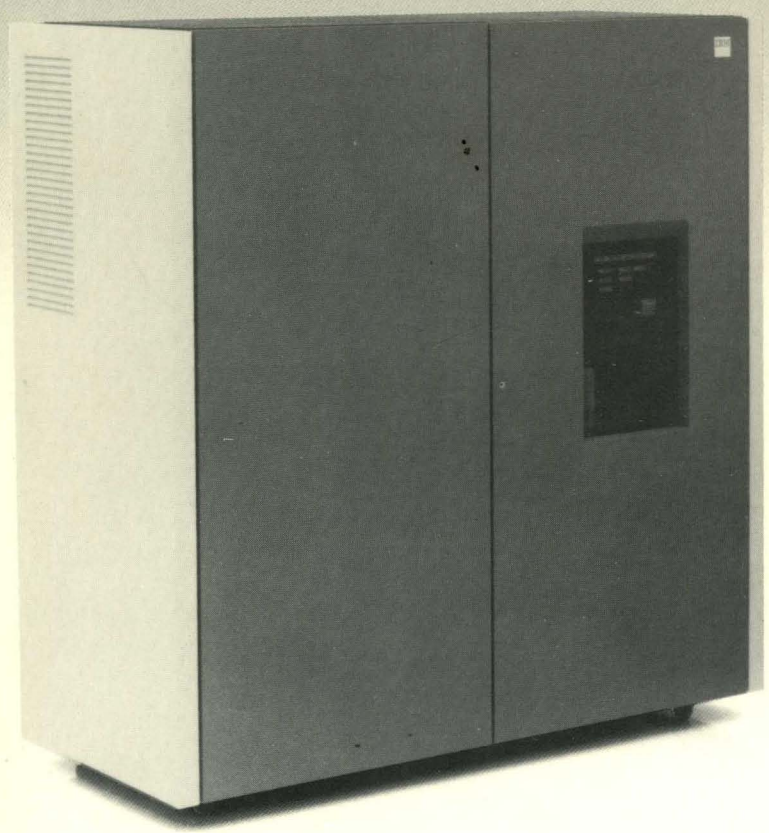
IBM

4381 Processor Operations Manual



GX24-3971-0

4381 Processor Operations Manual

Publication Number: GA24-3949-0
File Number: 4300-01

Federal Communications Commission (FCC) Statement

Warning: This equipment generates, uses and can radiate radio frequency energy and, if installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide a reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference; in which case the user, at his own expense, will be required to take whatever measures may be necessary to correct the interference.

First Edition (February 1984)

Information contained in this manual is subject to change from time to time. Any such change will be reported in subsequent revisions or through the System Library Subscription Service (SLSS).

It is possible that this material may contain reference to, or information about, IBM products (machines and programs), programming, or services that are not announced in your country. Such references or information must not be interpreted to mean that IBM aims to announce such IBM products, programming, or services in your country.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

A form for reader's comments is provided at the back of the publication. If the form has been removed, comments may be addressed to the IBM Systems Technology Division, Product Publications, Dept. K10, P.O. Box 6, Endicott, NY 13760. IBM may use or distribute any of the information you supply in any way that it believes appropriate without incurring any obligation whatever. You may, of course, continue to use the information you supply.

© Copyright International Business Machines Corporation 1984

Preface

This publication contains reference and instructional information necessary to operate the 4381 Processor and is designed for:

- System operators who perform startup procedures, monitor and control system operation, and respond to operating problems.
- System programmers and analysts who program and modify the system configuration.

Operating information related to programs and input/output devices is not included in this manual. Information on these subjects can be found in the documents listed in "Associated Publications," which is at the end of this Preface. A list of the screens in this manual is on pages xii and xiii.

The readers are assumed to have:

- Basic computer knowledge or have operated other related data processing equipment, or
- Previous computer operating experience on a similar system.

This publication is divided into five sections: **Operator**, **Programmer/Analyst**, **Directed Use**, **Messages**, and **Index**. The page numbers in the **Operator** section contain the prefix **OPR**. The page numbers in the **Programmer/Analyst** section contain the prefix **PRG**. The page numbers in the **Directed Use** section contain the prefix **DIR**. The page numbers in the **Messages** section contain the prefix **MSG**. The page numbers in the **Index** contain the prefix **X**. A brief description of each section follows.

Operator

The Operator section contains the following:

- **Introduction** – This section identifies and describes the processor components. A brief description of the available optional features for the system is also included.
- **Diskette Drive** – This section contains procedures for handling, inserting, and removing diskettes.
- **Controls and Indicators** – This section identifies and describes all operator console controls and indicators. It can be used for reference or introductory information.
- **General Procedures** – This section describes this document and how it is organized, with special attention given to the screen sequencing and how the screens control the system. This section also compares the features and functions of the 4341 and 4381 (for users who have some knowledge of the former system) and contains detailed procedures for system power-on, initialization, and general operation.
- **Screens** – This section describes the format and use of the display screens used by the operator to control the processor.

Programmer/Analyst

This section describes the display screens that are designed for the system programmer and/or analyst to perform more complex processor functions.

Directed Use

This section describes the format of the display screens that are available to the customer, but which are usually used under the direction of a service representative for processor analysis.

Messages

This section contains error, status, and instruction messages that can appear on the display console, including the messages generated by the Input/Output Control Program (IOCP). This section contains the message as it appears, the meaning of the message, and any recovery procedures that may be necessary.

Index

This section lists the page numbers for the index entries of the document.

Ordering This Publication

If you want to order this entire document (including tabs, binder, text, and binder inserts) use Order No. GA24-3982; by using this number, you will receive a completely assembled document. If you want to order *only* part of this document, use the order number for the appropriate part you want:

- The order number for the binder inserts (spine and front) is GX24-3971.
- The order number for the document text is GA24-3949.
- The order number for the tabs is GX24-3974.

For example, if you just want to order another set of tabs, use GX24-3974. If you want to order only the document text (no binders, tabs or inserts), use GA24-3949.

Associated Publications

- *IBM 4300 Processors, Installation Manual–Physical Planning*, GA24-3667
- *IBM 4381 Processor Summary and Input/Output & Data Communications Configurator*, GA24-3950
- *IBM 4381 Processor Model Groups 1 and 2 Functional Characteristics*, GA24-3947
- *IBM 4381 Processor Model Groups 1 and 2 Channel Characteristics*, GA24-3948
- *A Guide to the 4381 Processor*, GC20-2021
- *IBM 4381 Processor Input/Output Configuration Program User's Guide and Reference*, GC24-3964
- *IBM 4381 Processor Problem Analysis Guide*, GA24-3955
- *IBM 3278 Model 2A Display Console Problem Determination Guide*, GA23-0020
- *IBM 3279-2C Color Display Station, Problem Determination Guide*, GA33-3094
- *IBM 3287 Printer Component Description*, GA18-2001
- *IBM 3287 Printer Operator's Guide*, GA18-2002
- *IBM 3268 Printer Model 2 Planning and Site Preparation Guide*, GA27-3266
- *IBM 3270 Information Display System Color and Programming Symbols* GA33-3056
- *IBM System/370 Principles of Operations*, GA22-7000

- *IBM 370-XA Principles of Operations*, SA22-7085
- *IBM Diskette General Information*, GA21-9182.

Ordering the System Library

The following books comprise the system library for the 4381 Processor; all these books are stocked in Mechanicsburg under Order No. GA24-3981.

- *IBM 4300 Processors, Installation Manual–Physical Planning*, GA24-3667
- *IBM 4381 Processor Summary and Input/Output & Data Communications Configurator*, GA24-3950
- *IBM 4381 Processor Model Groups 1 and 2 Functional Characteristics*, GA24-3947
- *IBM 4381 Processor Model Groups 1 and 2 Channel Characteristics*, GA24-3948
- *A Guide to the 4381 Processor*, GC20-2021
- *IBM 4381 Processor Input/Output Configuration Program User's Guide and Reference*, GC24-3964

By ordering GA24-3981, you receive the above books in a specially designed binder (including a Table of Contents and tabs, GX24-3973) with inserts for the cover and spine, GX24-3969. If you prefer to use your own binder, you can order each document individually. You can also order the tabs (and the Table of Contents) and inserts separately. (Use GX24-3969 to order the binder inserts; use GX24-3973 to order the tabs and Table of Contents.)

Table of Contents

Operator

Introduction . . . . . **OPR 1**
Storage . . . . . OPR 2
Channels . . . . . OPR 2
Modes of Operation . . . . . OPR 2
System Diskette Drives . . . . . OPR 2
Display Console/Keyboard . . . . . OPR 2
Display Screen . . . . . OPR 3
Optional System Consoles and Printers . . . . . OPR 4

Diskette Drive Unit . . . . . **OPR 5**
Diskette Handling . . . . . OPR 6

System Controls and Indicators . . . . . **OPR 9**
Processor Frame . . . . . OPR 9
Service Panel Indicators . . . . . OPR 9
Unit Emergency Switch . . . . . OPR 10
System Controls . . . . . OPR 10
Display Console Control Panel . . . . . OPR 11
3278 Model 2A . . . . . OPR 11
3279 Model 2C . . . . . OPR 13
Security Keylock (Optional) . . . . . OPR 15
Operator Control Panel (OCP) . . . . . OPR 16
Display Console Keyboard . . . . . OPR 18
Typematic Keys . . . . . OPR 18
General Entry Keys . . . . . OPR 19
Cursor Control Keys . . . . . OPR 21
Input Control Keys . . . . . OPR 23
System Function Keys . . . . . OPR 25
Program Function Keys (PF1 to PF12) . . . . . OPR 28
Problem Determination Guide Access Panel . . . . . OPR 29

General Procedures . . . . . **OPR 31**
4341/4381 Comparisons . . . . . OPR 31
Similarities . . . . . OPR 31
Differences . . . . . OPR 31
4381 Enhancements . . . . . OPR 33
Using the Operations Manual . . . . . OPR 34
Operations Manual Screen Information . . . . . OPR 35
Controlling the System . . . . . OPR 36
Display Screens . . . . . OPR 36
Immediate Screen Commands . . . . . OPR 36
Grouping the Screen Functions . . . . . OPR 37
Changing the Screen Selection . . . . . OPR 38
Examples for Changing the Screen Content . . . . . OPR 39
Configuration Screen Group . . . . . OPR 40
Configuration Screen (QFO) Contents . . . . . OPR 42
QFO Change Capabilities . . . . . OPR 43
Powering On . . . . . OPR 44
Program Loading . . . . . OPR 44
Emergency Power Off . . . . . OPR 45
Turning Display Console Power On . . . . . OPR 45
System Diskettes 1 and 2 . . . . . OPR 45
Loading and Unloading the Diskette Drive . . . . . OPR 46
System Power On . . . . . OPR 47
Power-On Procedure . . . . . OPR 47
Channel-to-Channel Adapter Installed and Activated . . . . . OPR 47
Initial Microcode Load (IML) . . . . . OPR 48
Initial Program Load (IPL) . . . . . OPR 49
Switching Between Display and Ptr/Kybd Modes . . . . . OPR 50
Ptr/Kybd to Display Mode . . . . . OPR 50

Display to Ptr/Kybd Mode (System/370 Mode Only) . . . . . OPR 50
Switching Between Manual Control and Operating System Modes . . . . . OPR 51
Fast Selection of Manual Screens . . . . . OPR 52
Fast Selection of Manual Operations . . . . . OPR 52
Returning to a Previous Screen . . . . . OPR 52
Fast Selection of Hexadecimal Calculations . . . . . OPR 53
Paging . . . . . OPR 53
System Power Off . . . . . OPR 54
Without Channel-to-Channel Adapter . . . . . OPR 54
With Channel-to-Channel Adapter . . . . . OPR 54

Operator Screens . . . . . OPR 55
Operation Modes . . . . . OPR 56
Display Mode Screen . . . . . OPR 56
Input and Output Areas . . . . . OPR 56
System Status and Display Console Status Areas . . . . . OPR 56
Status – Line 22 . . . . . OPR 57
Display Line 23 . . . . . OPR 59
Display Line 24 . . . . . OPR 60
Display Console Status Line 25 . . . . . OPR 60
Printer/Keyboard Mode . . . . . OPR 63
Display Area . . . . . OPR 63
Input Area . . . . . OPR 63
Prt/Kybd Indicator Area . . . . . OPR 63
System Status and Display Console Status Areas . . . . . OPR 64
Manual Control (Q Function) Screens . . . . . OPR 65
General Selection (Q) . . . . . OPR 66
General Selection Screen Functions (Left Side of Screen) . . . . . OPR 66
General Selection Screen Functions (Right Side of Screen) . . . . . OPR 69
Program Load (QL) Screen . . . . . OPR 70
Alter IML Parameters (QLI) Screen . . . . . OPR 72
Configuration/Remote (QF) Screen . . . . . OPR 74
Console Color Convergence (QFA) . . . . . OPR 76
Console Color Convergence Utility . . . . . OPR 76
Console Color Convergence Pattern (QFA1) Screen . . . . . OPR 77
Convergence Adjustment Procedure . . . . . OPR 77
Console Test Pattern (QFP) . . . . . OPR 78
System Configuration – Customer (QFO) . . . . . OPR 80
Remote Operator Console Facility (ROCF) . . . . . OPR 82
Remote Operator Console Facility (ROCF) LOGON Screen . . . . . OPR 83
ROCF Messages . . . . . OPR 84
ROCF Screen (QFB) . . . . . OPR 86
ROCF Communication (QFC) . . . . . OPR 89
Configuration – Set Time-of-Day Clock (QFY) . . . . . OPR 90
Setting the Time-of-Day Clock . . . . . OPR 90
Synchronizing Processor and Support Processor Clocks . . . . . OPR 91
Language Support (QFL) Screen . . . . . OPR 92
Problem Analysis . . . . . OPR 94

Programmer/Analyst

Programmer and Analyst Introduction . . . . . PRG 1
System Programmer/Analyst Functions . . . . . PRG 1
Overview of Programmer and Analyst Screens . . . . . PRG 2
Program Load, Check Control, Operation Rates . . . . . PRG 4
System Configuration Functions . . . . . PRG 4
Display and Alter Functions . . . . . PRG 4
Compare and Trace Functions . . . . . PRG 4
Problem Analysis Functions . . . . . PRG 5

Programmer and Analyst Screens . . . . . PRG 7
General Selection (Q) Screen . . . . . PRG 7
General Selecton Screen Functions (Left Side of Screen) . . . . . PRG 8
General Selection Screen Functions (Right Side of Screen) . . . . . PRG 11
Program Load (QL) Screen . . . . . PRG 12
Alter IML Parameters (QLI) Screen . . . . . PRG 14

Operation Rate Screen (QO) . . . . . PRG 16
Check Control (QK) Screen. . . . . PRG 18
Configuration/Remote (QF) Screen . . . . . PRG 20
System Configuration – Service (QFS) Screen. . . . . PRG 22
System Identification Fields. . . . . PRG 22
Power Specification Fields . . . . . PRG 22
TOD Field . . . . . PRG 22
Storage Specification Fields. . . . . PRG 23
Remote Support Facility Specification Fields . . . . . PRG 23
Channel Specification Fields . . . . . PRG 23
System Configuration – Customer (QFO) Screen . . . . . PRG 24
Diskette Identifier Fields . . . . . PRG 25
Assigning the Power-On Control Fields . . . . . PRG 25
Assigning the Console Mode Controls . . . . . PRG 25
Assigning the COPY Key Device. . . . . PRG 25
Using the COPY Key . . . . . PRG 25
Assigning the Optional Byte Multiplexer Channel. . . . . PRG 25
Assigning the Console Ports . . . . . PRG 26
Configuration Selection . . . . . PRG 27
Copying a Screen to the Console Printer . . . . . PRG 27
Copying a Screen to the Channel Printer . . . . . PRG 27
Input/Output Configuration Functions (UCW and IOCP) . . . . . PRG 28
Overview of I/O Configuration in System/370 Mode . . . . . PRG 28
I/O Configuration (QFOI) Screen . . . . . PRG 30
UCW Directory Update (QFOIU) Screen . . . . . PRG 32
How to Change the UCWs for System/370 Mode . . . . . PRG 32
Restrictions in Changing the UCW Directory . . . . . PRG 33
Operation Examples . . . . . PRG 34
Characteristics Selection Tables – Part 1 . . . . . PRG 35
Characteristics Selection Tables – Part 2 . . . . . PRG 36
Characteristics Selection Tables – Part 3 . . . . . PRG 37
Characteristics Selection Tables – Part 4 . . . . . PRG 38
UCW Directory (QFOIC) Screen. . . . . PRG 40
Overview of I/O Configuration in Extended Mode . . . . . PRG 42
IOCP Function Screens . . . . . PRG 43
IOCP Operation Flow Diagram . . . . . PRG 44
IOCP Device Address (QFOID) Screen . . . . . PRG 46
Start IOCP (QFOIS). . . . . PRG 48
Status and Error Messages . . . . . PRG 48
Input Data Set Processing and IOCDS Generation . . . . . PRG 49
User-Initiated Termination . . . . . PRG 49
IOCDS Configuration (QFOISY) Screen. . . . . PRG 50
IOCDS Selection Considerations . . . . . PRG 50
Subchannel Image Listing (QFOIl) Screen . . . . . PRG 52
Subchannel Image Selection (QFOII–QFOIN) Screen. . . . . PRG 54
Display/Alter (QD) Screen . . . . . PRG 57
Display/Alter General Registers (QDG) . . . . . PRG 58
Translate Function of Display/Alter Screens . . . . . PRG 59
Display/Alter Floating-Point Registers (QDF). . . . . PRG 60
Display/Alter Control Registers (QDC) . . . . . PRG 62
Display/Alter Real Storage (QDM). . . . . PRG 64
Displaying the Storage Screens . . . . . PRG 64
Display/Alter Virtual Storage (QDV) . . . . . PRG 66
Altering the Storage Screens . . . . . PRG 66
Address Adjust Operation. . . . . PRG 67
Paging Operation . . . . . PRG 67
Dual Address Space Facility Key (QDK) . . . . . PRG 67
Display/Alter Storage Key (QDK) . . . . . PRG 68
Altering the Storage Key . . . . . PRG 68
Paging Operation . . . . . PRG 69
Display/Alter I/O Device Status (QDS) . . . . . PRG 70
Display/Alter Current PSW (QDP). . . . . PRG 72
Display/Alter Hex Calculator (QD=) . . . . . PRG 74
Compare/Trace Screen (QA) . . . . . PRG 76
Address Compare (QAA) Screen . . . . . PRG 78
Address Compare Trace (QAB) Screen . . . . . PRG 80
Data Contents Compare (QAC) Screen . . . . . PRG 82

Restrictions on Compare Operations . . . . . PRG 83
Data Contents Compare Trace (QAD) Screen . . . . . PRG 84
Instruction Trace (QAI) Screen . . . . . PRG 86
Display Instruction Trace Data (QAS) Screen . . . . . PRG 87
PSW and I/O Trace (QAP) Screen . . . . . PRG 88
Display PSW and I/O Trace Display (QAT) Screen (System/370) . . . . PRG 91
Purge PSW and I/O Trace Data (QATP) . . . . . PRG 92
Display PSW and I/O Trace Data (QAT) Screen (370-XA) . . . . . PRG 93
Purge PSW and I/O Trace Data (QATP) . . . . . PRG 94
Problem Analysis (QP) Screens . . . . . PRG 95
Problem Analysis Option 2, 4, 5, and 6 Screens . . . . . PRG 95
Send Service Information (SSI) – QP4 . . . . . PRG 96
Screen Information to be Supplied by the Customer . . . . . PRG 97
Action: Send Service Information Status Messages . . . . . PRG 98
Send Service Information Status Messages . . . . . PRG 98
Messages Appearing on Line 20 or 23 . . . . . PRG 98
Send Service Service Information – Warning (QP4) . . . . . PRG 100
Processor Option Select Screen . . . . . PRG 101
Command Selection . . . . . PRG 101
Valid Log Selection . . . . . PRG 101
Instruction Loop Analysis Screen . . . . . PRG 102
Logout of Channel and I/O Error Screen . . . . . PRG 103
Software Problem Isolation Screen . . . . . PRG 104
CMWP and INV Bit . . . . . PRG 104
Microcode Loop Analysis Screen . . . . . PRG 105
External Registers Screen . . . . . PRG 106
IML Error Analysis Screen . . . . . PRG 107
Customer Data Security Control Screen . . . . . PRG 108
Customer Security Selections . . . . . PRG 108
Password Protection Initiation . . . . . PRG 108
Data security Initiation . . . . . PRG 108

Directed-Use

Introduction to Directed-Use Functions . . . . . **DIR 1**
Directed-Use Functions . . . . . DIR 2
Block and Patch Operations . . . . . DIR 2
Error Logouts . . . . . DIR 2
Remote Operator Console Initialization . . . . . DIR 2

Directed-Use Screens . . . . . **DIR 3**
Block (QBT) Screen . . . . . DIR 3
Displaying the Block List . . . . . DIR 3
Block Save Area (QBS) Screen . . . . . DIR 5
Label Identification . . . . . DIR 5
Display Patch List (QBTP) Screen . . . . . DIR 6
Patch Status . . . . . DIR 6
Microcode Patch Implementation Concepts . . . . . DIR 7
IML Names – Run Block at IML (QBM) . . . . . DIR 9
Error Display (QE) Screen . . . . . DIR 10
Displaying the Error Display Options . . . . . DIR 10
Time-of-Day Clock Equivalent . . . . . DIR 10
Diskette Analysis (QED) Screen . . . . . DIR 11
Using the QED Screen . . . . . DIR 11
Diskette Analysis Display Screen . . . . . DIR 12
Device Status Meanings . . . . . DIR 13
Channel Interface Logout Summary (QEI) Screen . . . . . DIR 14
Channel Interface Logouts (QEID) Screen . . . . . DIR 15
Displaying the QEID Screen . . . . . DIR 15
Label Identification . . . . . DIR 15
RSF Line Error Statistics (QEL) Screen . . . . . DIR 17
Processing Unit Logout Selection (QEP) Screen . . . . . DIR 18
Processing Unit Logout Directory (QEPD) Screen . . . . . DIR 19
PU Logout Directory Fields . . . . . DIR 19
Processing Unit Microword Logout Directory (QEPS) Screen . . . . . DIR 21
PU Microword Logout Directory Fields . . . . . DIR 21

