: Enter a valid OP code, and retry the command.

INVALID OR INCOMPLETE INPUT, PLEASE REENTER: Incomplete or invalid data was entered.
Recovery: Verify that parameters entered meet the input requirements.

INVALID PAGE WIDTH: Selected page width for the output device is wrong.
Recovery: Enter the correct page width for the selected device, and retry the function.

INVALID PARTS LIST/ENTRY: An invalid part number is on the Component Locations and Part Numbers (QP7) screen.
Recovery: Invoke your support structure.

INVALID PASSWORD: Entered password does not match the password character requirements.
Recovery: Check the requirements for the password entry.

INVALID PRINTER TRAIN: The printer train selection is invalid for the type of assigned printer.
Recovery: Select a valid printer train the type of printer.

INVALID PRINTER TYPE: An invalid or unsupported printer type specified.
Recovery: Select a valid printer type.

INVALID PROCESSOR ID: The machine serial number on the diskette does not match the serial number hardwired in the machine. The requested function is disabled.
Recovery: Load the correct diskette, and perform an IML. If the error persists, go to Volume A01, "START Repair Procedure."

INVALID PROCESSOR NO.: Selected processor number is not valid.
Recovery: Enter the correct processor number, the I/O device address (cuu), and retry the function.

INVALID RANGE SPECIFIED: You tried to unassign some of the devices on a control unit. All devices on a shared device or SIOF device must be unassigned at the same time.
Recovery: Unassign the complete control unit.

INVALID VIA RSF LINK: You tried to alter a Remote Support Facility (RSF) function from a remote console.
Recovery: Make your changes using the local console. For more information, see Volume A06, Service Aids, "Remote Support Facility Aids."

IOS: The stop key was pressed while the processor was in the running state. I/O Suppression state active (no I/O operations will be processed from any internal queues).
Recovery: Press the Start key.

IPL COMPLETE: IPL is complete.

IPL DEVICE NOT RESPONDING: Indicates that the device is not attached, or that the CE key is off.
Recovery: Check the QL screen for the correct IPL UNIT ADDR. Ensure that the switching devices are system attached. Ensure the device control unit power and the CE key is on.

IPL EC-PSW FORMAT ERROR: The PSW loaded during an IPL is invalid; for example, the instruction address in the current PSW is not an address in main storage.
Recovery: Check the QL screen for the correct IPL UNIT ADDR. Also, ensure that the correct system mode (S/370 or S/370XA) is loaded and that the IPL device contains the correct disk or tape. Retry the IPL.

IPL ERROR: An error occurred during an IPL.
Recovery: Retry the IPL.

IPL I/O ERROR: No UCW exists for the devices or no valid IPL record is on tape (for example, the drive is not at load point).
Recovery: Check that the IPL UNIT ADDR is correct on the Program Load screen. Also, ensure that the IPL device is in a ready state and at load point, and contains the correct disk or tape. Retry the IPL.

IPL I/O ERROR. INTF CTL CK: The IPL was not successful because of a channel interface control check. For more information, see Volume A07, "Logs."
Recovery: Retry the IPL. If the error persists, try another device or invoke your support structure.

IPL I/O ERROR. US/CS=_____: An I/O error occurred. The unit status/channel status is shown.
Recovery: If US/CS=x2xx, xAxx, or xExx, check that the IPL device is powered on, ready, and physically attached. Retry the IPL. If the error persists, go to Volume A01, "START Repair Procedure."

IPL IN PROG: IPL is in progress.

IPL UNIT OR CTL UNIT BUSY: IPL not possible because of a busy condition in the path (or paths) to the device.
Recovery: Retry the IPL. If the condition persists, stop other activity to the IPL unit and try again.

IPL UNIT NOT DEFINED: Unit selected for the IPL has not been defined to the processor.
Recovery:

- Ensure that the selected unit is added to the IOCDS or is in the present UCW directory. If not, assign the unit, and retry the IPL.

- Ensure that the selected unit is the correct one.

If not, select the correct unit, and retry the IPL.

KATAKANA NORMAL: (Katakana keyboard only) A prompting message to press the Katakana normal key. Pressing this key puts the terminal in Katakana mode.
Recovery: Press another shift key to leave this mode.