Reconfiguration Data (QEPR) Screen . . . . . DIR 22
Logout TOD Equivalent. . . . . DIR 22
Reference Code Logouts (QER) Screen . . . . . DIR 23
Reference Code Logout File (QERD) . . . . . DIR 24
Reference Code Logout Fields . . . . . DIR 24
Support Processor Logout (QES) Screen. . . . . DIR 25
Support Processor Logout Summary (QESD) Screen . . . . . DIR 26
SP Logout Summary Field Definition . . . . . DIR 26
Support Processor Detail Log (QESDXX) Screen. . . . . DIR 27
Support Processor Detail Log Fields . . . . . DIR 27
The Screens for the SP Event Counters (QESE) . . . . . DIR 28
Total and Delta Columns . . . . . DIR 28
Support Processor Events Counted. . . . . DIR 28
Displaying the Saved Screens (QEV). . . . . DIR 30
QEV Screen Description . . . . . DIR 30
QEV Commands. . . . . DIR 30
Power Error Logouts (QEW) . . . . . DIR 32
Power Error Logout Directory (QEWD) Screen. . . . . DIR 33
Power Error Logout (QEWDXX) Screen . . . . . DIR 34
Remote Console Initialization (QFR) Screen . . . . . DIR 35
Remote Operator Console Program Function Keys . . . . . DIR 36
Change Status Display Mode . . . . . DIR 37

Messages

Messages for Manual Control Mode. . . . . **MSG 1**

Input/Output Control Program (IOCP) Messages. . . . . **MSG 35**

Index. **X-1**

Screen List

Abbreviation	Screen	Page
DIS	Display Mode	OPR 56
LOG	ROCF LOGON	OPR 83
MAN	Manual Control Mode	OPR 65
PRT	Printer/Keyboard Mode	OPR 63
Q	General Selection	OPR 66, PRG 7
QA	Compare/Trace	PRG 76
QAA	Address Compare	PRG 78
QAB	Address Compare Trace	PRG 80
QAC	Data Contents Compare	PRG 82
QAD	Data Contents Compare Trace	PRG 84
QAI	Instruction Trace	PRG 86
QAP	PSW and I/O Trace	PRG 88
QAS	Display Instruction Trace Data	PRG 87
QAT	Display PSW and I/O Trace Data	PRG 91
QBM	IML Names - Run Block at IML	DIR 9
QBS	Block Save Area Display	DIR 5
QBT	Block/Patch Display List	DIR 3
QBTP	Display Patch List	DIR 6
QD	Display/Alter	PRG 57
QD=	Hexadecimal Calculator	PRG 74
QDC	Display/Alter Control Registers	PRG 62
QDF	Display/Alter Floating Point Registers	PRG 60
QDG	Display/Alter General Registers	PRG 58
QDK	Display/Alter Storage Key	PRG 68
QDM	Display/Alter Real Storage	PRG 64
QDP	Display/Alter Current PSW	PRG 72
QDS	Display/Alter I/O Device Status	PRG 70
QDV	Display/Alter Virtual Storage	PRG 66
QE	Error Display	DIR 10
QED	Diskette Analysis Selection	DIR 11
QEDXX	Diskette Analysis Display	DIR 12
QEI	Channel Interface Logout	DIR 14
QEID	Channel Interface Logouts Summary	DIR 15
QEL	RSF Line Error Statistics	DIR 17
QEP	Processing Unit Logout Selection	DIR 18
QEPD	Processing Unit Logout Directory	DIR 19
QEPM	Processing Unit Microword Logout Dir.	DIR 21
QEPR	Reconfiguration Data	DIR 22
QER	Reference Code Logouts	DIR 23
QERD	Reference Code Logout File	DIR 24
QES	Support Processor Logout	DIR 25
QESD	Support Processor Logout Summary	DIR 26
QESDXX	Support Processor Detail Log	DIR 27
QESE	Support Processor Event Counters	DIR 28, 29
QEV	Display Saved Screens	DIR 30
QEW	Power Error Logout Selection	DIR 32
QEWD	Power Error Logout Directory	DIR 33
QEWDXX	Power Error Logout Detail	DIR 34

Screen List

Abbreviation	Screen	Page
QF	Configuration/Remote	OPR 74, PRG 20
QFA	Console Color Convergence	OPR 76
QFB	Remote Operator Console Facility	OPR 86
QFC	Remote Operator Console Communication	OPR 89
QFL	Language Support	OPR 92
QFO	System Configuration – Customer	OPR 80, PRG 24
QFOI	I/O Configuration	PRG 30
QFOIC	UCW Directory	PRG 40
QFOID	IOCP Device Address	PRG 46
QFOIL	Subchannel Image Listing	PRG 52
QFOII	Subchannel Image Selection	PRG 54
QFOIN	Subchannel Selection Display by Device No.	PRG 54
QFOIS	Start IOCP	PRG 48
QFOISY	IOCDS Configuration	PRG 50
QFOIU	UCW Directory Update	PRG 32
QFP	Console Test Pattern	OPR 78
QFR	Remote Console Initialization	DIR 35
QFS	System Configuration – Service	PRG 22
QFY	Configuration – Set Time of Day Clock	OPR 90
QK	Check Control	PRG 18
QL	Program Load	OPR 70, PRG 12
QLI	Alter IML Parameters	OPR 72, PRG 14
QO	Operation Rate	PRG 16
QP	Problem Analysis Selection	OPR 94
QP4	PA – Send Service Information	PRG 96
QP4	PA – Send Service Information – Warning	PRG 100
QP5	PA – Processor Option Selection	PRG 101
QP5	PA – Instruction Loop Analysis	PRG 102
QP5	PA – Logout of Channel and I/O Error	PRG 103
QP5	PA – Software Problem Isolation	PRG 104
QP5	PA – Microcode Loop Analysis	PRG 105
QP5	PA – External Registers	PRG 106
QP5	PA – IML Error Analysis	PRG 107
QP6	PA – Customer Data Security Control	PRG 108

Abbreviations

ACB	address check boundary
AID	attention identification
ALT	alternate
BC	basic control
CHG DPLY	change display
CNCL	cancel
COMM REQ	communications request
CU	control unit
DIAG	diagnostic
DIR	directed use
DISC	disconnect (key)
DSC	disconnected (console addr)
EC	extended control
IML	initial microcode load
INTF	interface
INTR	interrupt
INTV-REQD	intervention required
I/O	input/output
IOCP	input/output configuration program
IPL	initial program load
OCP	operator control panel
OPR	operator
OS	operating system
PA	Problem Analysis
PF	program function
PRG	programmer
PRT-INTV	printer intervention
PRT/KYBD	printer/keyboard
PSW	program status word
PU	processor unit
RC	reference code
REQ	request
ROCF	remote operator console facility
RSC	real storage control
RSF	remote support facility
SEL	select
SP	support processor
S/370	System/370
TOD	time of day
TODC	time-of-day clock
UCW	unit control word
VM	virtual machine
VS	virtual storage
XA	extended architecture

Introduction

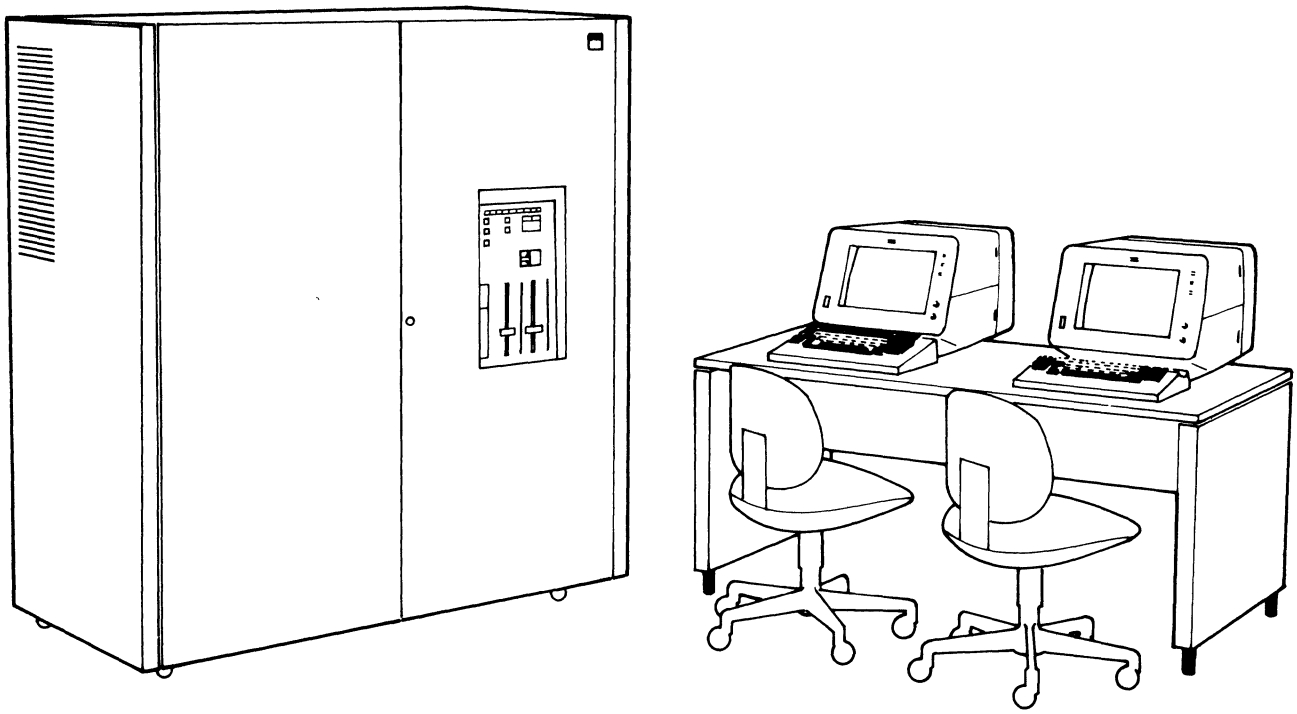


Figure 1. IBM 4381 Processor Complex

The IBM 4381 Processor Complex (Figure 1) consists of the processor frame and an IBM 3278 Model 2A Display Console or IBM 3279 Model 2C Color Display Console. The processor frame contains the instruction processor, channels, support processor, dual diskette drives, and main power supplies.

The support processor:

- Controls the machine power on and off sequence
- Stores error logs on the diskette drive
- Passes messages between the system display console and the operating system
- Monitors operation of the instruction processor.

The support processor loads the instruction processor with the microcode specified by the operator. After the instruction processor is loaded, it contains arithmetic, logic, and control functions to perform the tasks requested by the operating system.

Storage

Processor storage is available in various sizes, depending on the processor being used. (For available storage sizes, refer to your *Functional Characteristics* manual.) A portion of this main storage is used by the system microcode. The data path to and from storage is 16-bytes wide, and either 8 or 16 bytes of data are moved at a time, depending on the operation.

Channels

Many integrated channels are available on the 4381 Processor. Each system has many channels as a standard feature. (For information on channel layout, refer to your *Functional Characteristics* manual.)

On the 4381, block multiplexer channel 5 can be configured as a second byte multiplexer channel.

The 4381 can operate in data streaming mode, a selectable mode which permits some block multiplexer channels to operate at a 3-megabyte data transfer rate. (For complete channel data rates, refer to your *Channel Characteristics* manual.)

Modes of Operation

The mode is selected when you perform an initial microcode load (IML). Two modes of operation are available:

- System/370
- 370-XA.

System Diskette Drives

The system diskette drives are in an opening in the side of the processor frame, which also contains the system controls and status indicators. The diskettes contain the system microcode and permit the recording of system errors for diagnosis.

The diskettes supplied with the system contain the support and instruction processor microcode (required for system operation) and the diagnostics (to be used by the service representative).

Display Console/Keyboard

One IBM 3278 Model 2A Display Console (standard) or an IBM 3279 Model 2C Color Display Console (optional) provides communication with the processor for both operation and maintenance. The operator control panel (OCP) is integrated in the keyboard of the system display console. The console is used for turning power on and off, for performing an IML, and for starting and stopping processor operations. The keyboard and operator control panel operates with both the 3278-2A and 3279-2C. The console contains the controls to:

- Set the processing rate
- Set an address compare stop
- Alter registers and storage areas
- Display the system status.

For maintenance and service support, the console can display and store the 4381 system status and other service information. The console controls the implementation of diagnostic operations.

Up to three additional devices (3278 Model 2A *or* 3279 Model 2C Color Display Consoles, *or* 3268 Model 2 *or* 3287 Model 1, 1C, 2, or 2C printers), for a total of four devices, can be attached.

The 3279-2C Color Display Console and 3287 Printer Model 1C or 2C supply four colors for the 4381 output display; these colors are red, blue, green, and white. These colors are set through the existing protection and intensification characteristics of the fields of the existing display, which are set by the application program. All existing programs that use these characteristics produce color on the display. The character and line presentation on the 3279-2C is identical to the 3278-2A presentation.

The 3279-2C has a color convergence adjustment program for correct color presentation on the screen; this program is fully described in "Console Color Convergence" on page OPR 76 and in the *Problem Determination Guide* in the keyboard.

Display Screen

The 3278-2A or 3279-2C display screen size is 1920 characters, displayed in 24 lines of 80 characters each. An additional line (line 25) is used by the processor for console status display. Lines 1 through 20 are used for operator input and system output. Line 21 is not used for information. The three remaining lines (22 through 24) are reserved for system status information and are not available to the operator.

The bottom line of the display screen (line 25) indicates the console status.

Optional System Consoles and Printers

One or more IBM printers (3268 or 3287) can be attached to provide hard-copy output of system control communications. Each printer occupies one of the three spaces available for additional display consoles (see Figure 2 below).

The 3287 Printer Model 1C or 2C (depending on printer speed) produces an equivalent copy of the 3279-2C display. The 3287-1C Printer operates at 80 characters per second; the 3287-2C Printer operates at 120 characters per second.

The 3279-2C Color Display Console and 3287 Printer (Model 1C or 2C) enable you to use four colors without modifying the programs that were designed for the 3278-2A Display Console and 3287 Printer (Model 1 or 2).

A 3268 Printer (Model 2) also attaches as a console printer. This printer operates at up to 340 characters per second and can be manually selected to 10 or 16.7 horizontal spacing and 3, 4, 6, or 8 lines-per-inch vertical spacing. The 3268 is a monochrome printer.

For optional console and printer descriptions and installation information, refer to:

- *IBM 3287 Printer Component Description,* GA18-2001
- *IBM 3287 Printer Operator's Guide,* GA18-2002
- *IBM 3268 Printer Model 2 Operator's Guide,* GA27-3270.
- *IBM 4300 Processors, Installation Manual–Physical Planning,* GA24-3667.

Figure 2. Attachment Aperture for Optional Devices

Diskette Drive Unit

The diskettes (Figure 3) contain important information for system operation. It is important that the diskettes remain in their original condition; handle the diskettes with care.

To avoid unnecessary handling, the system diskettes should remain in the diskette drives and only be removed when it is necessary to install another diskette. Store additional diskettes in the protective opening in the frame cover. The opening should contain only the diskettes for this machine (labeled by serial number).

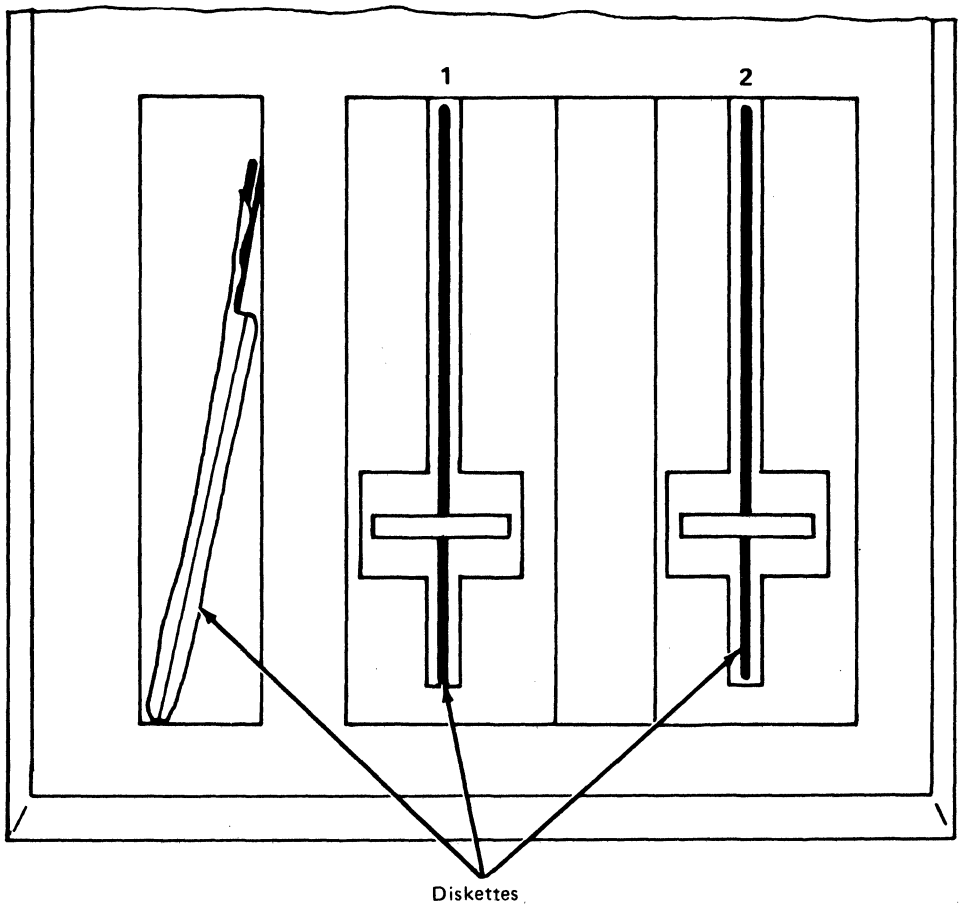
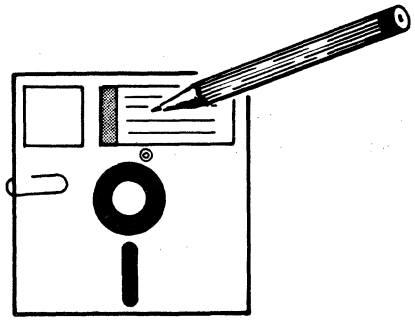


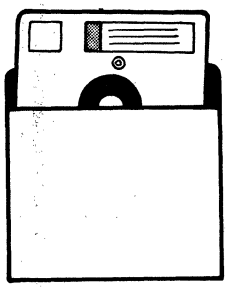
Figure 3. Diskette Drive Unit and Diskettes

Diskette Handling

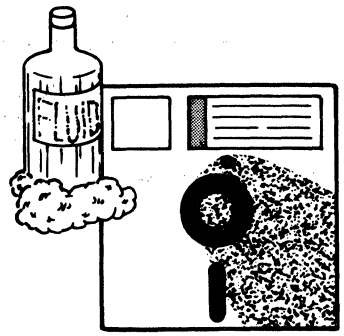
- Never write on the diskette with a pen or pencil. Writing pressure from a pen or pencil can damage the diskette.
- Never put paper clips or clamps on the diskette covers. The cover can tear and the disk inside can be damaged.



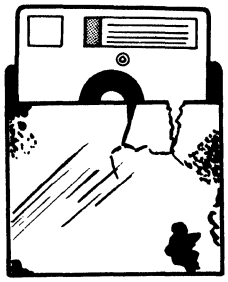
- Always return the diskette to its protective envelope when it is removed from the diskette drive.



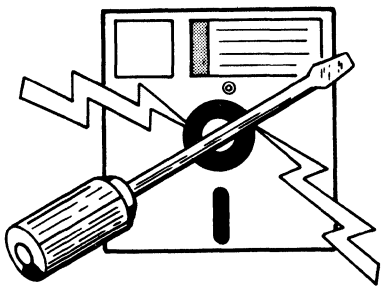
- Do not touch or try to clean the diskette surface. A cleaner can ruin a diskette. Even the salt from your fingers can erode the surface and cause damage to the magnetic surface.



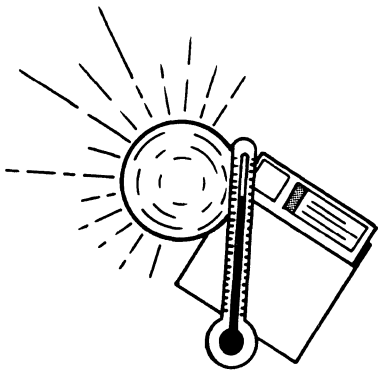
- Replace a diskette envelope if the envelope becomes worn, cracked, or twisted. A worn or damaged diskette can result in errors in the programs.



- Your diskette is magnetically recorded with the programs you run. Keep the diskette away from magnetic fields or from materials that might be magnetized. Your programs can be erased by outside magnetic sources, such as magnetic screwdrivers, magnetic holders, magnetic keys, and other magnetic devices.



- Do not expose diskettes to heat or sunlight; heat can warp the diskette.



System Controls and Indicators

The controls and service panel indicators are in an opening in the side of the processor frame. *These controls are not designed for general use by the operator.* The system display console is used for all operator communication with the system.

This chapter describes the switches, controls, and indicators on the system panel and is to be used for reference only.

Processor Frame

The processor frame of the 4381 has twelve service panel indicators, 5 system controls, and 1 Unit Emergency switch (see Figure 4). The Unit Emergency switch is to be used in *emergency* situations only.

Service Panel Indicators

The row of seven indicators in the top of the opening of the frame display the state of various internal hardware facilities. The five numeric indicators below them (and to the right) are used to display a *maintenance and service subsystem status code* number or a *power code* number. These 12 service panel indicators are for service personnel only; the numeric indicators may be nonzero under normal operating conditions.

Some of the service panel indicators can be on even though processor power is off. Pressing *Power Off* on the operator control panel *does not* remove power from these service panel indicators. To remove power from the service panel indicators, remove power at the wall or floor receptacle; **do not remove system power with the unit emergency switch,** unless you have an emergency situation.

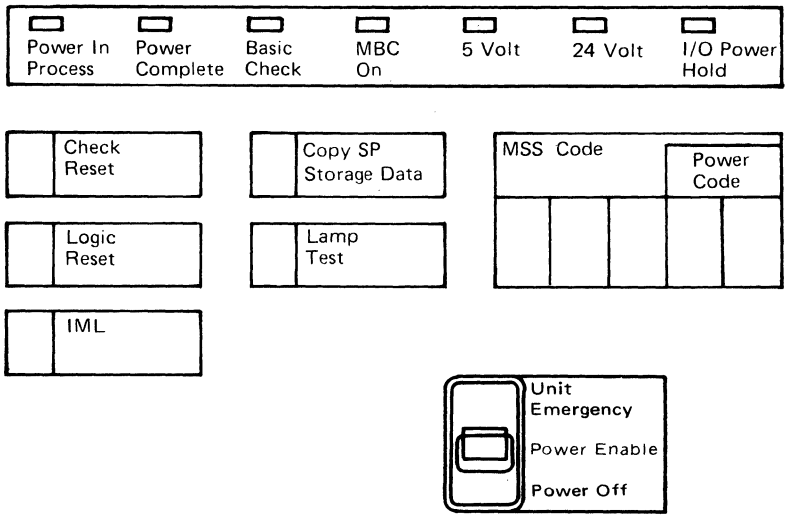


Figure 4. Processor Frame Controls

Unit Emergency Switch

Setting the Unit Emergency switch to *Power Off* removes power from the processor, along with the power to all I/O devices that normally power on and off with the system. The power is not removed from any display console or console printer devices. When this switch is set to *Power Off*, it is locked and cannot be turned on again by the operator. A service call must be placed to restore the switch to the *Power Enable* position.

Note: This switch MUST remain ON for normal operation; it should be set to *Power Off* in an *EMERGENCY* condition only.

System Controls

The 4381 has five system controls (pushbutton switches) in its frame. These controls are to be used by service personnel only. A brief description is given here as reference information for the operator.

Logic Reset Pressing *Logic Reset* causes a support processor reset. Use this control only when you are instructed to do so.

IML Pressing *IML* only loads the support processor with the support processor microcode. A PU-IML from the Program Load (QL) screen is necessary to load the processor microcode and put into effect any changes made to the processor configuration.

Check Reset Pressing *Check Reset* resets the Maintenance Bias Controller (MBC) indicator (on the top row of indicators on the service panel) and any power code indicators that are on.

Copy SP Storage Data Pressing this control causes the contents of support processor storage to be dumped to the functional diskette (FUNC2).

Lamp Test This function tests all indicators on the top row of the service panel and on the operator control panel (OCP).

MSS Code/Power Code Indicators If your system is not operational, and there is no reference code displayed on your console device, the contents of these indicators may be valuable to the service representative. If this state exists, record these values. These indicators may be nonzero under normal running conditions.

Display Console Control Panel

3278 Model 2A

The control panel for the 3278-2A Display Console (Figure 5) includes all controls and indicators on both sides of the display screen. All controls and indicators described on the next two pages are on the 3278-2A Display Console.

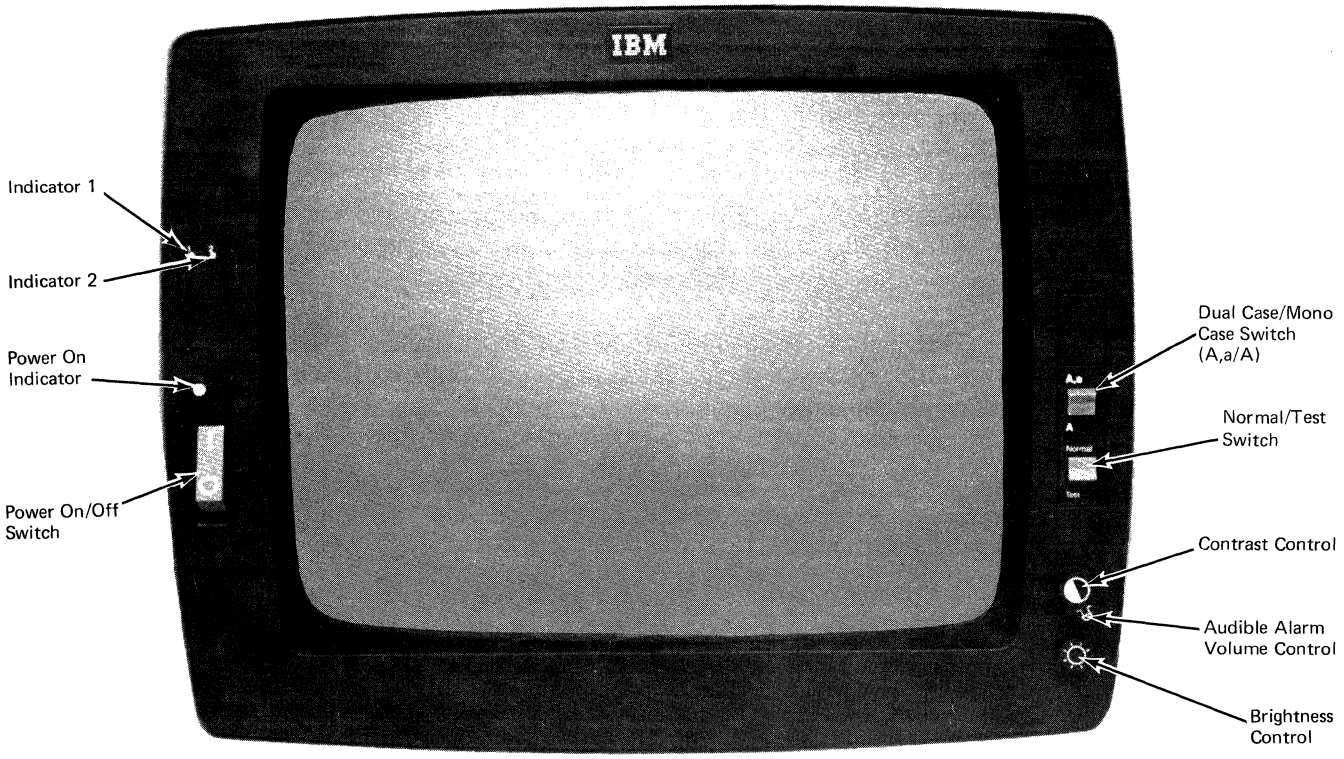


Figure 5. 3278-2A Display Console Control Panel

Power On/Off

This switch controls power to the 3278-2A Display Console only. Setting the Power switch to the ON (|) position applies power to the display console. The red Power On indicator (above the switch) lights when power is on.

Moving the switch to the OFF (O) position removes power from the display console.

Indicator 1

After you turn on the Power On switch, this lights to show that the internal console circuits, which produce the display image, are ready.

Indicator 2

This indicator turns on a few seconds after you turn on the Power On switch and shows that the high voltage circuits in the display console are on.

Dual Case/Mono Case (A,a/A)

This switch determines the case of the alphabet characters displayed on the screen. When this switch is set to Dual Case (Aa), both uppercase and lowercase alphabet characters are displayed on the screen. When the switch is set to Mono Case (A), all alphabet characters are displayed in uppercase on the

screen. However, the actual uppercase or lowercase character is transmitted between the system and the 3278-2A Display Console.

Normal/Test

This switch should be set to the Normal position. It is only used for servicing or testing. If it is set to the Test position during processing operations, a basic check or system reference code can result.

Contrast Control

This control can be adjusted to suit individual choice. When two intensity levels are used to display characters, the contrast control varies the difference between the two levels.

Audible Alarm Volume Control

Turning this control clockwise increases the sound of the display console alarm. Turning the control counterclockwise decreases the sound.

Brightness Control

This control adjusts the brightness of the characters on the screen. Turning the control clockwise makes the display image brighter; turning it counterclockwise makes the image dimmer.

3279 Model 2C

The 3279-2C Color Display Console control panel (Figure 6) includes all controls and indicators on both sides of the display screen. All controls and indicators described on these two pages are on the 3279-2C Color Display Console.

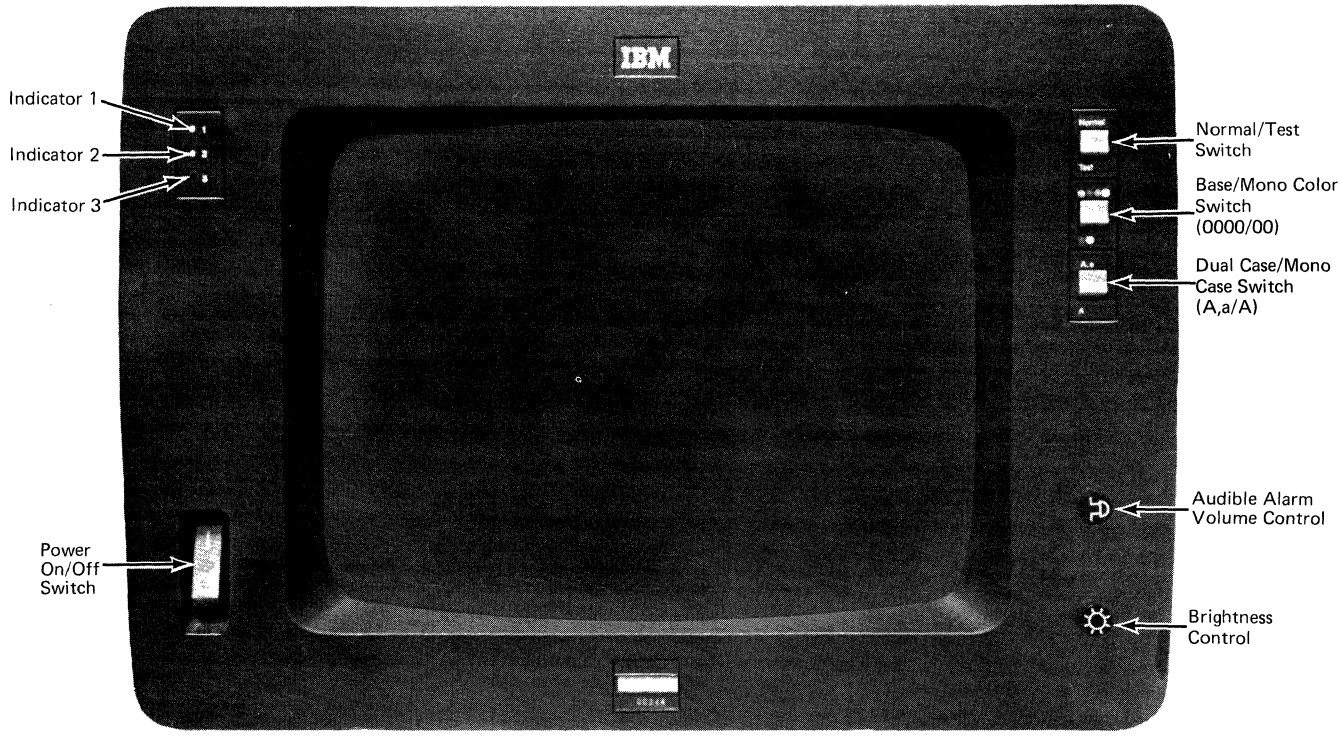


Figure 6. 3279-2C Color Display Console Control Panel

Power On/Off

This switch controls power to the 3279-2C Color Display Console only. Moving the Power switch to the ON (|) position applies power to the display console. Moving the switch to the OFF (O) position removes power from the display console.

Indicator 1

After you turn on the Power On switch, the Power On indicator lights to show that the internal console circuits, which produce the display image, are ready.

Indicator 2

This indicator turns on a few seconds after you turn on the Power On switch and shows that the high voltage circuits in the display console are on.

Indicator 3

This indicator turns on when the Normal/Test switch is set to the Test position.

Normal/Test

This switch should be set to the Normal position. It is only used for servicing or testing. If it is set to the Test position during processing operations, a basic check or system reference code can result.

Base/Mono Color (0000/00)

This switch selects either base color (four color) or monochrome (green only). The base color pattern consists of:

- Green – Unprotected, Unintensified
- Red – Unprotected, Intensified
- Blue – Protected, Unintensified
- White – Protected, Intensified.

Dual Case/Mono Case (A,a/A)

This switch determines the case of the alphabet characters displayed on the screen. When the switch is set to Dual Case (Aa), both uppercase and lowercase alphabet characters are displayed on the screen. When the switch is set to Mono Case (A), all alphabet characters are displayed in uppercase on the screen. However, the actual uppercase or lowercase character is transmitted between the system and the 3279-2C Color Display Console.

Audible Alarm Volume Control

Turning this control clockwise increases the sound of the display console alarm; turning it counterclockwise decreases the sound.

Brightness Control

This control adjusts the brightness of the characters on the screen. Turning the control clockwise makes the display image brighter; turning it counterclockwise makes the image dimmer.

Security Keylock (Optional)

The security keylock, when it is an installed feature (Figure 7), is on the lower right side of the 3278-2A or 3279-2C Display Console. A display console with this feature cannot be used until the key is inserted into the lock and turned to the ON position (clockwise).

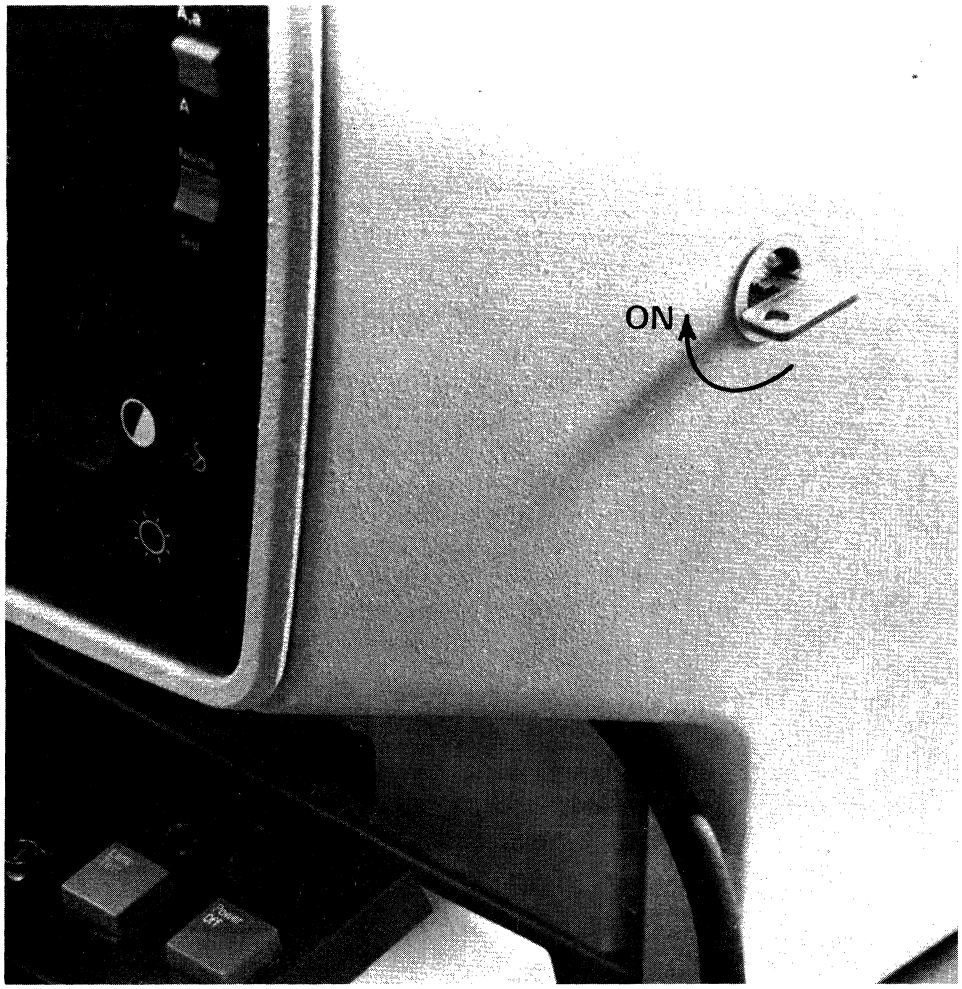


Figure 7. 3278-2A Security Keylock (Optional Feature)

This keylock device is optional for the 4381 when operating in remote operator console facility (ROCF) mode. If the system is not in ROCF mode, the security keylock controls the display console as described above.

If the system is in ROCF mode, the console can be used with the security keylock in both the ON and OFF positions. If the keylock is in the OFF position, the local console screen is blank, keyboard input is ignored, and the 4381 can only be controlled from the host location through the remote operator console facility (ROCF). If there is more than one console at the remote site, they should all be locked for maximum system security.

If the keylock is in the ON position and the system is in ROCF mode, control of the system can be accomplished either from the host location or from the local display console. (For a description of the ROCF conditions, refer to "Remote Operator Console Facility.")

Operator Control Panel (OCP)

The operator control panel (Figure 8) is on the upper portion of the System Display Console keyboard. The OCP controls the system power, the associated support processor IML, and also monitors the system operating states.

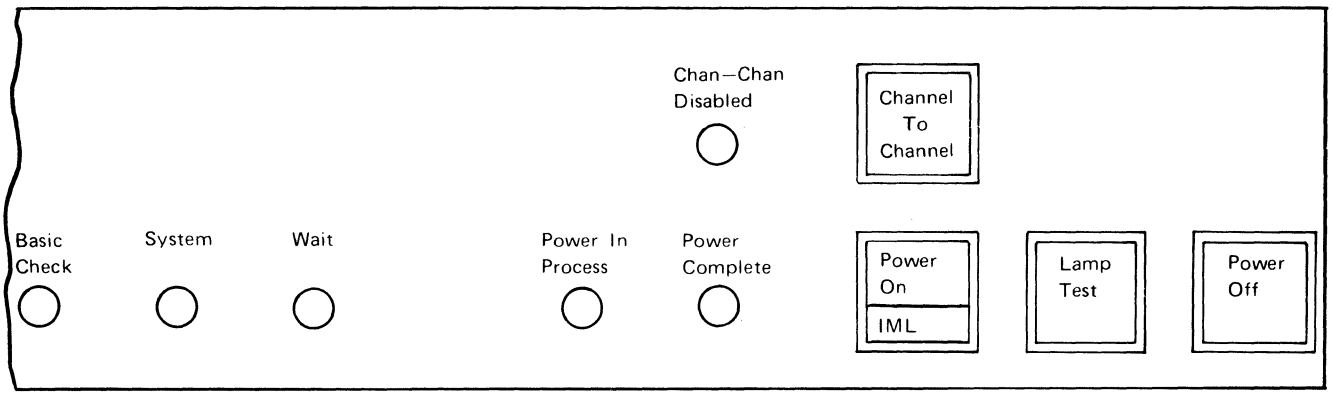


Figure 8. Operator Control Panel

Power On/IML

Pressing this pushbutton switch serves a dual function. When power is off, pressing *Power On* starts system power-on sequencing. The power-on sequence initiates an IML of the support processor microcode. This switch also initiates an IML of the processor unit microcode when IML AT POWER ON is specified on the System Configuration (QFO) screen.

Once the power-on sequence is complete, pressing *Power On/IML* causes only the support processor microcode to be loaded again (re-IML). The processor unit microcode is not reloaded.

Notes:

1. Before the system can be powered on, the 4381 needs 15 seconds of warm-up time after main power is applied.
2. You must wait approximately 30 seconds after pressing *Power Off* before pressing *Power On/IML*, or a basic check results; the cooling fans must have time to stop.
3. Do not activate any other controls during the power-on or IML process.
4. At least one display console must be turned on to power up the 4381.

Power Off

Pressing *Power Off* removes power from the system except for the 3278 Model 2A Display Console or 3279 Model 2C Color Display Console and optional 3278-2A, 3279-2C, 3268-2, and 3287 devices.

Channel-To-Channel and Chan-Chan Disabled Indicator

Channel To Channel and its associated indicator are on systems having the channel-to-channel feature. Pressing *Channel To Channel* (turning the Chan-Chan Disabled indicator off) causes a logical connection between processors for data sharing purposes; when pressed again, this connection is removed and the Chan-Chan Disabled indicator lights.

The channel-to-channel connection should always be disabled (indicator on) before you power down your system. Before you power on/off any 4381 with the channel-to-channel feature, your logically connected processor must be in a soft-stop state. Otherwise, your logically connected processor may be adversely affected.

Lamp Test

This pushbutton switch checks that the operator control panel indicators are working. When machine power is off, pressing this switch causes the Power Complete, Power In Process, and Basic Check indicators to light.

Power In Process

This indicator turns on when the Power On/IML switch is pressed and remains on throughout the power-on sequence. The indicator turns off when the power-on sequence is complete. The indicator also turns on during the power-off sequence.

Power Complete

This indicator turns on when the power-on sequence is complete and remains on during normal use.

Basic Check

This indicator turns on when:

- An error condition exists in the machine during power up.
- An error exists in the support processor while the functional microcode was running (a five-digit MSS code will be displayed with this error).
- The machine is in "service" mode.

The indicator is reset by powering off, as long as the error that turned it on was caused by a recoverable condition. If the indication cannot be reset, refer to the *IBM 4381 Processor Problem Analysis Guide*, GA24-3955, for proper action.

System

This indicator turns on when instruction processing or I/O data transfer is taking place.

Wait

This indicator turns on when there is no instruction processing taking place in the processor.

Display Console Keyboard

Most of the display console keyboard functions (Figure 9) are available in both the stopped and running states of the system. The characters that can be displayed consist of 26 uppercase and 26 lowercase alphabet characters, 10 numeric characters, and 32 symbols and punctuation marks. The keyboard also contains cursor, input, system function, and program function keys.

Keys that have two characters on the key tops can display either character, depending on the position of the Shift key. The lower character displays when the Shift key is not pressed. The upper character is displayed when either the Shift key (⇧) is held down or the Shift Lock key (⇪) is pressed before pressing the character key.

The labels that appear on the face of some keys are program functions and system functions. To select one of these functions, the ALT key must be held down while you press the specific function key.