KATAKANA UPSHIFT: (Katakana keyboard only) A prompting message to press the Katakana upshift key. Pressing this key puts the terminal in Katakana symbol mode.
Recovery: Press another shift key to leave this mode.

KEY IGNORED: The SP is busy processing the previous function.
Recovery: Try the function again.

KYBD SETUP REQD: Switch position 1 of the keyboard switch on the underside of the 3205 Color Display Console keyboard is in the On (|) position. The console is disabled preventing the user from using a keyboard that is set up incorrectly.
Recovery: Set switch position 1 to the Off (O) position. To activate the new switch setting, set the Normal/Test switch to Test and back to Normal, or power the display console off and on. Switch positions 4 through 8 should be set to the language being used (see *3205 Color Display Console Maintenance Information,* SY18-2121).

LINE DISCONNECTED: NO PASSWORDS ENTERED IN 1 MINUTE: Operator has not sent a password to the remote system by pressing ENTER within one minute since the ROCF LOGON screen was displayed or a previous password was entered. The Remote Operator Console session terminates.

LINE DISCONNECTED: TOO MANY INCORRECT PASSWORDS: Three incorrect password attempts were entered. The Remote Operator Console session terminates.

LINES OR SIZE OVER MAX: The number of characters exceeds the available space, or more than the allowed number of editing lines is requested.
Recovery: Delete the excessive characters or lines.

LOAD: Displayed during a program load.

LOG AREA FULL: The log area is full.
Recovery: Erase the screen, and retry the save function.

LOG DATA NOT VALID: The data associated with the requested log is invalid and cannot be displayed.
Recovery: Select another log ID or press the MODE SEL key to exit.

LOG SCRN SAVED AS ADDR 0: The address of the CE Log Edit screen was altered and saved on the diskette as address 0.

LOGOUT PURGED: Informational message to indicate that the purging function is complete.

LONG IPL PROCEEDING: The IPL is running longer than usual.
Recovery: If this condition is abnormal, press the MODE SEL key to leave IPL.

LOOP ENDED BY CANCEL KEY: User cancelled the loop function.

MACH CHECK: Machine Check state. Processor is inoperative or error retry is in process.
Recovery: Go to Volume A01, "START Repair Procedure."

MAIN CONSOLE NOT READY DURING POWER UP SEQUENCE: The main (primary) console failed to operate on power-on.
Recovery: Press the CHG DPLY key on the console displaying this message.

MAIN STG ADDRESS ERROR:

- An addressing error or a data content (pattern) error was detected during IML of the Main Storage test.
- An error in main storage was detected while running the verification test (V3) of the Program Load (QL) screen. This error can be accompanied by a reference code.

Recovery: Press the PF9 key.

MAIN STG DATA CMP ERROR:

- An addressing error or a data content (pattern) error was detected during IML of the Main Storage test.
- An error in main storage was detected while running the verification test (V2) of the Program Load (QL) screen.

Recovery: Press the PF9 key.

MAIN STORAGE DUMP NOT ALLOWED OR WRONG PASSWORD: An attempt was made to dump main storage and the system is configured not to allow a dump, or the password was not entered correctly.

MAN: The processor is in the stopped state.

MANUAL CONTROL: The system is under control of the support processor microcode. In this mode, an SIO to the display console is accepted but held pending until the display console is available to the operating system. If an SIO is queued, the audible alarm sounds and CONSOLE I/O WAITING is displayed on line 23.
Recovery: Press the CHG DPLY key to return to the operating system.

MATCH STOP: A match-stop occurred. If CSAR is displayed, a clock-stop occurred. If DATA and ADDR are displayed, an instruction-stop occurred.

MAX (8) SIOF CU PER CHAN: You attempted to assign more than eight control units (with SIOF queueing) on the same channel.

MAX (60) CTL UNITS EXCEEDED: You attempted to assign more than 60 UCWs (control units) per channel.

MAX (2048) UCWS EXCEEDED: You attempted to assign more than 2048 UCWs per system.

MAXIMUM NO. OF CHARS IS 8: More than eight characters were specified in a field where the maximum number is eight.

MINIMUM NO. OF CHARS IS 4: Less than four characters were specified in a field where the minimum number is four.