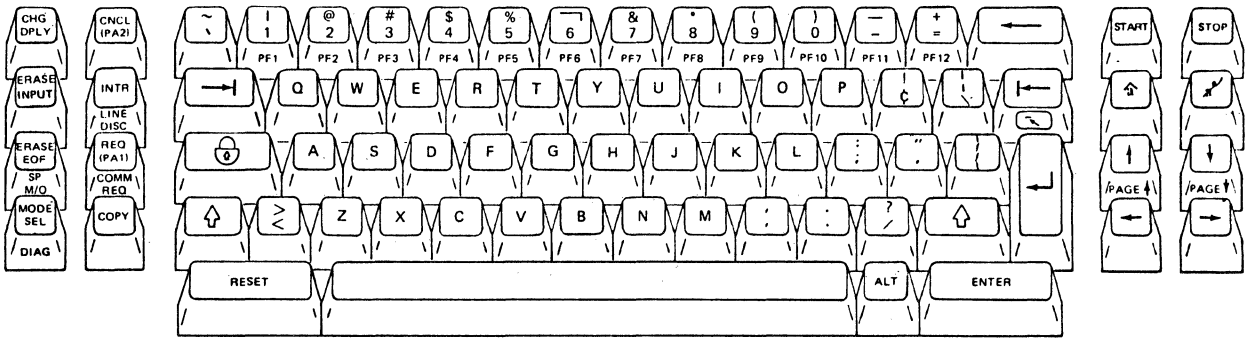


Figure 9. Display Console Keyboard

Typematic Keys

Most of the keys are typematic. When a typematic key is held down, the character or function is repeated approximately ten times per second until the key is released.

The typematic keys include:

- Alphabet
- Number
- Symbol
- Space bar
- Cursor control keys.

General Entry Keys

The general entry keys (Figure 10) enter alphanumeric characters, punctuation marks, and symbols.

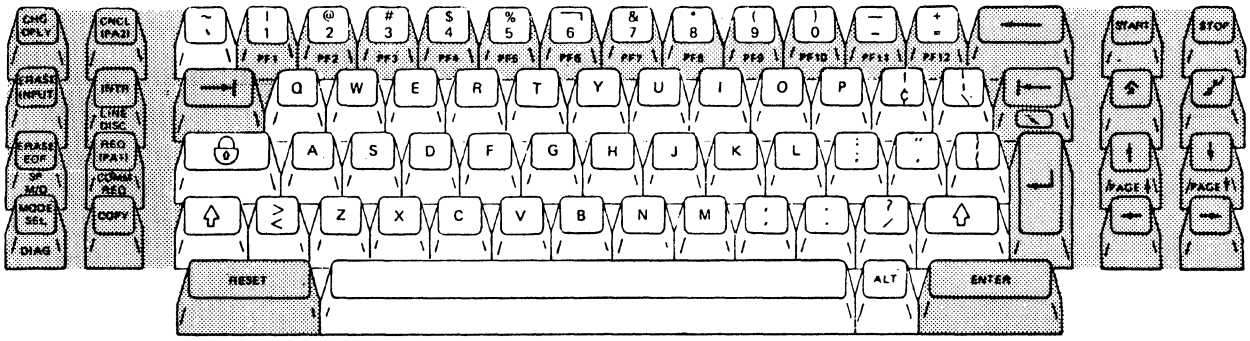


Figure 10. General Entry Keys

Alphanumeric Keys

As you press the alphanumeric keys, the characters appear on the display screen at the cursor location (if entry is allowed at that location). The displayed data is not transferred to the processor until you press the ENTER key. This allows you to visually verify your input. All alphanumeric keys are typematic when held down.

Shift and Shift Lock

The Shift (⇧) and Shift Lock (⇪) keys operate the same as they do on a standard typewriter keyboard. When either the left or right Shift key is held down, the upper symbols shown on the key tops display when their respective keys are pressed. If the character key has no upper symbol (such as the alphabet keys), the Shift key causes the uppercase characters to be displayed on the screen. The left and right Shift keys do not lock; they must be held down.

Pressing the Shift Lock key locks the keyboard in the shifted (uppercase) mode so that the Shift key does not have to be held down when multiple uppercase characters are to be typed. Pressing either Shift key resets the Shift Lock and returns the keyboard to lowercase mode.

Symbols and Punctuation Marks

These characters are divided into two groups because of their physical location. The first group contains the symbols that are on the upper part of the number (1 through 0) keys. The second group are those characters on keys that have two symbols on them. The symbols that appear on the upper half of any key require the Shift key to be pressed for their selection.

All the symbol and punctuation mark keys are typematic when held down.

The following list shows the symbols and punctuation marks available on the display console keyboard:

Number Key	Upper Half of Number Key
1	| (logical OR, vertical bar)
2	@ (at sign)
3	# (number sign)
4	$ (dollar sign)
5	% (percent sign)
6	¬ (logical NOT sign)
7	& (ampersand)
8	* (asterisk)
9	((left parenthesis)
0	) (right parenthesis)

Lower Symbol	Upper Symbol
` (grave accent)	~ (equivalent, similar)
- (minus sign)	_ (underscore)
= (equal sign)	+ (plus sign)
¢ (cent sign)	! (exclamation point)
\ (back slash)	| (broken vertical line)
; (semicolon)	: (colon)
' (apostrophe)	" (quotation mark)
{ (opening brace)	} (closing brace)
< (less than sign)	> (greater than sign)
, (comma)	, (comma)
. (period)	. (period)
/ (slash)	? (question mark)

Space Bar

A space is an actual character that occupies a position on the display screen. When the space bar is pressed, a space is entered on the screen and replaces any character currently in that position. The space bar must not be used to position the cursor. The space bar is typematic when held down.

ALT

The ALT (alternate function) key allows selection of the function that appears on the front of specific keys. To select the alternate function, the ALT key must be held down and the appropriate function key must be pressed.

Cursor Control Keys

The cursor appears on the screen as an underscore to mark the position that the next entered character occupies; the cursor moves one space to the right as each character is entered.

The cursor can be freely moved on the screen by the program. It can also be moved freely from the keyboard without interfering with other characters by using the cursor control keys (Figure 11). There are two types of cursor keys:

1. Those that move the cursor to the first character location in an unprotected field (one where keyboard entry is allowed).
2. Those that move the cursor one character position at a time.

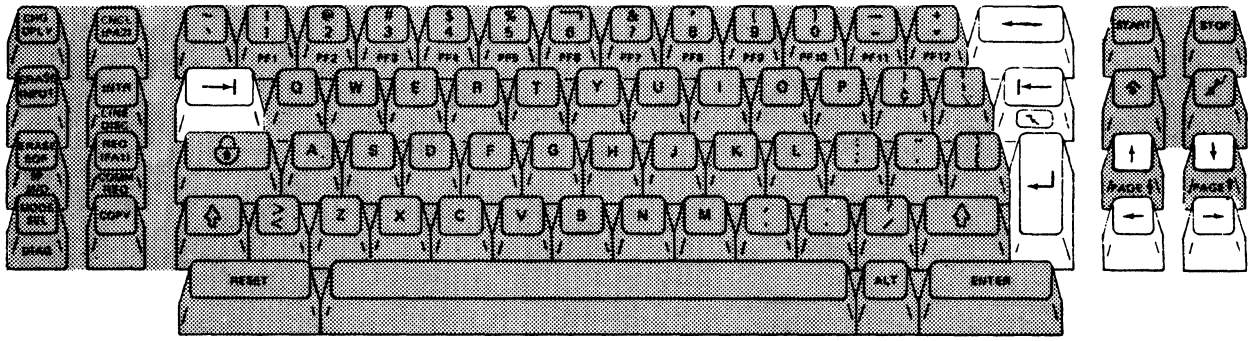


Figure 11. Cursor Control Keys

Tab (→\|)

The Tab key moves the cursor to the first character location of the next unprotected data field. This field may be on the same line or later lines. If the screen is not formatted, or if there are no unprotected data fields, the cursor is positioned at the first character location of line one. The Tab key is typematic and moves the cursor quickly from field to field.

Backspace (←)

The Backspace key moves the cursor one character space to the left. This typematic key operates exactly as the Cursor Left key.

Back Tab (\|←)

The Back Tab key moves the cursor back to the first character position of the input field in which the cursor is located. If the cursor is already in the first character position of an input field, it is moved to the first character position of the prior input field. If the screen is not formatted, or if there are no unprotected data fields, the Back Tab key moves the cursor to the first character position of line one.

Home (↖)

The Home key (ALT key pressed) moves the cursor to the first unprotected character position on the display screen. If there are no unprotected character positions on the screen, the cursor moves to the first character position of line one.

New Line (↵)

The New Line key moves the cursor to the first unprotected character location of the next line. If all character positions of the next line or lines are protected, the cursor moves as many lines as necessary to the first unprotected field. If all character positions on the display screen are protected, the cursor resets to the first character location on the first line. The New Line key is typematic.

Vertical Positioning Keys

The Cursor Up (↑) and Cursor Down (↓) keys move the cursor one space in the direction of the arrow on the key. These vertical positioning keys are effective for all cursor positions on the display screen, including protected fields, although no data can be entered in these fields.

If the Cursor Down key is used to move the cursor off the bottom of the screen, the cursor reappears at the top of the screen in the same column. If the Cursor Up key is used to move the cursor off the top of the screen, the cursor reappears at the bottom of the screen in the same column.

The cursor vertical positioning keys are typematic and continue to move the cursor in the indicated direction when they are held down.

Horizontal Positioning Keys

The Cursor Left (←) and Cursor Right (→) keys move the cursor one space in the direction of the arrow on the key. The horizontal positioning keys are effective for all cursor positions on the display screen, including protected fields, although no data can be entered in these fields.

If the Cursor Right key moves the cursor off the right edge of the screen, the cursor reappears at the left edge of the screen on the following line. If the Cursor Left key moves the cursor off the left edge of the screen, the cursor reappears at the right edge of the screen on the preceding line. The cursor horizontal positioning keys are typematic and continue to move the cursor in the indicated direction when they are held down.

Input Control Keys

The input control keys (Figure 12) erase, insert, or otherwise modify the data entered from the general entry keys.

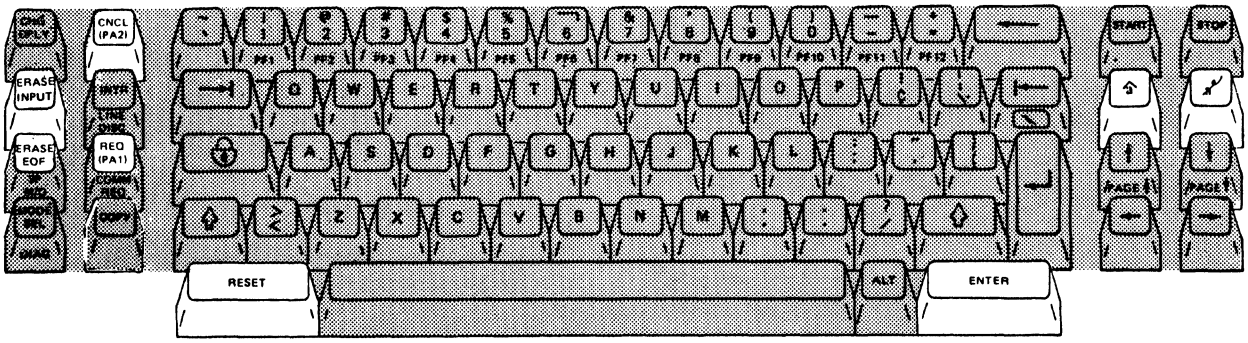


Figure 12. Input Control Keys

Erase Input

The ERASE INPUT key erases all input fields on the display screen and moves the cursor to the first character position of the first input field. If there are no input fields on the screen, nothing is erased and the cursor moves to the first character position of the first line.

When working with an unformatted screen, the ERASE INPUT key erases all character positions and moves the cursor to the first character position of the first line.

Erase EOF

The ERASE EOF (End of Field) key erases all characters from the cursor location to the end of the input field in which it is located. If the display screen is unformatted, all character positions from the cursor to the last character position on the bottom line are erased. The cursor does not move.

This key can be used when incorrect information has been entered in a field. The Back Tab or Backspace key moves the cursor back over the incorrect data and the ERASE EOF key erases the data.

Cncl (PA2)

In display mode, the CNCL key causes an attention status to be generated and an attention identifier (AID) character is set for the CNCL key. The program is responsible for performing a read command to get the AID and determine the function to be performed.

In Prt/Kybd mode, the CNCL key is used to indicate the canceling of a read command in progress. No data is transferred to the processor; only status is transferred to indicate a cancel function.

This key is not used in manual control mode and generally causes a FUNCTION KEY IGNORED error message.

Req (PA1)

In display mode, the REQ key generates an attention status and sets the attention identifier (AID) character for the REQ key. The program is responsible for performing a read command to get the AID and determine the function to be performed.

In Prt/Kybd mode, the REQ key generates attention status. The operating system should generally respond with a read command to allow data to be entered.

The REQ key is not used in manual control mode and generally causes a FUNCTION KEY IGNORED error message.

Reset

The RESET key restores the keyboard to the normal mode of operation. If you try to enter or change data in a protected field, the keyboard is stopped and the INHIBITED message displays at the bottom of the display screen. The RESET key removes the inhibited condition and allows the cursor to be positioned at an input field.

The RESET key also removes the display console from insert mode.

Enter

In display mode, the ENTER key generates an attention status and sets an attention identifier (AID) to indicate the ENTER key was pressed. The program is responsible for performing a later read command to get the AID and any entered data.

In Prt/Kybd mode, the ENTER key signals completion of input for a read command and transfers entered data to the processor.

In manual control mode, pressing the ENTER key performs the requested function.

Insert (a)

The Insert key inserts a character or string of characters where the cursor is located, without disturbing the information already displayed there. In insert mode, all the keyboard control keys operate normally and INSERT MODE is displayed at the bottom of the screen.

The RESET key restores the display console to normal operation.

Delete (a)

Pressing the DEL key when the cursor is located in an unprotected field deletes the character at the cursor position. The character is erased without leaving a blank space and all characters in the field to the right of that position on the same row are shifted one position to the left. The DEL key is active for display, Prt/Kybd, or manual control mode.

System Function Keys

The system function keys (Figure 13) are used to control operation of the system and the display console screens.

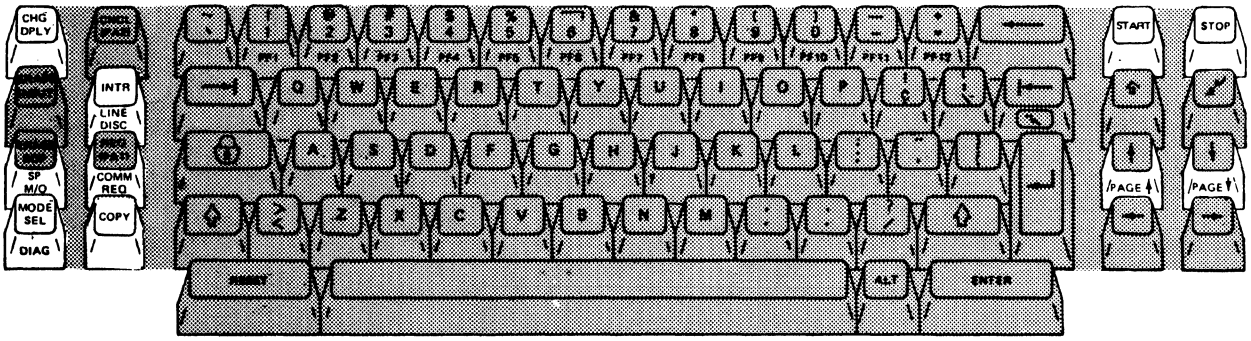


Figure 13. System Function Keys

Chg Dply

The CHG DPLY key changes the display console from the most recently used manual screen (manual control mode) to the operating system screen, and back. However, if the last manual function was a Z exit (Return to Prog Sys), pressing the CHG DPLY key displays the General Selection screen.

SPM/O

The SPM/O (support processor manual operations) key is reserved for use by the service representative.

Mode Sel

The MODE SEL key starts the manual function and displays the General Selection screen. The state of the machine is not changed when you press the MODE SEL key; the only difference is that the screen cannot be used by the operating system. The most recent display of the operating system is stored by the processor for later use.

To return to the operating system screen from any manual screen, either press CHG DPLY (if the return is temporary) or (if no further use of the manual functions is required at the time), key **Z** and press ENTER.

Copy

The COPY key can be used any time a console printer is attached to the system. Pressing this key causes the printer to make a copy of the information displayed on the screen.

The COPY key cannot operate when a hard-copy device is not installed or a copy key device has not been assigned on the QFO screen.

Diag

This diagnostic function key is to be used by the service representative.

Intr

The INTR key is used to request an external interruption. The key is active from any display console during normal processing operations.

When a display console is placed in manual control mode, the INTR key is active

only from that console. The key will not operate on any other consoles.

Line Disc

The LINE DISC (line disconnect) key is used to disconnect the remote operator console facility (ROCF) link and the remote support facility (RSF) link. In a normal environment, this key can be used to end an ROCF session.

Comm REQ

The COMM REQ (communications request) key displays an intensified COMMUNICATION REQ message on line 24 when the ROCF link is active. This message requests the controlling operator to select the QFC screen so that messages can be exchanged between the host and remote locations.

In a service environment, this key is used to start voice or terminal communications between an on-site service representative and a remote specialist.

Start

When in operating systems mode, pressing the START key from any display console causes the system to start processing. The key has no effect when:

- Processing is already in progress
- The system is in a wait state
- The system is in the check-stop state.

When a display console is placed in manual control mode, the START key is active only from that console. The START key will not operate on the other consoles.

Stop

Pressing the STOP key places the system in the manual state after the current instruction has been processed and all waiting interruptions have been serviced. This key is active from any display console, as long as the system is in operating mode. Pressing the STOP key also causes the processor to enter I/O *supress* mode; no queued I/O operations are tried again.

If the STOP key is pressed while the console printer is printing, the printer completes the operation. The STOP key is inactive if a maintenance or log display program is running.

When a display console is placed in manual control mode, the STOP key is active only from that console. The key will not operate on the other consoles.

Page Up and Page Down

The Page Up (PAGE ↑) and Page Down (PAGE ↓) functions are only active in manual control mode. The page keys increase or decrease storage addresses to display new blocks of storage on the screen. The amount that the address increases or decreases is determined by the manual function being performed.

To increase the address of the storage display, hold the ALT key and press the Page Up key. To decrease the address of the storage display, hold the ALT key and press the Page Down key.

The message PAGING KEY IGNORED appears on line 20 when:

- The paging keys have no significance to the function being performed,
- The address that is generated by paging is either too high or too low for the function, or
- The previous command had a nonpaging error.

Program Function Keys (PF1 to PF12)

In addition to the functions permanently assigned to system function keys, application programs can assign other program functions to the program function (PF) keys (Figure 14). To activate a program function, press and hold the ALT key and press the appropriate PF key.

In display mode, these keys generate an attention status and set an attention identifier (AID), which identifies the key pressed. The operating system program is responsible for performing a later read command to get the AID and any entered data. The appropriate function to be performed is determined from the AID character.

In Prt/Kybd mode, the program function keys clear the ALARM indicator and unlock the keyboard.

In manual control mode, use of the program function keys is determined by the displayed screen. In manual control mode, when the Q screens are in operation, PF12 is used to redisplay the previous command.

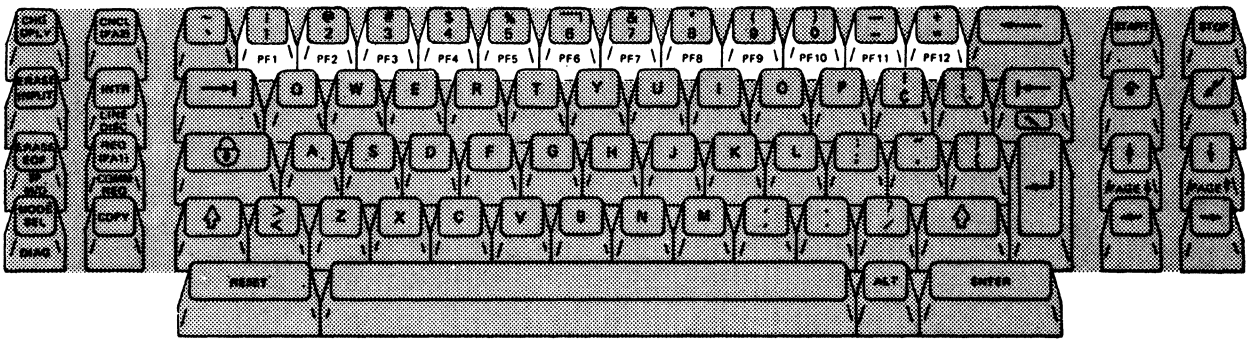


Figure 14. Program Function Keys

Problem Determination Guide Access Panel

The display console keyboard has an access panel below the keys that contains an *IBM 3278 Model 2A Display Console Problem Determination Guide*, Order No. GA23-0020 or *IBM 3279 Color Display Station Problem Determination Guide*, Order No. GA33-3051. These *guides* contain problem determination and abbreviated operating and reference information. The *guide* for the 3279-2C supplies a color convergence program to obtain maximum color resolution.

To get to the *guide,* press the latch on the panel and open the panel cover, as shown in Figure 15. Use the *IBM 4381 Problem Determination Guide* and the Problem Analysis (PA) procedures to determine the appropriate action for display problems.

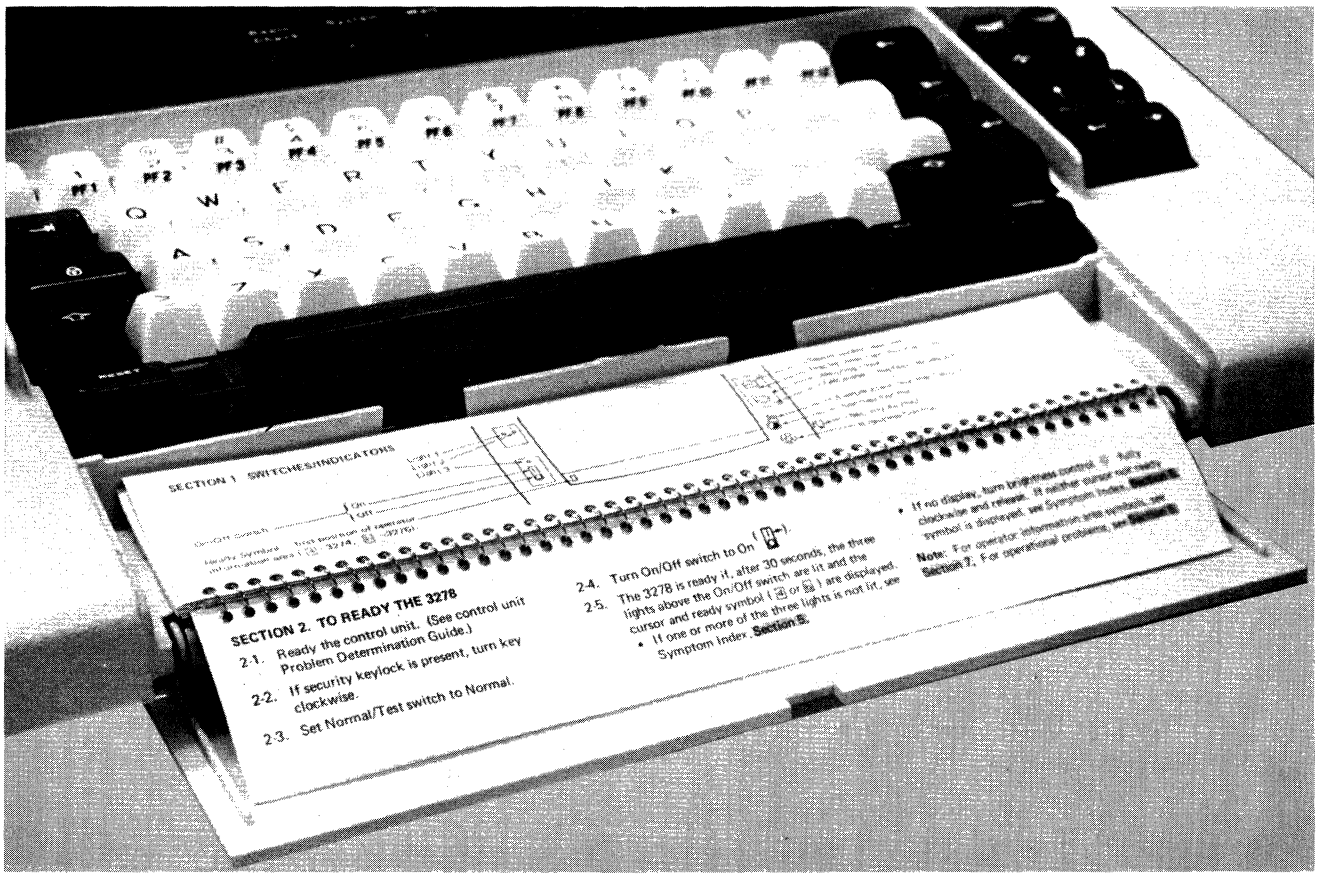


Figure 15. Display Console Problem Determination Guide Access

General Procedures

This chapter describes procedures that the operator normally performs; it gives information for:

- Using this manual
- Organizing, displaying, changing, and controlling the screens
- Controlling system power, screens, and display modes.

If you are unfamiliar with using the screen concepts of the 4300 processors, go to "Using the Operations Manual" on page OPR 34.

4341/4381 Comparisons

The 4381 retains some of the major operating characteristics of the 4341. Important similarities and differences between the 4341 and 4381 are described in the following text.

Similarities

Similarities between the 4341 and 4381 include:

- **Channel operation:** Except for channel speeds, the overall channel operation is similar in both processors. The channel subsystem is configured in the same manner when you are in System/370 mode.
- **Logic reset and emergency power controls:** The 4381 retains the logic reset and emergency power off controls on the main frame of the processor.
- **Consoles and printers:** The operator console keyboard, operator control panel, printer, and display facilities are similar to the 4341.
- **Screen design:** The 4381 uses a similar Q screen design to access and control the processor by menu driven screen commands (QF, QFA).
- **Screen menus:** The 4381 also uses similar screen groupings for functions; for example, the QD screens are the display/alter screens, the QL screens are the program load screens, along with others.
- **Immediate commands:** The immediate commands of the 4381 are similar with those in the 4341, except for a small modification to the General Selection (Q) screen.
- **Problem Analysis:** An improved Problem Analysis procedure is performed in the same manner as the 4341 Problem Analysis procedure. For example, to begin the 4381 PA procedures, you only key **P** instead of **PA** (as you did on the 4341).

Differences

Important differences between the 4341 and 4381 are noted in the following text.

- **Operating mode:** The 4341 and 4381 both operate in System/370 mode; however, where the 4341 used ECPS:VSE as its second mode of operation, the 4381 uses 370-XA (extended architecture) as its second mode. ECPS:VSE mode of operation is not supported by the 4381. There are no assists on the 4381. All assists that were a part of the 4341 are standard on the 4381.

- **Entering data:** The line to enter commands on the 4341 was the SELECTION line. The line to enter commands on the 4381 is the COMMAND line, and all characters in the command appear in this area. The positional cursor is still in a blank position to accept input characters when you press ENTER. In the 4381, you can "back up" the cursor at the COMMAND line by using the cursor positioning keys and you can select screens by erasing existing letters; this procedure gives you more flexibility than does the 4341.
- **Diskette drives:** The two functional diskettes, which contain all the processor microcode, are always accessible by the processor. However, functional diskette 1 (alone) can run the system in System/370 mode.
- **4381 operating screen differences:**
  - Additional Problem Analysis detail screens, which supply an in-depth inspection mechanism for problem analyzation.
  - The Configuration Screen group gives the operator or programmer the capability to configure and display the system consoles in both System/370 and 370-XA modes. The native consoles are now described in this area.
  - The Compare/Trace screen group has been simplified. Although the functions are similar, the screen group has been expanded from a single screen (QA) to a five screen group (QAA). This expansion reflects a significant usability improvement over the 4341.
  - Interface control checks are now automatically recorded and can be displayed with the new customer error display screen facilities (QEI).
  - Although the check control (QK) and operation rate (QO) functions are unchanged, the current controls are now highlighted on these screens.
  - The system status lines on the display screen have been reorganized and are now contained in three lines with a different test indicator function.
  - The system reset program has been changed from PROGR to NORMAL.
  - The configuration function now includes native console device configurations and UCW directory definitions, which were previously in the program load and display/alter groups. Three native consoles can now be installed by the customer, using connectors in the processor cover.

4381 Enhancements

Listed below are operating features of the 4381 that are not found in the 4341, along with 4381 enhancements to existing 4341 facilities.

- The addition of 370 extended architecture support with IML and input/output device configuration.
- National language support for six foreign languages for Problem Analysis and other Problem Analysis enhancements.
- The new MVS (multiple virtual storage) support, including an alternate nucleus identifier, restart screen, and automatic store status with IPL.
- Improved program load and compare/trace human factors design.
- Automatic interface control check logging.
- The ability to set the support processor local time-of-day clock.
- The addition of a remote time-of-day facility.
- The ability to copy the screen contents to a channel printer in addition to a console printer, and the ability to copy to the console in both printer/keyboard and display mode.
- Improved facilities for viewing additional configuration data, error logs, microprogram patch lists and remote support initialization.
- Improved organization of customer information, including grouping functions for operators, programmers/analysts, and service directed-use operations.

Using the 4381 Operations Manual

The 4381 Operations Manual is divided into four sections; an **Index** is also included.

- **Operator** This five-part section is intended primarily for the operator who runs the system, makes general configuration changes, restarts the system on occasional failures of devices, initiates the Problem Analysis program, and maintains the day-to-day functions.
- **Programmer/Analyst** This section is more complex, containing the subjects that are in the programmer and analyst category, such as initiating traces on internal facilities, altering internal registers, reconfiguring the system when necessary, and running the Problem Analysis program in depth.
- **Directed Use** This section, although accessible by the general user, falls within the service personnel area, and is meant to be used by the customer only with the guidance of a service representative.
- **Messages** This section contains all the messages that the system can generate while in operation. This section also contains the Input/Output Configuration Program (IOCP) messages, which are generated only while the IOCP function is running.

Operations Manual Screen Information

The Operator, Programmer/Analyst, and Directed-Use sections include a chart that shows the screens that are described in that section:

Page OPR 55 contains the Operator screens—see A .

Pages PRG 2 and 3 contain the Programmer/Analyst screens—see B .

Page DIR 1 contains the Service Directed-Use screens—see C .

The screen information and illustrations in this document focus on lines 1 through 20 of the manual function screens. The system status (lines 22 through 24) and the console status information (line 25) always appear on the manual function screens.

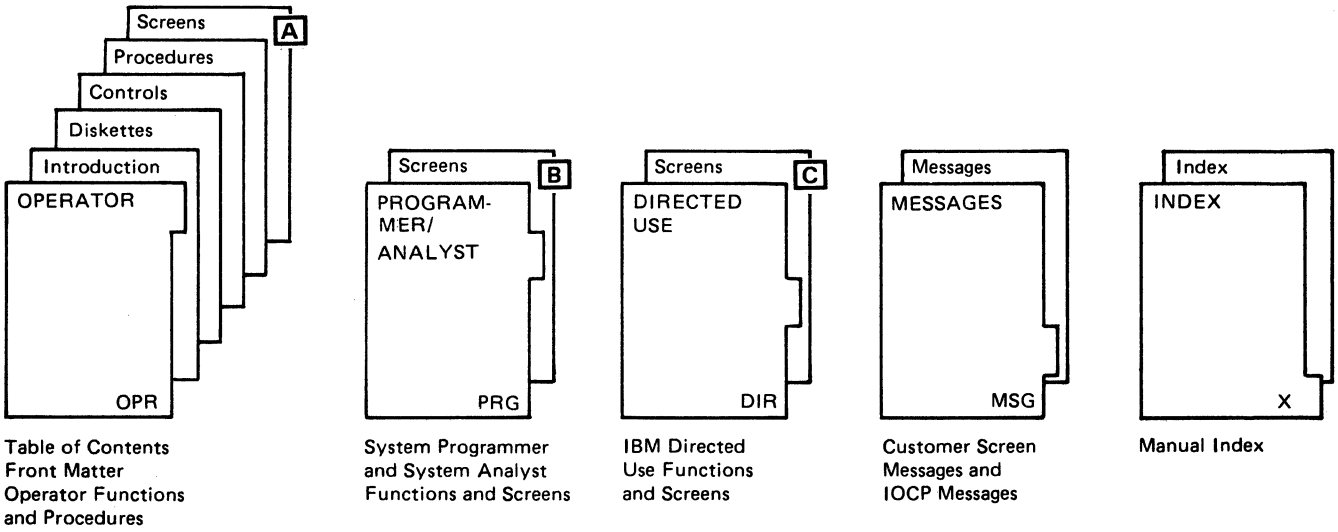


Figure 16. Operations Manual Organization Diagram

Controlling the System

The only controls on the 4381 that are available for operator use are those on the processor frame and on the operator control panel (OCP). The accessible switches on the processor frame are generally used in problem conditions to reset check conditions and logic resets, and to support processor copying and other tests.

The controls for general operator use are on the operator control panel, which is just above the keyboard. These pushbutton controls are the Power On, the Power Off, the Lamp Test and Channel-To-Channel enable controls. The operator's primary method of communicating with the system is through the manual function (or Q) screens. The Q screens are accessed, modified, and stored using the keyboard.

Display Screens

The 4381 screens are grouped by their general function so that you can readily determine the screen or screens you need to use. By referring to the screen list in the front section of this document, and to the screen diagrams at the beginning of each section of each this manual, you can see that the screens are referenced through a sequence of letters. Beginning with the letter Q, you can select any valid screen function, and with each succeeding letter entered, call for a more specific function. Also, on the COMMAND line on any screen, you can enter any of the listed screen labels and immediately access and display the screen; this function is generally called *fast selection*. For example, entering **QFO** takes you immediately to the configuration display screen.

Immediate Screen Commands

The General Selection screen (Q) contains a series of commands that do not "bring up" another screen, but immediately perform the command. (However, certain MVS systems can cause a screen to appear, but this screen is controlled by the MVS program.) These commands are called the immediate commands:

[A]

QY – Time of Day enable
QJ – Interval timer switch
QS – Store Status
QN – Normal system reset
QC – Clear system reset
QR – Restart.

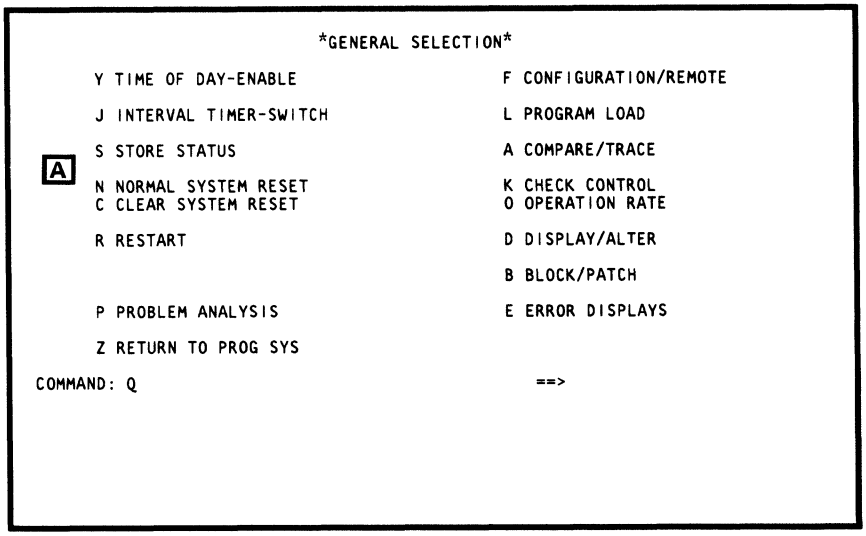


Figure 17. General Selection Screen Immediate Commands

Grouping the Screen Functions

Any time that the system is in manual control, the COMMAND line on each screen displays Q following the colon. The letter after the Q specifies the next group of screens. The available screen groups are:

QA – Compare/Trace controls the address compare and trace functions.
QB – Block/Patch displays the blocks and patches (with IBM direction).
QD – Display/Alter displays the processor facilities (see Figure 18—A).
QE – Error Log displays the processor error records (with IBM direction).
QF – System Configuration/Remote controls miscellaneous configuration items and remote operations.
QK – Check Control controls the processor error, or check handling.
QL – Program Load group controls the system load specifications.
QO – Operation Rate controls the instruction processing mode.
QP – Problem Analysis controls the options for PA (see Figure 18—B).

The following diagram shows the Display/Alter A and Problem Analysis B screen groups with their available functions.

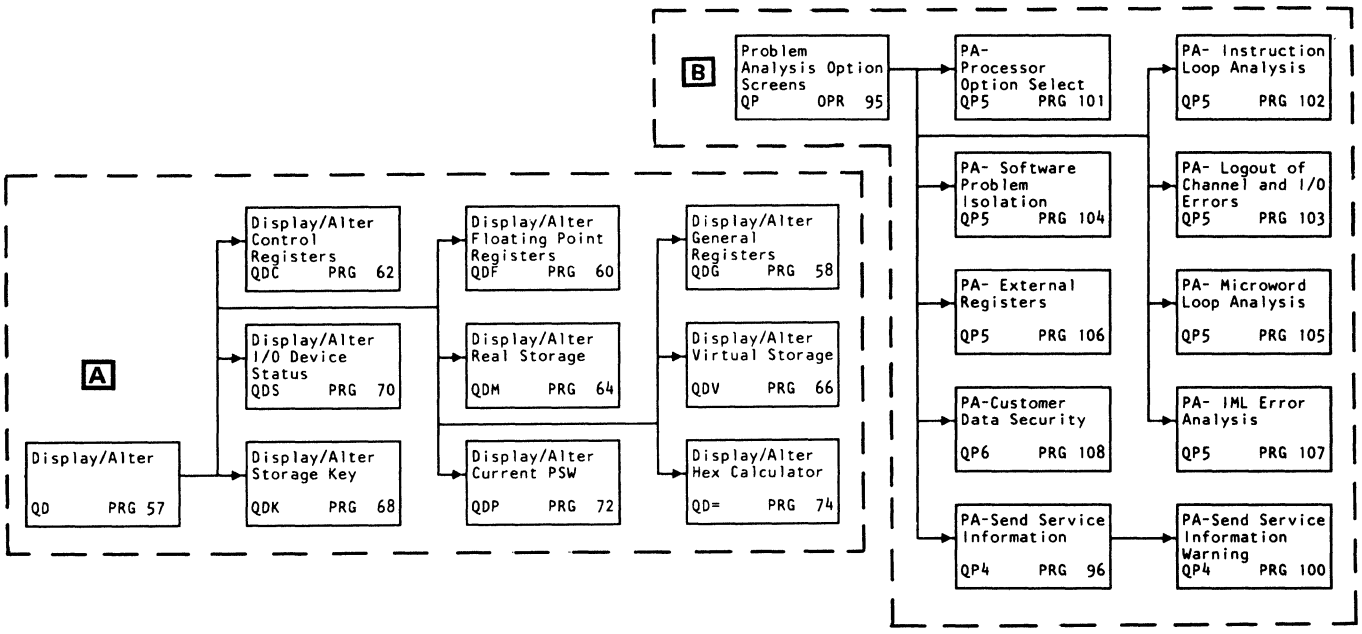


Figure 18. Display/Alter and Problem Analysis Groups

Changing the Screen Selection

When you "bring up" a manual function screen (Q screen), the selections currently in effect are sometimes intensified (if you have a 3278 screen) or appear in white (if you have a 3279 color console), depending on the screen characteristics.

You change the selections on this (or any other) screen in one of two ways, *depending on the screen's characteristics.* You may have to enter the changes directly at the COMMAND line, as shown in A on the IML parameter (QLI) screen, or enter the changes directly at the appropriate fields, as shown in the B screen (see Figure 19).

To determine the method for changing screen selections, refer to the description of the appropriate screen in this document.

Examples for Changing the Screen Content

The two screens shown below (QLI the QFY) operate in different manners. The QLI screen requires you to enter the changes only at the COMMAND line—see [A] . For example, to change the system mode, type QLIW2 at the COMMAND line; this selects 370-XA mode.

The changeable parameters of the QFY screen (the time and date, whose settings are the user's responsibility) are intensified on the screen. You change these parameters directly at their respective fields by typing the selections at these fields— see [B] . You can move the cursor by using the four cursor-positioning keys (up, down, left and right) or the New Line key that immediately moves the cursor to the first unprotected field on the next line.

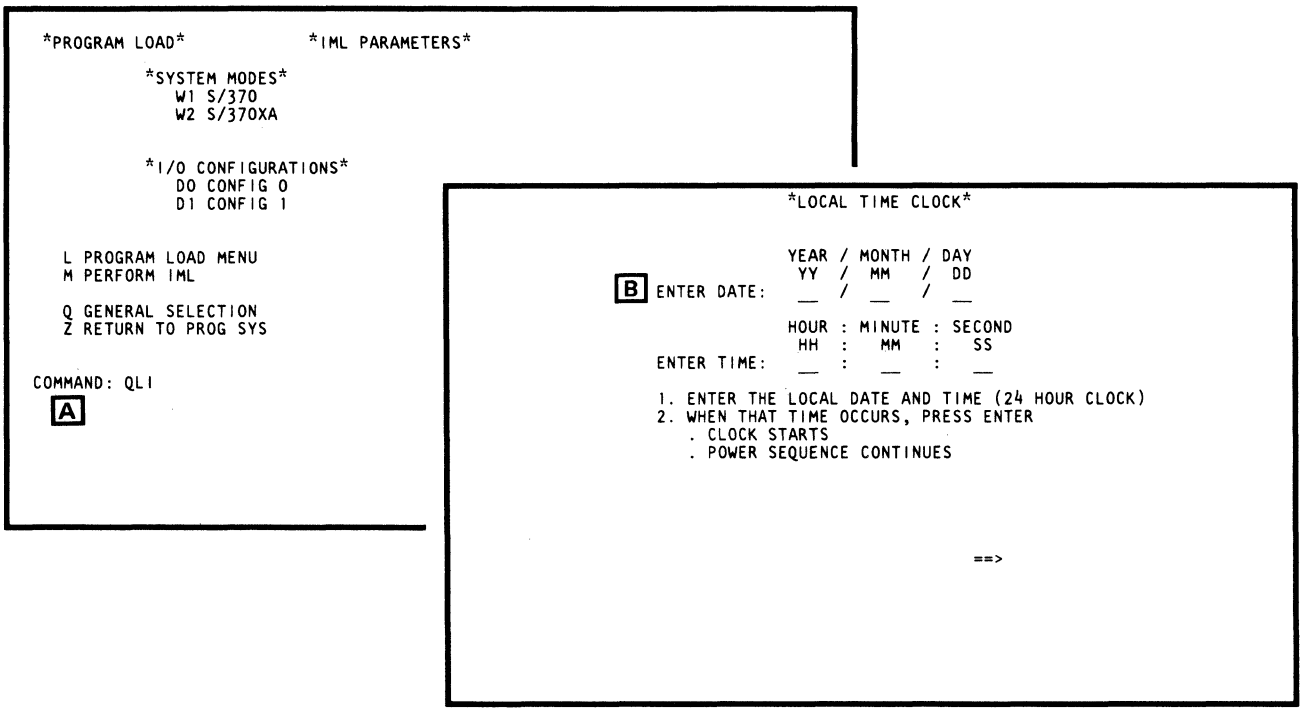


Figure 19. QLI and QFO screen change differences

Configuration Screen Group

As a rule, only the Program Load screens and the system configuration screens are used by the system operator during normal operation. The Program Load screens are used to specify the events you want to occur when the processor is IMLed or IPLed, or when you want to see what the present program load status is.

The Configuration Screen group (QF), as covered in the operator section, enables you to:

- Test and adjust the color console presentation (using the QFA and QFP screens).
- Communicate with the remote console operator (using the QFC screen).
- Initiate the remote console operator facility (using the QFB screen).
- Set the time-of-day clock (using the QFY screen).
- Select the foreign language configuration (using the QFL screen).
- Display and change the customer-controlled system configuration items (using the screens under the QFO function).

The configuration group, QFO, addresses the system configuration for both System/370 and 370-XA mode. Figure 20 shows the relationship between the charts in each of the sections and the actual screens as they appear on the console and in the manual. This diagram shows the levels of screens, from the QF screen [A] to the next level, QFO [B], to the next level, QFOI [C], and to a more detailed level (QFOIU, QFOIC, QFOID and other detail levels shown—see [D]).

Depending on the operation desired, these screens specify the various options available in the system configuration area.