MODE NOT SELECTED: The system mode of operation has not been selected (S/370 or S/370XA).
Recovery: Select the proper mode through the Alter IML Parameter (QLA) screen.

MODULE NOT FOUND: The requested module was not found on the diskette.
Recovery: Enter the correct ID, or mount the correct diskette.

MORE: More saved screens are on the next page.
Recovery: To display the next page of Saved Screen area, press the Page Up key.
STOP RFRSH CLOCK'

MORE DATA
STOP RFRSH CLOCK: See the note under "Displaying System Check Data" on page 205

MORE ERRORS USE PAGE KEY: There are more than 12 errors.
Recovery: Use the Page key to view the additional errors.

MORE, PRESS ENTER: The data cannot fit on the page.
Recovery: Press the ENTER key again to continue the display to the next page.

MOUNT PROPER DISK, ENTER: Prompting message to install the proper diskette, and press ENTER.

MOUNT TAPE ON SELECTED DRIVE, INSERT DISKETTE ON DRIVE TWO AND PRESS ENTER: Prompting message to mount tape on the selected drive, install the correct diskette on diskette drive 2, and press ENTER.

NAME2 LONGER THAN NAME1:
Recovery: Make NAME2 equal to or shorter than NAME1.

NATIVE DEVICE ADDR USED: Wrong screen was used to assign or unassign a native device.
Recovery: Use the System Configuration—Customer (QFO) screen to change any native device address.

NEW PASSWORD=OLD PASSWORD: Entered password is the same as the one you are trying to change.
Recovery: Enter a password that is different.

NO AUTO-ANS DCE INSTALLED: ROCF AUTO MODEM selection is not enabled on the System Configuration—Service (QFS) screen.
Recovery: Enable the selection. For more information, see Volume A06, Service Aids, "System Configuration—Service."

NO BLOCK AT MATCH-WAIT: No block is active (available to be halted).

NO IML: No IML was performed.
Recovery: Press Power On/IML.

NO LINES SELECTED: No modules are selected for transfer.
Recovery: Select module(s) for transfer, and press ENTER.

NO PATH DEF FOR IPL UNIT: IPL unit has been defined to the processor, but the path to the unit has not.
Recovery: Correct the IOCDS, and retry the IPL.

NO REMOTE TOD INSTALLED: Remote TOD is not enabled on the System Configuration—Service (QFS) screen.
Recovery: Enable REMOTE TOD mode on the System Configuration—Service (QFS) screen.

NO RSF RESPONSE IN nn MIN: Teleprocessing connection to the Remote Support Facility has **not** been made. nn increments every two minutes.
Recovery: Disconnect the line (hold down the ALT key and press LINE DISC) and retry the function.

NO SAVED SCREENS: The saved screens area is empty.

NO SPACE IN LIST: The list area is full.

NOT ALLOWED WITH POWER UP: Requested function not allowed with the power completely up (see the QW command).

NOT AVAILABLE: The requested function cannot be performed because it is unavailable on the installed diskette. Note that the insert/extract function is on the DIAG1 diskette.
Recovery: Install the proper diskette.

NOT AVAILABLE, RCS MODE: Convergence operation was attempted on a TP console while in Remote Console Support mode.
Recovery: Color Convergence is not available on a console in Remote Console Support mode. To perform convergence, disconnect the TP link.

NOT FOUND IN LIST: The Block or Patch name was not found in the list.

NOT IMLED: An IPL was attempted without a prior IML. The cursor is positioned at the end of the COMMAND line.
Recovery: IML the support processor, and rekey the correct command and parameter.

NOT INSTALLED AS HARDCOPY: An attempt was made to assign the COPY key to a port that does not have a hard-copy device assigned.

NOT RSF CONSOLE: Display console specified is not assigned as the Remote Support Facility (RSF) console.
Recovery: Use the display console assigned for the Remote Support Facility.

NOT VALID WITH ROCF: You attempted to install an RSF feature code that is not compatible with ROCF.
Recovery: Enter a correct RSF feature code.

ONE INPUT DEVICE REQUIRED: A input device must be assigned for the specified operation.
Recovery: Assign an input device, and retry the function.

OPERATING: The processor is operating (processing instructions).

OPERATION RATE NOT NORMAL: Operation rate is not set to normal.
Recovery: Perform a QON, and retry the function.

PAGING KEY IGNORED:

- A paging operation was attempted on a screen that has only a one page display, or
- The address to be generated by paging is either too high or too low for the function selected, or
- The previous command had a nonpaging error.

PARTIAL RESET COMPLETE: A processing unit is check-stopped and cannot be reset. QNORMAL resets the processing unit that is not check-stopped and ***all*** I/O devices on ***both*** processing units.
Recovery:

- Continue processing on the processing unit that is not check-stopped until the error can be corrected.
- Use QFO to reconfigure the check-stopped processing unit and continue processing.

PASSWORD CHANGED - PASSWORD DATED - MM/DD/YY: The password was successfully changed.

PASSWORD CHANGED, RECORD NEW PASSWORD: The password was successfully changed.

PASSWORD INCORRECT, RETRY PASSWORD DATED - MM/DD/YY: The entered password did not match the current password in the remote system. The date set by the operator when the password was last changed is displayed.
Recovery: Enter the correct password for the system being dialed.

PATCH: Displayed when a patch is being processed.

PATCH AREA FULL: The patch record area is full, but the support system tried to send another patch.
Recovery: Invoke your support structure.

PATCH ACTIVE: The patch is active and cannot be edited.
Recovery: Press ENTER to return to the Patch List (QBTP) screen.

PATCH NOT ACTIVE: Selected patch is not active.
Recovery: Use the Activate (QBA) command to activate the block.

PORT x CONFIG ERROR: A device is not specified or not configured correctly (for example, a console specified as a hard-copy device) on the System Configuration (QFO) screen.
Recovery: Ensure that the device is specified or configured properly.

POWER INCOMPLETE: You selected a function that requires a certain power sequence to be present.
Recovery: Press the Power Off key, wait approximately 30 seconds, and then press the Power On/IML key. Wait for Power Complete, and then retry the command.

PRESS CANCEL TO INPUT CMD: Processor is in a loop condition.
Recovery: To input on the COMMAND line, press the CANCEL key.

PRESS ENTER KEY: Prompting message to press the ENTER key to scroll the message area.

PRESS ENTER TO LOCK: Prompts you to press the ENTER key when performing the serial number update on the System Configuration—Service (QFS) screen.
Recovery: Press ENTER to lock the serial number or MODE SEL to leave the function.

PRESS ENTER TO REDISPLAY: Prompts you to press the ENTER key to execute the command on the COMMAND line again.

PRESS ENTER TO SAVE: Prompts you to press the ENTER key to complete the save function. This additional step is intended to be a check to ensure the save command has not been entered accidentally.
Recovery:

- If you want the data saved, perform the requested function.
- If you do not want the data saved, enter a different command, or press the MODE SEL key.

Warning: If the machine has been IPLed, performing this function alters storage and requires an IML/IPL; therefore, a loss of customer data results.

PREVIOUS DISPLAY SAVED: Display Buffer switch (QVD) function is active, and the previously displayed screen has been saved.

PRINTER HALTED: The printer stopped copying.

PROBLEM ANALYSIS RUNNING: Processor is running with Problem Analysis invoked.

PROBLEM ANALYSIS ERROR: Problem Analysis has encountered a hardware error during the analysis operation.
Recovery: Go to Volume A01, "START Repair Procedure."

PROCEED: A Read command is in progress. Only now can you enter data in the input area. Proceed is cleared when the Read command is ended through one of the following conditions:

- Normal ending caused by ENTER or CNCL key.
- A system or selective reset.
- A Halt Device or Halt I/O instruction issued to the device.

PRT-BUSY: The printer is in manual mode and busy from a previous COPY key request or an SIO from the operating system. The COPY key request is ignored.
Recovery:

- Press the RESET key, and retry the COPY key request.
- Press the RESET key, and then press the STOP and START keys at the processing unit. Retry the COPY key request.
- Power off the printer and then power on. Retry the COPY key request.

PRT CHECK: In manual mode, the printer has an irrecoverable error.
Recovery: Press the RESET key.

PRT INTV REQUIRED: In manual mode, intervention is required to restore the printer to the ready condition.