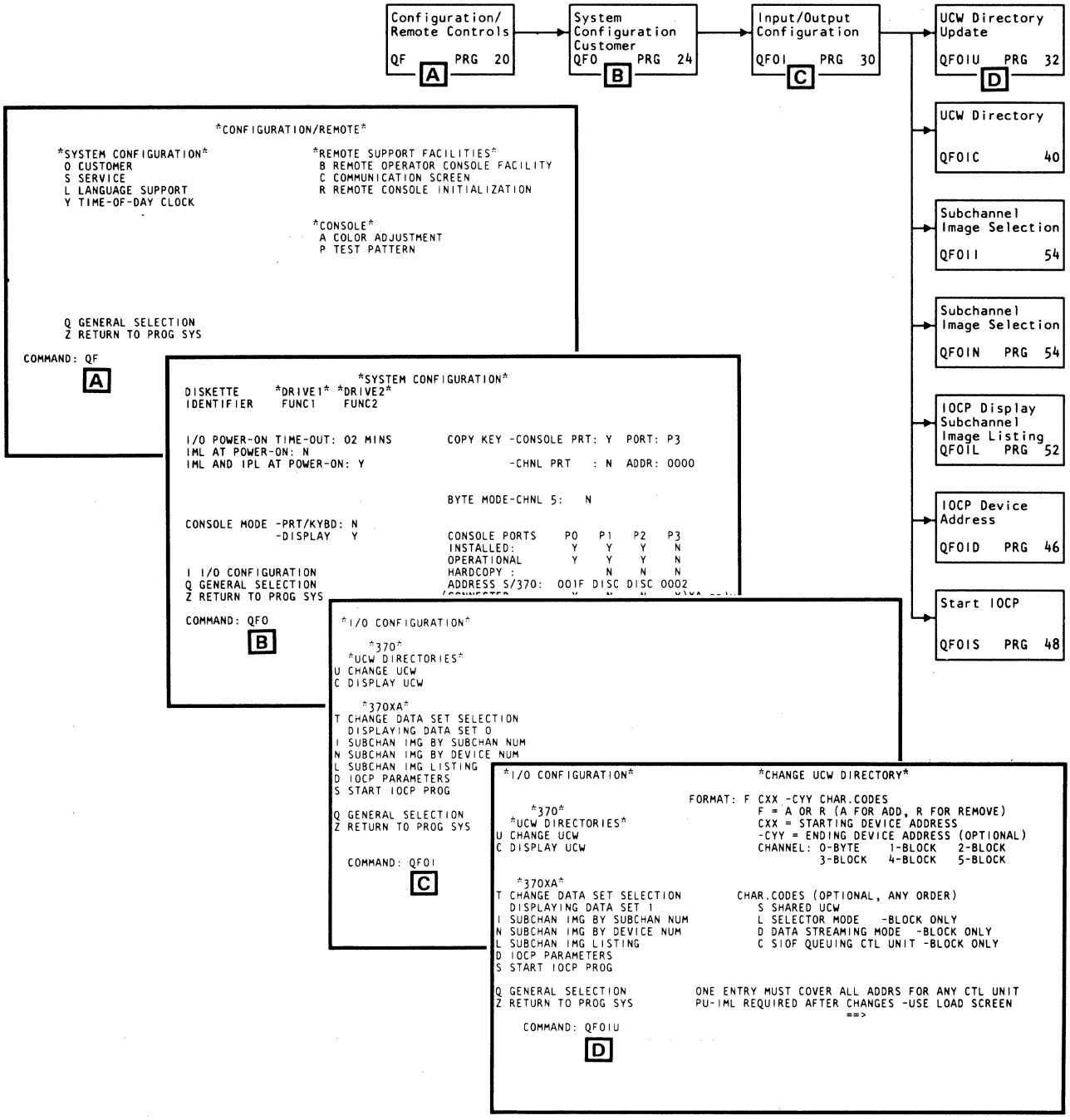


Figure 20. Configuration Example – QFO to QFOIU Sequence

Configuration Screen (QFO) Contents

Displaying the QFO screen further describes the system configuration and the state of the attached console devices, along with several other items that you may need to control. These items can be changed using the positional cursor.

The QFO configuration screen can be divided into six general sections.

The 4381 has two online diskettes containing functional microcode. The two lines immediately under *System Configuration* show which diskettes are in the two drives [A] and cannot be changed.

The next three lines on the left side [B] show your selections of power-on actions. Displayed is the time allowed for I/O devices to complete a power on when the 4381 is powered on. You can also load the microcode (IML) at power on, or load the microcode and the system control program (IPL) at power on.

Your console mode selection is shown next [C] . By selecting the state of the printer keyboard mode (Y or N), you automatically select or deselect the display mode. Only one mode can be selected at a time.

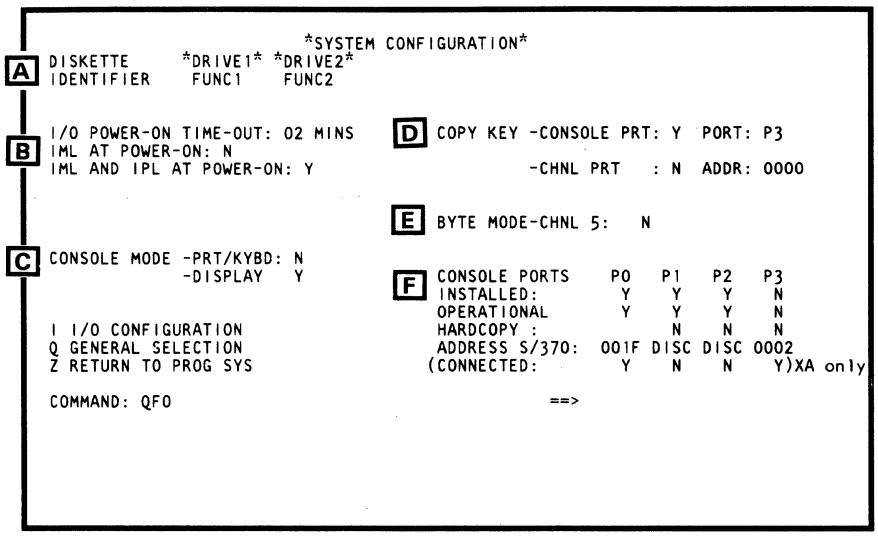


Figure 21. Configuration Screen Contents Description

[D] is the device you have selected to receive a copy of the contents of the display console when you press the COPY key. If you have selected a console printer as the copying device, its port assignment is also shown. If you have selected a channel printer, its channel address is displayed. You can have only one device selected at a time.

The next line [E] indicates if channel 5 has been optionally selected as a second byte channel.

The next section describes the characteristics of the four available console device ports [F] . The four ports are labeled P0, P1, P2 and P3 across the top line. The current state of each of the devices on the port is shown under each of the devices on that port, such as whether:

- A device is installed on the port (Yes or No)
- The device is operational, Yes or No (field is not alterable).
- It is a hard-copy device (Is it a printer? Y or N) A printer cannot be installed on Port 0, which is reserved for a display console.
- The device number is disconnected (if you are in 370-XA mode).

The address of the device or its device number (if you are in 370-XA mode) is also displayed.

If you are operating in System/370 mode, the fourth line displays ADDRESS S/370. However, if you are operating in 370-XA mode, this line displays DEVICE NUMBER, which is a number assigned by the IOCP operation and cannot be changed by the user on this screen. Also, if you are in 370-XA mode, an additional line states whether the device number is CONNECTED (Yes or No). You cannot change the device number, but you can change the connection state.

QFO Change Capabilities

If a field on the QFO screen is preceded by a colon (:), you can change this field by typing over the existing setting. *Fields that are not preceded by colons cannot be changed.* For example, the functional diskettes can only be changed by changing the diskette in the drive; the console port operational status is set by the device itself.

If you need further information for this or any other screen, refer to the appropriate screen.

Powering On

When you power on the system from a cold start (the total system is unpowered), first ensure that the display console's power is on. The consoles do not power on or off with system power; they must be powered on before the system is powered on. After powering-on the display console, press the Power On key on the operator control panel; the processor and all devices attached to it should power on in sequence. If the devices do not power on, make sure the devices's power-on switches are on. If problems persist, refer to "System Power On" on page OPR 47.

Program Loading

The Program Load (QL) screen is the first Q screen that appears after you power on. This screen contains the commands to load your selected system control program (SCP), which executes your programs.

This screen (QL) and its associated QLI screen shows you the status of the program load and gives you the facility to change the program loading selections. By entering your selections on this screen at the COMMAND line, you can :

- Perform an initial microcode load operation (QLM)
- Perform a normal reset followed by an initial program load (QLP)
- Perform a clear reset followed by an initial program load (QLL)
- Specify the input device that contains the system control program (QLU)
- Specify an alternate MVS nucleus name for IPL (QLN).

This screen (QL) and its associated screen (the QLI screen) also allow you to change the system mode with an initial microprogram load (IML).

Additionally, after the microcode has been loaded (or IMLed) from the diskette, the system mode to be used on the next IML can be determined by displaying the QLI screen. One mode will be highlighted under *System Modes*, either W1 S/370 if you are operating in System/370 mode, or W2 S/370XA if your system is operating in extended architecture mode. If you are in XA mode, the *I/O Configuration* will show (using highlighting) that either the D0 or D1 data set was used to define the I/O configuration on the last IML.

In addition to the various screens appearing in the display area of the console, the system status also appears at the bottom of the display screen and shows the present state of the system. After IPL, the word OPERATING appears; the system begins to run the system control program.

Emergency Power Off

The Unit Emergency switch is on the side of the processor frame, above the diskette drives. Use this switch *only in an emergency condition* to immediately remove logic power from the processor and remove power from all I/O devices that are set to power on/off with the system. Power for the console devices must be turned off at the device. If complete power is to be removed from the processor, the wall circuit breaker must be tripped.

After the Unit Emergency switch is set to *Power Off*, the customer cannot turn it on again. A service call must be placed so that a service representative can restore the switch to the *Power Enable* position.

Turning Display Console Power On

1. Ensure that the 3278-2A Display Console or the 3279-2C Color Display Console Normal/Test switch is in the *Normal* position.
2. For a 3278-2A, set the display console Power On/Off switch to the ON (|) position. The Power On indicator and Indicator 1 should light immediately. Indicator 2 should light in approximately 30 seconds.

   OR

   For a 3279-2C, set the display console Power On/Off switch to the ON (|) position. Indicator 1 should light immediately. Indicator 2 should light in approximately 30 seconds.
3. Insert and turn the key of the security keylock feature (if installed) to the ON position.

   If the remote operator console facility (ROCF) is installed and activated, the display console responds to operating system commands when the keylock is in both the ON and OFF positions. However, when the keylock is in the OFF position, console input can only come from the host location through the ROCF link.

   (For a description of the ROCF environment, refer to "Remote Operator Console Facility.")

System Diskettes 1 and 2

The 4381 has two diskette drives (drives 1 and 2) that contain two functional diskettes. Functional diskette 1 (FUNC1) contains the resident microcode for the processor. Functional diskette 2 (FUNC2) contains the resident extended architecture and Problem Analysis microcode, and other internal microcode and service areas. (An additional functional 1 and functional 2 diskette containing backup microcode is also supplied and should be stored in the place supplied in the processor frame.) The assignment of the diskette drives is selected by the user, but it is recommended that the two functional microcode diskettes, FUNC1 and FUNC2, be placed in drives 1 and 2, respectively. The customer system configuration screen (QFO) indicates which diskettes are contained in the drive locations. (Also refer back to "Diskette Drive" on OPR 5.)

Loading and Unloading the Diskette Drive

Review "Diskette Handling" (OPR 6) before removing or installing diskette cartridges.

1. To open the diskette aperture, turn the latch to the left.
2. Remove the diskette by gently pulling it straight out from the drive. Properly store the removed diskette in the frame opening.
3. Ensure that the new diskette contains the correct serial number for the machine.
4. Put the new diskette into the drive (Figure 22).
5. Close the diskette drive by firmly moving the latch to the right.

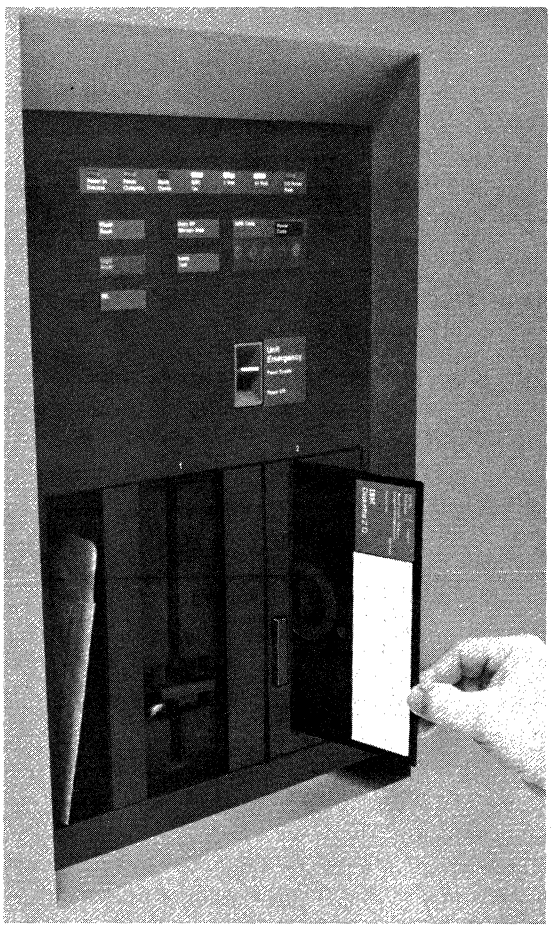


Figure 22. Installing Diskette Cartridge Into Drive

System Power On

Pressing *Power On/IML* on the operator control panel applies power to the processor, loads the support processor, and powers on all I/O devices that are switched to power on/off with the processor. (For more information, refer to "Operator Control Panel" on page OPR 16.)

System power on loads the processor unit if IML AT POWER ON=YES is specified on the System Configuration (QFO) screen. This process takes approximately three minutes, depending on the attached I/O devices.

Use of the Power On/IML pushbutton switch after power is already on the machine causes a support processor IML. You should only use the Power On/IML after power is already on the machine if:

- Your service representative directs you to do so, or
- You are directed to do so by the Problem Analysis procedures, the System Configuration (QFO) or the UCW Directory Update (QFOIU) screens.
- The console/keyboard becomes inoperative.

Power-On Procedure

1. Turn on all 3278-2A, 3279-2C, 3268-2, and 3287 console devices. It is necessary that at least one 3278-2A or 3279-2C on the system be powered on, or a basic check occurs and the system does not power on.
2. Ensure that the correct diskette is properly installed in the diskette drive.
3. Press the Power On/IML key on the operator control panel. During the IML of the support processor, the system displays the Set Time-Of-Day Clock screen (QFY). After the QFY screen fields are completed as required, pressing ENTER continues the procedure. (For specific clock-setting instructions, refer to the QFY screen in "Screens" of the **Operator** section.)
4. If the IML AT POWER-ON selection is specified YES (Y) on the System Configuration (QFO) screen, the instruction processor IML is started following power on. The system is then ready for IPL. If IML AT POWER-ON is not specified on the System Configuration (QFO) screen, the instruction processor IML must be manually performed before the system can be IPLed.
5. If the IML and IPL is specified as Yes, the instruction processor IML is started, and the processor loads the system control program (IPL).

Channel-to-Channel Adapter Installed and Activated

To activate the channel-to-channel adapter, the following steps are required.

1. Wait for the Chan-Chan Disabled indicator to turn on (10 seconds).
2. If the Chan-Chan Disabled indicator remains off, the connection to the other processor is made, and no further steps are necessary.
3. If the indicator is on, press the Channel-to-Channel pushbutton switch. When the Chan-Chan Disabled indicator turns off, the channel-to-channel adapter is enabled. The system can be IPLed either before or after the channel-to-channel adapter is enabled. [The System Configuration screen (QFS) indicates whether the channel-to-channel adapter is installed on the system.]

Initial Microcode Load (IML)

The initial microcode load of the instruction processor is performed from the Program Load screen. This screen is displayed upon completion of a system power-on sequence. If IML AT POWER-ON is specified YES on the System Configuration (QFO) screen, an IML of the mode that is intensified on the screen is automatically started. If IML AT POWER-ON is not specified, or if an IML is required at some time other than at power on:

1. Obtain the Program Load screen if it is not already displayed.
   - If the operating system screen (Display or Prt/Kybd) is presently displayed: (1) press MODE SEL to display the General Selection manual control mode screen, (2) key in **L**, and (3) press ENTER.
   - If a manual control mode screen other than the Program Load screen is displayed: (1) key in **QL** after COMMAND, and (2) press ENTER.
2. Check that the specified mode on the screen (either S/370 or 370-XA) is the correct microcode that you want to load. If the mode is correct, key in **M** and press ENTER. The status area of the Program Load screen indicates IML IN PROG followed by IML COMPLETE. If the mode specified on the screen is not correct, continue with step 3.
3. On the Program Load screen, key in **I** and press ENTER to display the IML Parameters Selection screen.
4. Key in the mode desired, either W1 or W2 at the COMMAND line and press ENTER. The new mode and I/O configuration are intensified on the screen.
5. When the mode has been correctly specified, key in **M** after COMMAND and press ENTER. The Program Load screen is displayed and the IML is started. The status area of the Program Load screen indicates IML IN PROG, and is followed by IML COMPLETE.

Initial Program Load (IPL)

If *IML and IPL at Power-on* is specified as yes, the initial program load is performed from the Program Load screen.

1. The Program Load screen should display after an IML. If an IPL is required at some other time, you must first get the Program Load screen:
   - If the operating system screen (Display or Prt/Kybd) is presently displayed: (a) press MODE SEL to display the General Selection screen, (b) key in **QL** and (c) press ENTER.
   - If a manual control mode screen other than the Program Load screen is presently displayed: (1) key in **QL** after COMMAND, and (2) press ENTER.
2. Check that the specified IPL UNIT address on the Program Load screen is correct. If the address is incorrect, key in **U** and the proper address.

   Any other changes to the Program Load screen can also be made at this time by keying the appropriate selections on the COMMAND line. Refer to "Program Load Screen" for selection descriptions.
3. When the IPL UNIT address and any other selections have been keyed in, key in **P** or **L**, and press ENTER. The selection changes are made to the Program Load screen and the IPL is started. The display status area indicates IPL IN PROG and IPL COMPLETE.

Switching Between Display and Prt/Kybd Modes

The operational mode is displayed at the bottom of the screen when you are not in manual control or you are disconnected. To change between the Display and Prt/Kybd operating system modes, the Customer Configuration screen must be displayed. To obtain the Customer Configuration screen:

- If the operating system screen (Display or Prt/Kybd) is presently displayed: (a) press MODE SEL to display the General Selection screen, (b) key in **QFO** and (c) press ENTER.
- If a manual control mode screen other than the Customer Configuration screen is presently displayed: (1) key in **QFO** after the COMMAND line and (2) press ENTER.

Prt/Kybd to Display Mode

In System/370 display mode, each console device must have its own address or be assigned disconnected (DISC). The first two characters of each address must be 00 and the address cannot be the same as any other device on channel 0.

In 370-XA mode, the device addresses cannot be changed on the QFO screen. This address is established using the IOCP function. (Refer to the QFO screen description in this section).

1. To prevent errors, change all related input areas on the configuration at the same time.
2. Press the ENTER key.

If no selection errors were made, the System Configuration (QFO) screen displays the new console address and console mode. All operating system console display screens are cleared.

If an error is made in the selection entry, an error message is displayed on the display console. Refer to the **Messages** section (MSG 1) for error messages and recovery, and to the System Configuration (QFO) screen to correct the entry.

Display to Prt/Kybd Mode (System/370 mode only)

In Prt/Kybd mode, only two console addresses are permitted. A 3268-2 or 3287 Printer cannot be assigned an address by itself, but must share an address with a display. Two console displays cannot share an address.

The first character of any assigned address must be 0 and the address cannot be the same as any other device on channel 0.

1. To prevent errors, key all console address changes and the console mode at the same time.
2. Press the ENTER key.

If no selection errors were made, the System Configuration (QFO) screen displays the new console address and console mode. All operating system console display screens are cleared.

If an error is made in the selection entry, an error message displays to the right of the COMMAND line. To correct the entry, refer to the **Messages** section (MSG 1) for error messages and their recovery procedures, and the System Configuration screen.

Switching Between Manual Control and Operating System Modes

The mode of operation is displayed at the bottom of the screen. To change from the operating system screen (Display or Prt/Kybd mode) to the manual control mode screens, either of two keys may be used. The MODE SEL key always causes the manual control mode General Selection screen to be displayed. This screen is the entry to the other manual control mode screens and functions. The CHG DPLY key causes the most recent manual control mode screen to be displayed. Pressing the CHG DPLY key a second time returns the display to the original operating system screen.

Only one display terminal can enter the manual control mode display function at a time. If the MODE SEL or CHG DPLY key is pressed on a display when another display is already in manual control mode, a USAGE CONFLICT message appears at the bottom of the operating system screen. The RESET key must be pressed to remove the USAGE CONFLICT message and allow use of the display.

To return to the operating system screen from any manual control mode screen: (a) key in **QZ** after the COMMAND line and (b) press ENTER. To return temporarily to the operating system screen, use the CHG DPLY key.

Fast Selection of Manual Screens

Fast selection permits the display of any manual control mode screen from any other manual control mode screen without returning to the General Selection screen. In order to use the fast selection process, a knowledge of the various screen and subscreen display codes must be known so that reference to the General Selection and Display/Alter menu screens is not necessary.

To select any screen, enter **Q** for the General Selection and the individual screen and subscreen (if necessary) codes. Screen selections must be entered on the COMMAND line as the first entry (starting one space after the colon).

Fast Selection of Manual Operations

Many functions can be performed in manual control mode without displaying the actual screen controlling the function. In order to use manual operation fast selection, a knowledge of the entry selections needed to start the function (without reference to the associated screen) is necessary.

To fast select an operation from an unassociated screen, enter the associated fast selection screen code (see "Fast Selection of Manual Screens"), followed by the appropriate function selections. If the selection is valid, the present screen remains displayed and the function is invoked. The status area of the screen verifies the selected function as appropriate.

An exception to this is when an area is altered, the appropriate screen is displayed to show the result of the alter operation. Also, if the selection is invalid, the appropriate screen is displayed for reference so that the correct function selections can be entered.

Returning to a Previous Screen

Often you will want to return to a previous, or higher level screen from a detail screen, especially using the Configuration (QF), Compare/Trace (QA) and Problem Analysis (QP) functions. This operation is done by simply erasing the unnecessary characters at the COMMAND line. For example, if you are currently displaying the UCWs on the QFOIC screen and you want to return to the Customer Configuration screen (QFO), simply erase the characters IC, and press ENTER.

Fast Selection of Hexadecimal Calculations

The hexadecimal calculator is a normal function of the Display/Alter (D) screen. However, hexadecimal calculations can be made from any other manual control mode screen by keying **QD=** followed by the problem, and pressing ENTER. The same screen remains displayed and the calculation result is shown to the right of the COMMAND entry. If an entry error is made, an INVALID INPUT message is displayed and the cursor is positioned under the first invalid character encountered.

For a detailed description of the hexadecimal calculator function, see "Display/Alter Selection Screen."

Paging

The paging keys are used only with those screens that are unable to contain their entire data display function on one screen. The Page Up key (PAGE ↑) displays the next highest address of the function and the Page Down key (PAGE ↓) displays the next lowest portion of the function.

The paging keys are used by holding down the ALT key and pressing the appropriate page key. The paging keys are typematic and, when held down, give continuous paging.

A PAGING KEY IGNORED message is displayed if the paging limit is is exceeded or the paging function is attempted on a screen to which it does not apply.

System Power Off

Pressing *Power Off* on the operator control panel starts the system power-off sequence. However, all console devices are powered off using their individual power off switches.

Do not use the Unit Emergency switch on the processor frame for normal system power off; the Unit Emergency switch must be used in *EMERGENCY* situations only. When turned off, the Unit Emergency switch is locked and can be turned on only by a service representative. A service call must be placed to restore the switch to the Power Enable position. For more information on the Unit Emergency switch, refer to "Unit Emergency Switch" on OPR 10.

Without Channel-to-Channel Adapter

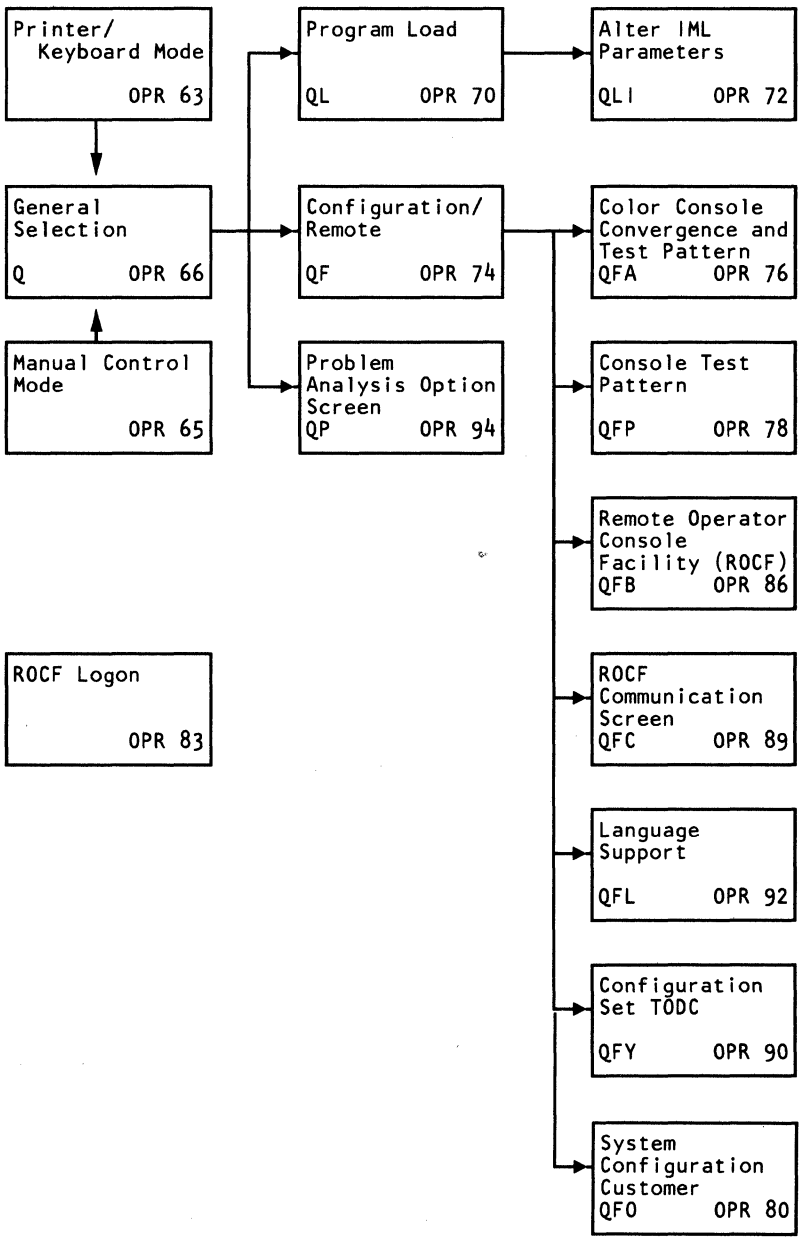
1. Check that the appropriate I/O devices are unloaded and all power-driven covers and doors are closed.
2. Press the Power Off key on the main operator display console. Power then sequences off.
3. Turn power off on console devices.

With Channel-to-Channel Adapter

1. Notify the operator of the other system that the channel-to-channel adapter is to be removed from use. (All systems attached to a 3088 multi-way channel-to-channel adapter must be notified of the local system power off.)
2. Advise the other operator to *soft stop* the attached processor.
3. If your Chan-Chan Disabled indicator on your OCP is off, press the Channel-to-Channel pushbutton switch. When the Chan-Chan Disabled indicator turns on, the channel-to-channel adapter is disabled.
4. Check that the appropriate I/O devices are unloaded and all power driven covers and doors are closed.
5. Press the Power Off key on the main operator display console. Power sequences off.
6. Turn power off on console devices.

Operator Screens

This chart shows the 4381 system of operator screens that are described in this section. These screens contain the operator/system communication link necessary to operate the 4381. The display and printer/keyboard screens are the normal run mode screens. The General Selection screen (Q function) and those screens operating under the Q function are manual control mode screens, which are used for system loading, control, and console testing.



Operation Modes

The display screens are a visual link between operator input and system output. The display screen has three modes of operation that affect screen format: display, printer/keyboard, and manual control.

The display or printer/keyboard mode (whichever has been selected for use) is under control of the operating system and controls program processing. The manual control mode can be entered at any time to obtain control of basic system functions.

Display Mode Screen

In display mode, the 3278-2A Display Console or 3279-2C Color Display Console and the optional 3287 Printer are separately addressed devices. Data can be entered or displayed on the display console and separately printed on the console printer. The format of the display screen in display mode is shown in Figure 23.

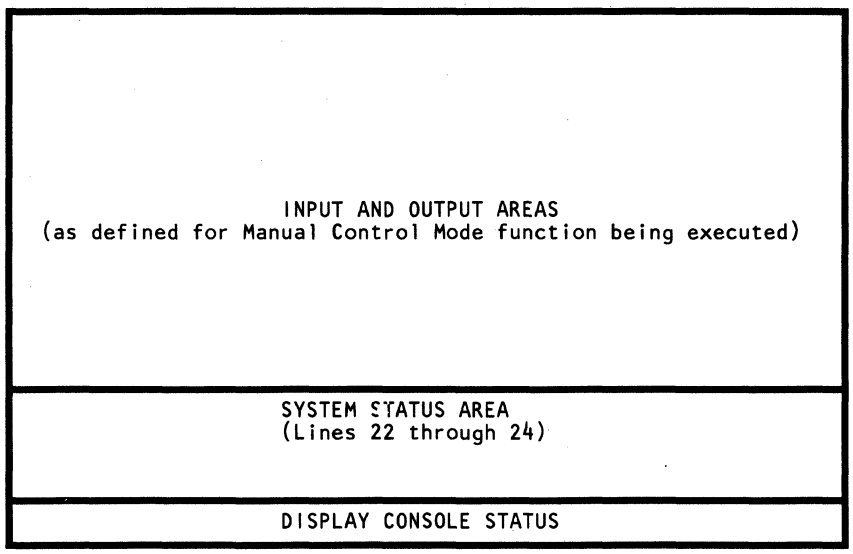


Figure 23. Display Mode Screen Format

Input and Output Areas

Lines 1 through 20 on the display are used as the system input and output area. This area is organized and used as defined by the operating system.

System Status and Display Console Status Areas

The system status area (lines 22 through 24) and display console status are common to all screens; they are described from OPR 56 to OPR 60. Line 25 displays the display console status indicators.

> **Note:** If an indication displays in the system status area and it is not illustrated in Figure 24 and defined in the field description, your IBM service representative should be notified.

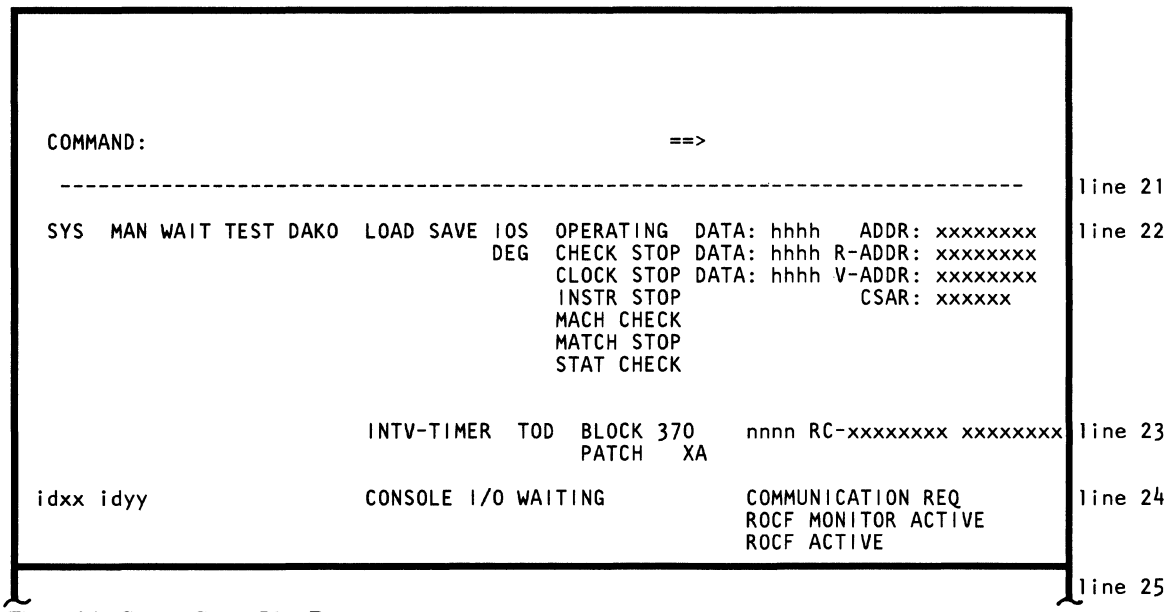


Figure 24. System Status Line Data

Status – Line 22

System

SYS — This displays when the system is processing instructions or input/output information.

Manual

MAN — Displays when the processor is in the Stop state.

Wait

WAIT — Displays when the processor is in the Wait state. Refer to the Wait indicator on the operator control panel for a more accurate indication of actual machine wait state.

Note: The SYS and WAIT fields display most accurately when not in manual control mode (use QZ to exit manual control mode.

Test Dako

TEST — Displays when a processor control is not in its normal state or when a maintenance function is being performed [Compare/Trace (QA), Check Control (QK), Operation Rate Control (QO)].

DAKO — This is read as follows:

D Indicates that the system is, or was, in diagnostic mode. You can clear this by performing a SP-IML again.
A Compare/Trace is active.
K Check Control is active.
O Operation rate is active.

If TEST appears without a D, A, K or O indicator, CE mode is active.

Load and Save

LOAD	Displays during program load and is removed from the screen when the new PSW is loaded.
SAVE	Displays after successful completion of a store status and removed by a system reset.

IOS and DEG

IOS	This indicator specifies that the Stop key was pressed while the processor was in the running state.
DEG	This indicator shows that the processor is running in degraded mode.

Operation Status

This field indicates the operating or stop status of the processor.

OPERATING	Displays when the processor is able to process instructions.
INSTR STOP (STEP)	Displays when the processor is stopped because the Stop key was pressed or the operation rate control is set to instruction step. (See "Operation Rate Control Screen.")
MATCH STOP	Displays when the processor is stopped due to the compare/trace function. (See "Compare/Trace Screen.")
CLOCK STOP (STEP)	Displays when the processor is stopped in microcode. (Normally due to a CE control.)
CHECK STOP	Displays when the processor is in check stop state.
MACH CHECK	Displays when the processor cannot operate or error retry is in progress.
STAT CHECK	Displays when the processor is in an unreliable condition.

DATA:hhhh

DATA	This is the first two bytes of data (hhhh) at the related instruction counter or control store address that is displayed in the address fields when the processor is in the stopped state. This field is absent when the processor is running.

Address

ADDR:xxxxxx	This is the address (xxxxxxxx) when in instruction stop or match stop state. The displayed address for a stop condition is the location of the next instruction.
V-ADDR:xxxxxx	The V-ADDR indicates that the processor is operating with virtual addresses.

R-ADDR:xxxxxx	The R-ADDR indicates that the processor is operating with real addresses.
CSAR: xxxxxx	Displays when the processor is totally stopped (clock stop). This should occur only in CE mode. The displayed address is the current control store address.

Display Line 23

Interval timer

INTV-TIMER:	Displays the ON state of the interval timer switch. If the switch is off, the indicator is absent.

Time of Day

TOD	This field indicates that the SET CLOCK instruction can be issued. The TOD indication resets approximately six seconds after the enable function.

Block and Patch

BLOCK PATCH	This field indicates that a patch or block is being processed, or a block is waiting for an address match to occur.

370-XA

370 XA	This field indicates the operating mode of the processor.

nnnn

nnnn	This field indicates the processor model identification.

RC=xxxxxxxx

RC=xxxxxxxx	This field contains the eight-digit reference code issued by an error routine. An additional eight-digit extension may also be displayed. The reference code is intensified until you press the ENTER key, which returns the code to normal intensity. The reference code is used in the Problem Analysis procedures.

Display Line 24

idxx idyy

idxx idyy — These fields display the module identifiers of the most recently loaded program in the support processor, and the module identifier of the most recently loaded data set. These will be the same if a program has been loaded. These identifiers will be different if the last program loaded had an error during loading.

Console I/O Waiting

CONSOLE I/O WAITING — This indication displays when the console is in manual mode and an I/O operation has been requested by the operating system. To leave manual mode, press the CHG DPLY key or type **QZ** on the COMMAND line and press ENTER.

Communication Req

COMMUNICATION REQ — This field indicates that the COMM REQ key has been pressed.

ROCF Monitor Active

ROCF MONITOR ACTIVE — This indicator displays when the remote operator console facility (ROCF) monitor is active.

ROCF Active

ROCF ACTIVE — This field indicates that remote operator console facility (ROCF) is active.

Display Line 25

Display Console Status

The display console status information is displayed at the bottom of the screen. The following status messages can be displayed; the below presentation reflects the approximate screen position of each message.

DISPLAY MODE INSERT MODE	INHIBITED	ALPHA ↑
PRT/KYBD MODE	USAGE CONFLICT	ALPHA
MANUAL CONTROL	PRT BUSY	KAT ↑
DISCONNECTED	PRT INTV REQD	KAT
	PRT CHECK	

Display Mode

This indicator displays when the display console is in display mode.

Prt/Kybd Mode

This indicator displays when the display console is in printer/keyboard mode.

Manual Control

This indicator displays when the display console is in manual control mode.

Disconnected

This indicator displays when the display console is not logically connected to the 4381 system. The display is not available to the operating system and is not in use for manual functions. This condition exists when no unit address is assigned to the display through the System Configuration (QFO) screen.

Insert Mode

This indicator displays when the Insert key is pressed; the display remains in the insert mode until the RESET key is pressed.

Inhibited

This indicator displays and the keyboard is disabled when:

- An attention key is pressed (PF keys, ENTER, CNCL, PA2, REQ, PA1, MODE SEL, CHG DPLY, or DIAG).
- You try to alter a protected field.
- You try to insert a character into a field that is full.
- You pressed more than one key together or you pressed a key too quickly.
- The console is busy processing a previous command.

The indicator is reset and the keyboard is enabled when you press the RESET key or the application program issues a Write command that specifies a keyboard restore. (This also resets the Usage Conflict, Prt Busy, Prt Intv Reqd, or Prt Check indicator.)

Usage Conflict

This indicator displays when a function is not allowed at the present time. This occurs if the START, STOP, INTR, MODE SEL, CHG DPLY, or DIAG key, and others, is pressed when another display console is already in manual control mode. This indicator also displays when a function is requested and a previous request has not been completed.

The indicator is reset by pressing the RESET key.

Prt Busy

This indicator displays when an attempt has been made to start a printer operation and the printer is busy from a previous COPY key request or print command from the system. The copy request is ignored.

This indicator is reset by pressing the RESET key.

Prt Intv Reqd

This indicator displays when you have to restore the printer to the ready condition. The indicator is also displayed if a COPY key request is made and no copy key is *device defined*.

The Prt Intv Reqd indicator is reset by pressing the RESET key.

Prt Check

This indicator displays when a print operation is attempted and the printer has detected a permanent error.

The Prt Check indicator is reset by pressing the RESET key.

ALPHA (↑)

This indicator displays when the processor display console is in uppercase alphanumeric mode.

Alpha

This indicator displays when the processor display console is in lowercase alphanumeric mode.

Kat (↑)

This indicator displays when the processor display console is in uppercase Katakana mode.

Kat

This indicator displays when the processor display console is in lowercase Katakana mode.

Printer/Keyboard Mode

In printer/keyboard mode, the display console and the optional 3287 Printer share a single address. This operational mode is used to duplicate a 1052 for the operating systems and programs designed for that type of operator console. Operating messages to and from the system are displayed on the display console and are also printed on the coupled console printer. The format of the display console screen in printer/keyboard mode is shown in Figure 25.

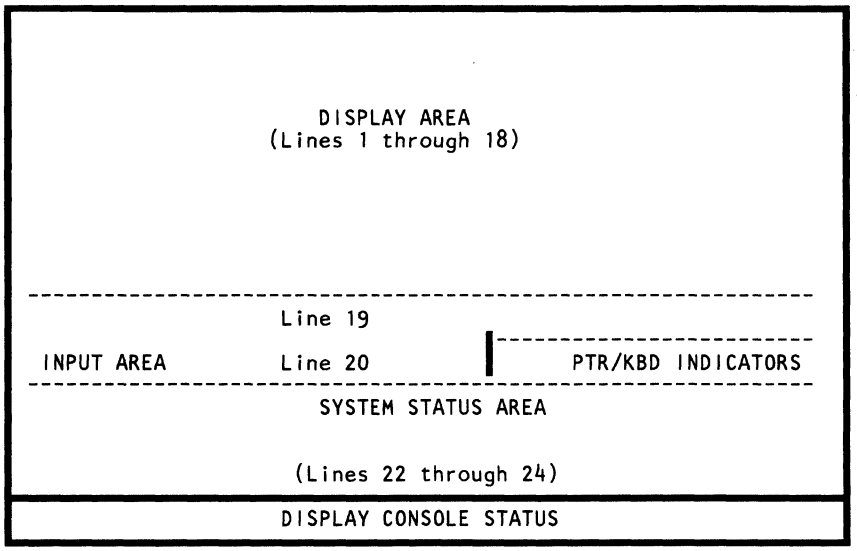


Figure 25. Printer/Keyboard Mode Screen Format

Display Area

Lines 1 through 18 are used as the operating system display area. This area displays both operator input and system output messages. As the display area becomes full, the messages are scrolled up (six lines) on the screen so that only the current messages are displayed. All information displayed in this area is duplicated on the attached 3287 Printer for a hard-copy record of operating messages.

The 3287 Color Printer Model 1C or 2C duplicates the 3279-2C Color Display Console, except that the white fields of the 3279-2C screen print in black on the printer. (The green and black fields of the 3287 Printer may be interchanged at feature order time.)

Input Area

The operator input area consists of line 19 and the first 46 characters of line 20. Operator input messages keyed from the keyboard are entered in this area. When the ENTER or CNCL key is pressed, the data entered into the input area is transferred to the system. Data accepted by the system is moved to the display area and printed on the 3287.

Prt/Kybd Indicator Area

The printer/keyboard indicator area is contained in character positions 48 through 79 of line 20. This area is intensified and displays the state of the printer/keyboard device. The following indications can be displayed in this area:

Proceed This indicator displays when a Read command is in progress. At this

time, data can be entered from the keyboard into the input area.

Proceed is normally cleared when the Read command is ended by pressing the ENTER or CNCL key. Proceed is also cleared by a Halt Device or Halt I/O instruction sent to the device, or by a system or selective reset.

Request This indicator displays when the REQ key is pressed (which generates an attention interrupt), but the device is busy executing a previous operation. When the operation is complete, the Request indicator is reset and the attention status is sent to the channel.

Alarm This indicator appears and the audible alarm sounds when an Alarm command is received by the display. The indicator is cleared by:

- Pressing a Program Function (PF) key,
- Pressing the ENTER or CNCL key when Proceed is not displayed, or
- A system or selective reset condition.

INTV-REQD The Intervention Required indicator appears if the 3268-2 or 3287 Printer, which is coupled as the hard-copy device, becomes not ready. This can be caused by an end-of-forms, power off, or other check condition. When the check condition is cleared and the printer is restored to ready status, the Intv Reqd indicator disappears.

System Status and Display Console Status Areas

The system status area (lines 22 through 24) and display console status are common to all screens and are described on page OPR 56 (see "System Status and Display Console Status").

Manual Control (Q Function) Screens

The manual control mode consists of the Q function screens that are used to communicate with the system on a level below the operating system. These screens give the customer control of the following functions:

- IML, IPL, and console device assignments
- Reset and Restart
- Time of day (TOD) and TIMER control
- Compare/trace controls
- System operation controls (system check and rate controls)
- Display/alter functions.

The general format of the manual control mode display screens (Q screens) is shown in Figure 26. Lines 1 through 20 are used as the input and output area; these lines are the areas shown in the figures of the manual screens (or Q screens) in this manual. Lines 22 through 24 are used to display system status and are not shown in the figures for the Q screens. Line 25 is the display console status line and is also not included in the figures for the Q screens.