- Printer power is off.
- Printer is in Test mode.
- A COPY key request was performed and no copy key device was configured. The copy request is ignored.
- Recoverable condition (end-of-form).

Recovery: Press the RESET key.

PRT/KYBD CONS ADDR ERROR: The address restrictions of printer/keyboard mode were not met. Either more than two ports were assigned to printer/keyboard mode or a port address was not assigned correctly for operating in S/370 mode.
Recovery: Rekey the correct command and parameter on the screen.

PRT/KYBD MODE: The display console was assigned a common address with a hard-copy printer (with the Program Load screen).

PSW UNPREDICTABLE: A program reset made the PSW unpredictable. The PSW is set to zeros.
Recovery: Display the current PSW to determine whether program execution can continue. If necessary, perform an IPL.

PU ALREADY INITIALIZED: An attempt was made to use the Copy function to a channel printer while the system was in an active IPL. This Copy function overlays the existing program within the system.
Recovery: If a copy is desired, perform the QCLEAR command, and retry the Copy function.

Warning: Performing a QCLEAR alters storage and requires an IPL. Customer data is lost.

PU CHECKSTOPPED The processing unit is in a check-stop condition.

PU HARDSTOPPED The processing unit is in a hard-stop condition.

PU IML REQUIRED: The PU must be IMLed to perform the requested function.
Recovery: Perform a PU IML, and retry requested function.

PU IPLED: Requested function requires that the processor not be IPLed.
Recovery: Perform a QCLEAR, and retry the function.

Warning: Performing a QCLEAR alters storage and requires an IPL. Customer data is lost.

PU NOT INITIALIZED: The selected function was not possible because no PU IML was performed.
Recovery: IML the PU, and try the function again.

PUT IN DEVICE TYPE: Prompting message to enter the device type.

PUT IN FROM DISK—ENTER: Prompting message to put in the **FROM** diskette and press ENTER.

PUT IN MODULE ID: Prompting message to enter the module identification.

PUT IN TO DISK—ENTER: Prompting message to put in the **TO** diskette and press ENTER.

QCLEAR RESET REQUIRED:

- Appears if a requested function requires that the machine not be IPLed.
- The channel printer or (QEVC) option was selected when the machine was IPLed.

Recovery: To protect the operator from accidentally overlaying storage, the COPY key to line printer function requires a clear reset. If a customer job is running, a clear reset ends the job. An IPL is required after a clear reset if more programs are to be run.

Warning: Performing a QCLEAR alters storage and requires an IPL. Customer data is lost.

QNORM OR QAN REQUIRED: Storage must be accessed to preserve a compare/trace setting when issuing a clear reset (QCLEAR). This is usually associated with when the machine is in a check-stop state.
Recovery:

1. Perform the QNORM command. Error state is now cleared. Storage should now be able to be accessed.
2. Perform the QCLEAR command.

Note: If the error state has not been cleared:

1. Perform the QAN command. All compare/trace settings are cleared.
2. Perform the QCLEAR command. Error state is now cleared.
3. Reenter any required compare/traces that were cleared.

Warning: Performing a QCLEAR alters storage and requires an IPL. Customer data is lost.

QVA:DIR MISS fxx: A match was not found in the Directory array. For additional information, see the QVT command.

QVA:DLAT MISS uxx: A match was not found in the DLAT array. For additional information, see the QVT command.

QVA:fxx gxxxx: A Directory match occurred. For additional information, see the QVT command.

QVA:uxx DIR MISS fxx: A match was found in the DLAT array, but not in the Directory. For additional information, see the QVT command.

QVA:uxx fxx gxxxx: A DLAT and Directory match occurred. For additional information, see the QVT command.

QVA:uxx fxx gxxxx gxxxx s: A DLAT and Directory match occurred using nonsecondary and secondary space. For additional information, see the QVT command.

QVA:uxx fxx gxxxx s: A DLAT and Directory match occurred using secondary space. For additional information, see the QVT command.

RC=xxxxxxxx: Eight-digit reference code that identifies an error. The reference code is intensified until the ENTER key is pressed. After you press the ENTER key, the reference code returns to normal intensity. Sometimes an extension code displays to aid in analyzing the problem.
Recovery: Go to Volume A01, "START Repair Procedure."

RC/DB MUTUALLY EXCLUSIVE: You tried to invoke the Remote Console Support facility or the Data Bank facility while the other one was invoked. They both rely on the same communications link and are only run on a individual basis.

RCS ACTIVE: Remote Communication Support is active.

RCS ALREADY INITIALIZED: The Remote Console Support facility is already initialized.

READY PRINTER: A print operation was attempted, but the printer (channel) was not ready.
Recovery: Ready the printer, and retry the operation.

RECONFIGURATION ACTIVE: Alternate hardware was substituted for failing primary hardware. Data displayed is from an alternate channel data buffer.

RECONFIGURATION ACTIVE (V): Alternate hardware has been substituted for failing primary hardware. Intensified Vs are displayed over those data columns using the substitute hardware.

REENTER L TO ACTIVATE: Prompting message to enter L to start the activate all function.

REENTER P TO PURGE: Prompting message to enter P to complete the purging function.

REENTER R TO RESET: Prompting message to enter R to complete the reset function.

REENTER SELECTION: Prompting message to enter the selection to complete the function.

REENTER X TO INIT INDEX: Prompting message to enter X to write the block into the index.

REENTER X TO PURGE: Prompting message to enter X to complete the purging function.

REENTER Y TO PURGE: Prompting message to enter Y to complete the purging function.

REFERENCE CODE LOGGED: A reference code was logged.
Recovery: Go to Volume A01, "START Repair Procedure."

REFRESH CLOCK NOT STOPPED: Requested function requires that the refresh clock be stopped.
Recovery: Issue QVW2B maintenance command, and retry the function.

Warning: Stopping the refresh clock alters storage and requires an IML/IPL. Customer data is lost.

REJECTED—BLOCK INVOKED: A compare/trace reset was attempted while a compare/trace selection set by a block is active and in a match-wait state.
Recovery: Halt the block (QBH) before issuing an Address Compare command.

REMOTE CONSOLE NOT INIT: Communications request was not acknowledged because the other console is not initialized.
Recovery: Contact must be made with the other processor to initialize the remote console.

REMOTE LOGON IN PROGRESS: Remote Operator Console Facility (ROCF) is enabled and is processing the logon procedures with another processor.
Recovery: When the logon procedure is complete, the teleprocessing link is established, and the system is made available.

REMOTE OPERATOR SUPPORT HAS BEEN INITIALIZED ON CONSOLE Ty. CONSOLE Tx WAS NOT OPERATIONAL: The remote system console (Tx), selected from the QFB screen for use during Remote Operator Console Facility sessions, was not operational. The remote system automatically selects an alternate console (Ty) for this session.

REMOUNT FUNCTIONAL DISK: Prompting message to install the functional diskette.

REPEAT NEW PASSWORD: This is a prompting message to enter the new password again.

REPEATED PASSWORD WRONG: When repeating the new password, you entered it incorrectly.
Recovery: Enter the new password correctly.

REQUEST: A REQ (Request) key attention status was queued because the device was busy executing a command. When the current operation is completed, the attention status is presented to the channel, and the request indicator is cleared. A system or selective reset also clears the request indicator.

RINGS RESET: xxxx: All rings or displayed rings have been reset. xxx can be displayed as "ALL" or "rxx" (ring number).

ROCF ACTIVE: The host system has an active session in process with the 4381 through the RSF link.

ROCF LINK DISCONNECTED: The ROCF link has been disconnected, and the system has been powered off. SYS POWER OFF message is also displayed at this time.

ROCF MONITOR ACTIVE: The Remote Operator Console Facility is enabled and waiting for incoming calls from the host system.

SAVE DATA SET (Y/N): A prompting message to enter Y to save the data set or a N to purge it.
Recovery:

- If you want to save the data set, enter Y next to COMMAND and press ENTER. The message DATA SET SAVED is displayed.
- If you do not want to save the data set, enter N next to COMMAND and press ENTER. The message DATA SET NOT SAVED is displayed.

SAVED: The information was successfully saved.

SAVED SCREEN AREA FULL: Saved Screen area is full when you configured the COPY key to the diskette.
Recovery:

- If you want to save a screen(s), erase a saved screen or purge all saved screens (see the QEV command).
- If you do not want to overlay the indicated screen, leave this procedure by entering a different command or by pressing the MODE SEL key.

SAVED - PU IML REQUIRED: Save function (from the PU Configuration screen) was performed. The values on the diskette were altered and a PU IML is required to update the processor.
Recovery: Perform a PU IML.

Warning: If the machine has been IPLed, performing this function alters storage and requires an IML/IPL; therefore, a loss of customer data results.

SAVED-title: A screen was successfully saved on the diskette.

SEC KEY OFF: The keyboard is locked because the security key is in the locked (off or removed) position. Screen is blank, except operator information area.
Recovery: Turn key to the ON position.

SEE ERROR MESSAGE: See the error message on line 20.

SELECTION COMPLETE: The selected function processed successfully.

SENDING DATA GROUP ____: This status message indicates that data is being sent to or from the support system. The underscored field is continuously updated with a sequential number to indicate data transfer status.

SENDING SBA MAINT CMD xx: This status message indicates that maintenance command xx is in the process of being sent.

SERIAL NO. DOES NOT MATCH: The diskette image machine serial number does not match the processor serial number.
Recovery: Install the proper diskette, and retry the function.

SERIAL NO. READY TO LOCK: The machine serial number entered does not have a syntax error.
Recovery: Use LOCKSERNUM to secure the serial number.

SP DUMP FAILED: Attempted SP dump failed.
Recovery: Ensure the diskette is properly installed in the diskette drive, and retry the function.

SP DUMP IN HEX LOC xxxxx: The SP dump from the diskette-to-main-storage is complete, and begins at address location xxxxx.

SP DUMP SUCCESSFUL: The SP dump was successful.

STAT CHECK: Processor status unreliable.
Recovery: Perform a system reset (QCLEAR) or a PU IML. If the failure persists, go to Volume A01, "START Repair Procedure."

Warning: Performing a QCLEAR alters storage and requires an IML/IPL; therefore, a loss of customer data results.

STORAGE C/T ACTIVE ON QA__: This is an information message to indicate the active storage compare/trace.

STORAGE ERR - REIPL NEEDED: The system has been stopped by an irrecoverable storage error. The START key is disabled because the condition of storage cannot be determined.
Recovery: IPL the system using the Clear reset (QLL) option.

SUCCESSFUL END - RETURN FUNCT DISKETTES: Prompting message to install the functional diskettes into the diskette drives.

SUPPORT BUS FAILURE: The PU logic reset failed during IML or a support bus error was detected.
Recovery: Perform an IML. If the failure persists, go to Volume A01, "START Repair Procedure."

SYNTAX ERROR: An error occurred in the editing fields. The cursor is positioned beneath the data in error.
Recovery: Key in the correct data, and press ENTER.

SYS: Indicates the processor is being used for productive work (either running instructions or processing I/O information).

SYS POWER OFF: The ROCF link has been disconnected, and the system has been powered-off. ROCF LINK DISCONNECTED message is also displayed at this time.

SYSTEM ERROR: An internal error occurred in the processor. A reference code indicates the source:

EC900060	Coding error (Ref Code)
EC90EC60	Start or stop attempt failed (Ext Code)
F4900060	Diskette I/O error (Ext Code)
F8900060	NDS Display error (Ext Code)
FD900060	Scan ring failed to cycle properly (Ext Code)
ED900060	Path from the SP to the PU failed (Ext Code)

Recovery: Retry the command function. If the error persists, go to Volume A01, "START Repair Procedure."

SYSTEM IS IMLED: The system dialed by the operator has been IMLed. An IML of the system alters the present IML status.

SYSTEM IS IPLED - CURRENT PSW IS xxxxxxxx xxxxxxxx: The system dialed by the operator has been IPLed. The current PSW of this system is xxxxxxxx xxxxxxxx. An IPL of the system alters the present status.

SYSTEM IS IPLED - MACHINE IS IN A CLOCKED STOPPED STATE: The system dialed by the operator has been IPLed and is in a clock-stop state. An IPL of the system alters the present status.

SYSTEM IS IPLED - MACHINE IS IN A ERROR STOPPED STATE: The system dialed by the operator has been IPLed and is in a error-stop state. An IPL of the system alters the present status.

SYSTEM RESET REQD: An attempt was made to use the MODE SEL or CHG DPLY key while the system was in a clock-stop state, and the console was busy with an operating system operation.
Recovery: Perform a program reset (QNOR), clear reset (QCLE), or an IPL.

S/370 IML REQUIRED: The system is not IMLed for S/370 mode.
Recovery: IML the system in S/370 mode.

TAPE NOT OPERATIONAL: The specified tape drive is not operational.
Recovery: Verify that the correct tape drive is used, and that the tape unit and tape control unit are operational.

TARGET CONFIGURED PU: The targeted processor is not configured.
Recovery: Target the configured processor to perform the function.

TARGET PU0 OR 1 REQUIRED: Only one processing unit can be targeted for this operation.
Recovery: Select the correct processing unit (see "T TARGET PU-SWITCH" on page 9).

TEST DAKO: Indicates one of the following:

D Diagnostic mode was (or is) active. Perform an IML to clear this indication.

A Compare/Trace (QA) active.

K Check Control (QK) active.

O Operation Rate (QO) active.

- If TEST alone appears, CE Mode is active.

THE CSAR HAS BEEN SET: The Set Control Storage Address Register (QVG) function has been invoked.

THE INVALID PASSWORD SECURITY COUNT IS xxx. UNAUTHORIZED ACCESS TO THE REMOTE OPERATOR CONSOLE FACILITY MAY HAVE BEEN ATTEMPTED: More than 10 incorrect passwords were entered from this and previous sessions. The actual number of passwords replaces (xxx). An unauthorized user may have attempted to gain access to the remote system. Note that any incorrect password is counted, even if a good password is subsequently entered.

TITLE TRUNCATED: Twenty-nine characters of the new title were saved. The QEVL retitle function is limited to 29 characters.

TO CANCEL, PRESS ENTER: Prompting message to indicate that the function can be cancelled by pressing the ENTER key.

TODC PRESERVED: The TODC value is still valid (it is synchronized to the latest TODC setting).

TRACE CONTROLS RESET: An active trace control setting was reset because storage was not accessible when the clear system reset command was issued.
Recovery: Reselect the desired trace control setting.

TRACE/DATA COMP NOT RESET: The entered command required a trace or data compare to be reset, but the PU was in a clock-stop state or had a machine check. The command turned off the trace or data compare in hardware, but did not reset the microcode.
Recovery: Perform a system reset, or place the processor in instruction step mode. Reenter the normal address compare function.

TRANSFER HALTED: An SP common adapter code interface failed during a transfer.
Recovery: Return to the Module Transfer (QFM) screen, and rerun the module transfer function.

UNEXPECTED STOP OCCURRED - BUILD PROCESS ABORTED: A condition occurred causing the build process to be cancelled.
Recovery: Retry the function. If the failure persists, go to Volume A01, "START Repair Procedure."

USAGE CONFLICT: A previous request was not completed, or the START, STOP, INTR, MODE SEL, CHG DPLY, SPM/O, or DIAG key was pressed while another display console was already in manual mode.
Recovery: Press the RESET key to clear messages. To activate function keys for the display, find the console that is in manual mode, and press the CHG DPLY key. Now the function keys can be activated.

USE MODE SEL TO EXIT TEST: This is a prompting message to press the MODE SEL key if you want to leave the Console Test Pattern (QFP) screen.

VERIFY CORRECT DISKETTES: Ensure the correct diskettes are installed in both disk drives.
Recovery: Check line two of the patch for the correct diskettes. Ensure the correct diskettes are installed in the correct disk drives. Retry the function.

WAIT: Processor is in the wait state. Look at the Wait indicator on the operator control panel for a more accurate indication of actual machine wait state.

WARNING: CHECK ERROR: A CRC (CHECKSUM) error occurred.
Recovery: Enter the correct CRC value.

WARNING: CHECK ERROR (xxxx): A CRC (CHECKSUM) error occurred.
Recovery: Enter the CRC value (xxxx) in this message.

XA: Processor is operating in S/370XA mode.

xx MASK CODE ERROR:
Recovery: Redisplay the screen, and retry the function. If message persists, invoke your support structure.

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