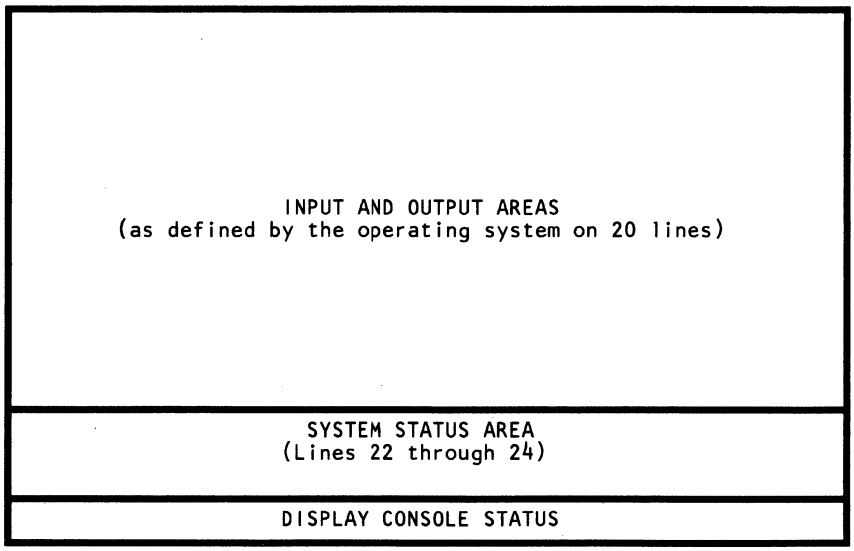
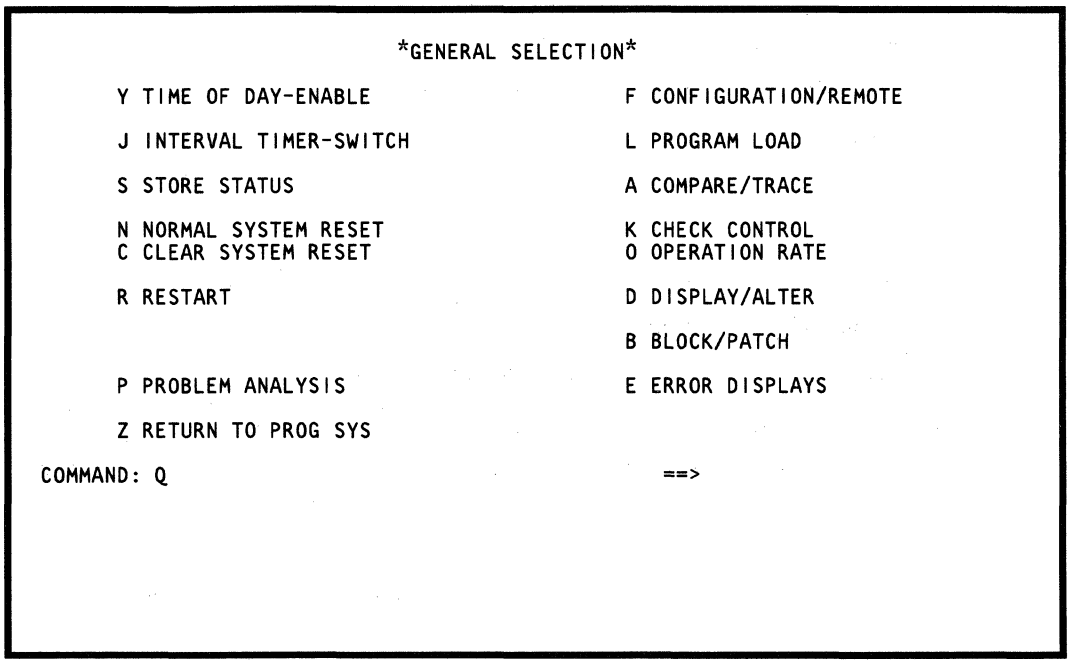


Figure 26. Manual Control Mode Screen Format

General Selection (Q)



The General Selection screen (Q screen) is the main screen and the first to appear when initially entering manual control mode. The screen is displayed when you press the MODE SEL or CHG DPLY key, or when you enter **Q** in the selection area of another screen.

The General Selection menu is divided into two sections. The selections on the left half of the screen, except for Restart (R), Problem Analysis (P), and Return to Prog Sys (Z), are immediate operations and do not generate another screen. When the immediate operations are selected, they execute their particular function and continue to display the General Selection screen.

The commands Store Status (S), Normal System Reset (N), Clear System Reset (C), and Restart (R), may be entered at the COMMAND line as Q followed by from three letters of the command (that is, QCLE, QRES, and others), up to the complete word (that is, QCLEAR, QRESTART, and others).

The selections on the right half of the screen generate another manual control mode screen to complete their functions.

General Selection Screen Functions (Left Side of Screen)

Time Of Day-Enable (QY)

The Time-of-Day (TOD) switch is set (enabled) by entering **QY** after COMMAND and pressing ENTER. When set, the TOD switch remains enabled for six seconds and TOD is indicated on line 23 of the display console. An automatic CHG DPLY function occurs when this switch is set and the display area returns to the operating system screen.

Interval Timer-Switch (QJ)

The interval timer function is available when the system is operating in S/370 mode. The interval timer switch is ON at the first IML after power on. The timer can be turned off by entering **QJ** at the COMMAND line and pressing ENTER on the keyboard. The interval timer is alternately turned on or off each time that **QJ** is entered. On later re-IMLs, the on/off state of the interval timer is unchanged.

The status of the interval timer is indicated on line 23 of the console display.

Problem Analysis (QP)

This selection begins an automatic Problem Analysis procedure that enables the machine to run a series of microcode routines to detect and analyze failures.

This Problem Analysis program is explained in the *IBM 4381 Problem Analysis Guide*, GA24-3955.

To begin the Problem Analysis procedure, follow the instructions in the *Problem Analysis Guide*. Be sure you are familiar with the steps to this procedure.

Store Status (QS) or QSTORE

This function is started by entering **QSTORE** after COMMAND and pressing ENTER.

In S/370 mode, the store status function stores the following in main storage:

- CPU timer – 8 bytes at hex D8 (216 dec.)
- Clock comparator – 8 bytes at hex E0 (224 dec.)
- Current PSW – 8 bytes at hex 100 (256 dec.)
- Prefix Reg – 8 bytes at hex 108 (264 dec.)
- Floating point registers – 32 bytes at hex 160 (352 dec.)
- General Registers – 64 bytes at hex 180 (384 dec.)
- Control Registers – 64 bytes at hex 1C0 (448 dec.).

When store status is complete, SAVE is indicated on line 22 of the system console and the system goes into the stopped state.

Normal System Reset – QNORMAL (QN)
Clear System Reset – QCLEAR (QC)

Most machine check/check stop conditions indicated on line 22 of the status area can be cleared using either the system reset QNORMAL or the system reset QCLEAR; QNORMAL (normal) is preferable. However, a few checks cannot be cleared with these resets. If a system reset fails to clear a check, a re-IML of the processor may be necessary (see "Program Load (QL) Screen"). If another check stop occurs after an IML is performed, the error is probably significant, and a service representative should be notified. If a program problem or a program-caused hardware problem is suspected, perform a trace wrap on the instruction counter (see Compare/Trace Screen) and take a main store dump before performing any Clear Reset or re-IML. This information may be helpful to your service representative.

The normal reset and clear reset functions are implemented by entering **QNORMAL** or **QCLEAR** after COMMAND and pressing ENTER.

Either of these resets will:

- Clear waiting interrupts or machine check conditions
- Cause the following to stop:
  - Execution of the present processor unit instruction (if any)
  - All channels and their control units
  - All adapters
  - All I/O devices (channel and natively attached).
- Reset manual functions:
  - Time-of-day enable
  - Save indicator.

A Program Reset does not affect the values of:

- CPU timer
- Clock comparator
- General registers
- Floating-point registers
- Control registers
- Main storage.

A Clear Reset initializes the control registers and clears to zero the values of any storage or registers whose contents can be modified by the system program. These include:

- Current PSW
- CPU timer
- Clock comparator
- General registers
- Floating point registers
- Main storage.

  Note: A Clear Reset causes an incorrect MATCH STOP to occur if a trace or stop on a main storage data compare (nonzero) function is in effect.

Restart (QR or QRESTART)

The restart function is implemented by entering **RESTART** following Q at the COMMAND line and pressing ENTER. If the machine is in the stopped state, it loads the program restart PSW from storage location 000000 as the current PSW. If the machine is in the operating state, the PSW exchange occurs at the end of the current instruction after all interrupts (for which the processor is enabled) are handled; this function can only be used if your operating system supports it.

If the operating system is MVS, a restart selection causes a new screen to appear. The screen is defined for and under control of the MVS operating system and is not shown in this manual. The screen contains several types of program restarts for the user to select; select the choice desired, press ENTER, and normal operation continues.

Return To Prog Sys (QZ)

In manual control mode, entering **QZ** after COMMAND and pressing ENTER returns the screen to the operating system.

Command Abbreviations

The commands QSTORE, QRESTART, QNORMAL and QCLEAR may be abbreviated at the COMMAND line (to three characters, for example, QRES, QNOR). Also, if only three characters are entered, the entire long form is shown at the COMMAND line.

General Selection Screen Functions (Right Side of Screen)

Configuration (QF)

This screen gives selections to obtain a testing facility for the console intensity or color convergence presentations, the remote operator console facility (ROCF), remote console communication screen selections, and customer configuration. The screen is selected by entering **QF** after COMMAND and pressing ENTER.

Program Load (QL)

This selection causes the Program Load screen to display on the console. The screen is selected by entering **QL** after COMMAND and pressing ENTER on the keyboard.

Compare/Trace (QA)

This selection causes the Compare/Trace screen to display on the console. The screen is selected by entering **QA** after COMMAND and pressing ENTER on the keyboard.

Check Control (QK)

This selection causes the Check Control screen to display on the console. The screen is selected by entering **QK** after COMMAND and pressing ENTER on the keyboard.

Operation Rate (QO)

This selection causes the Operation Rate Control screen to display on the console. The screen is selected by entering **QO** after COMMAND and pressing ENTER on the keyboard.

Display/Alter (QD)

This selection causes the Display/Alter screen to display on the console. The screen is selected by entering **QD** after COMMAND and pressing ENTER on the keyboard.

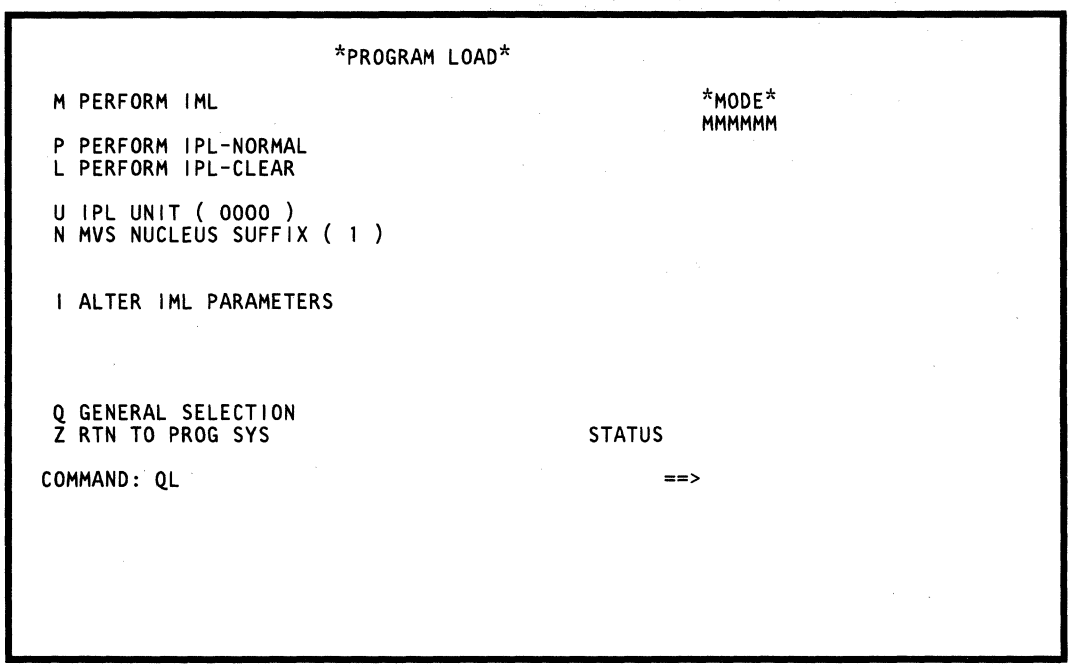
Block/Patch (QB)

This selection causes the Block/Patch screen to display on the console. The screen is selected by entering **QB** after COMMAND and pressing ENTER on the keyboard.

Error Displays (QE)

This selection causes the Error Display screens to display on the console. The screen is selected by entering **QE** after COMMAND and pressing ENTER on the keyboard.

Program Load (QL) Screen



The Program Load screen (QL) controls and displays the state of the processing unit initial microprogram load (IML) and the system initial program load (IPL). The *Mode* field displays the name of the last successful IML, System/370 or 370-XA mode. This screen can be obtained during initial power on or can be selected from the general selection screen. To display the QL screen, key **QL** next to COMMAND and press ENTER.

Perform IML (QLM)

This function controls the loading of the processor unit microcode. By entering **M** after the QL at the COMMAND label and pressing ENTER, the current microcode mode is loaded into storage.

Perform IPL-Normal (QLP)

Prior to performing this command, check the parameters on the screen. If the parameters are correct, enter **P** after QL at the COMMAND line and press ENTER. The QLP command does not clear storage.

If the parameters are not correct, they can be altered. You can alter the parameters by keying in the parameters to be changed and **L** after the COMMAND line and pressing ENTER.

For systems running the MVS system control program, subsequent IPLs perform an automatic store status (QSTORE) if the previous IPL was MVS. This function assures that the store status data is present for IPLing the next operation (for example, a stand-alone storage dump).

Perform IPL-Clear (QLL)

Before performing this command, check the parameters on the screen. If the parameters are correct, enter **L** after the QL at the COMMAND line and press ENTER. This will clear storage and load the program from the device indicated at the IPL UNIT.

If the parameters are not correct, they can be altered. You can alter the parameters by keying in the parameters to be changed and **L** at the COMMAND line, and pressing ENTER.

For systems running the MVS system control program, subsequent IPLs perform an automatic store status (QSTORE) if the previous IPL was MVS. This function assures the store status data is present for IPLing the next operation (for example, a stand-alone storage dump).

You can automatically perform an IPL from a power off condition. For this to occur, enter (on the QFO screen) **Y** next to IPL AND IML AT POWER-ON. With this option selected, IPL automatically occurs at the next power on.

IPL Unit (0000) (QLU)

This field indicates the address of the device (in System/370 mode) from which the program is loaded when the Perform IPL (P or L) function starts. To change the address, key the following at the COMMAND line and press ENTER.

- **U**
- A one-character hexadecimal control unit address
- A two-character hexadecimal device

  Note: In 370-XA mode, the IPL unit address is a four-character hexadecimal device number. This number can be entered as a one- to four-digit number.

MVS Nucleus Suffix (1) (QLN)

To specify a nucleus, key **QLN(x)** next to COMMAND; **(x)** represents a one-character MVS nucleus suffix.

Alter IML Parameters (QLI)

This option allows you to change the control mode of operation and the extended architecture (XA) I/O configuration data set (IOCDS).

Fast-Select IML/IPL (QLMP)

To perform IML and IPL from the Program Load screen:

- Key **QLMP** next to COMMAND and press the ENTER key.

  Note: The IML and IPL operate with the previous parameter settings.

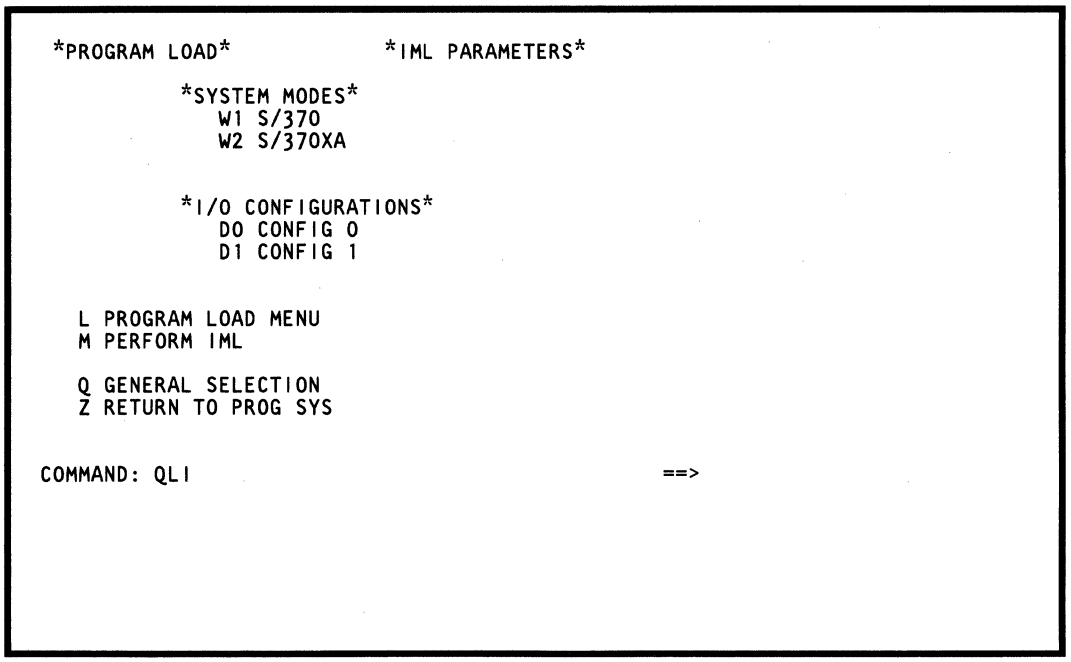
Return to General Selection (Q)

To return the display to the General Selection screen, enter **Q** next to COMMAND.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, enter **QZ** after COMMAND.

Alter IML Parameters (QLI) Screen



You can use this screen to change any of the IML parameters described below.

CAUTION
If you use the QLI screen to change an IML parameter, you must load the change before you leave the Program Load area, otherwise the desired change(s) is lost. To load the change, specify QLM or QLIM on the COMMAND line, and then press the ENTER **key.**

System Modes

The system mode (either W1 to indicate that the system is in System/370 mode, or W2 to indicate that the system is in 370-XA mode) is intensified on the screen. To change it, key in the desired code (**W1** or **W2**) after QLI on the COMMAND line, and then press the ENTER key.

I/O Configurations

These two selections apply to 370-XA only. The D0 and D1 indicate which input/output configuration data set (IOCDS) is to be loaded at the next 370-XA initial microprogram load (IML). Refer to the I/O configuration function (QFOI) for details on the D0 and D1 selections.

Program Load Menu (L)

This selection returns the display to the Program Load (QL) screen. To display the Program Load menu, enter **L** after QLI on the COMMAND line and then press the ENTER key. At this point, an IML (QLM) will reflect any changes made on the IML Parameters screen.

Perform IML (M)

This selection performs an IML and returns the display to the Program Load (QL) screen. To perform an IML, enter **M** after QLI on the COMMAND line and press the ENTER key.

Return to General Selection (Q)

This selection returns the display to the General Selection (Q) screen. To display the General Selection menu, enter **Q** on the COMMAND line and then press the ENTER key.

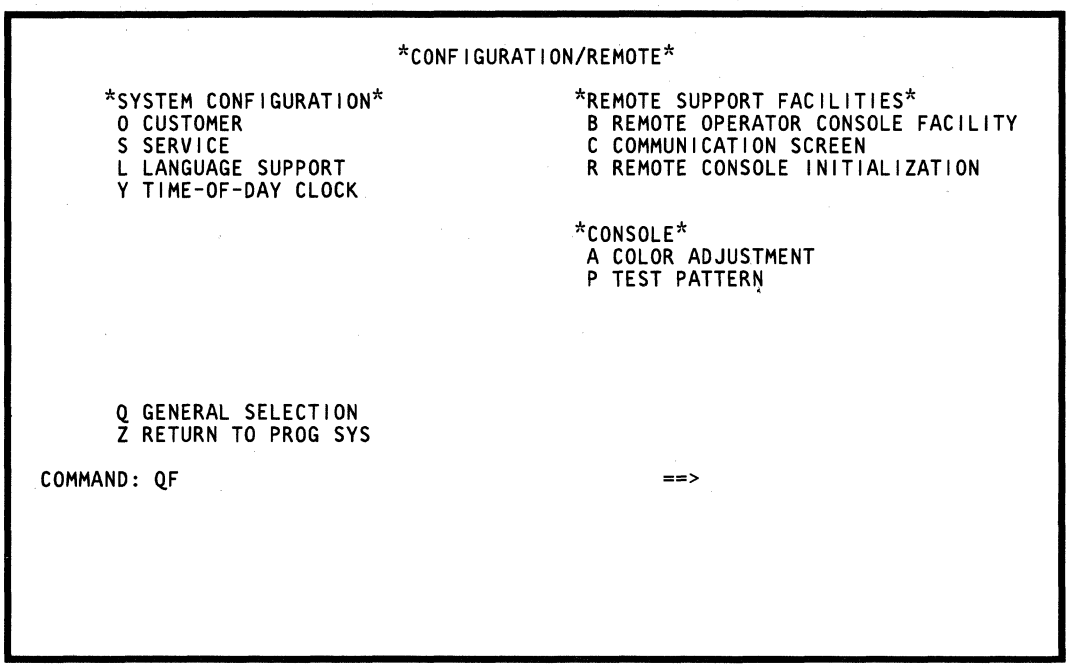
See **CAUTION** under "Alter IML Parameters (QLI) Screen" (OPR 72).

Return to Prog Sys (Z)

You can use this selection to return the display to the control of the operating system. Enter **Z** after QLI on the COMMAND line and then press the ENTER key.

See **CAUTION** under "Alter IML Parameters (QLI) Screen" (OPR 72).

Configuration/Remote (QF) Screen



You can use this screen to change the state of the system or test the system from a remote site. To display the options available on the Configuration/Remote screen, key **QF** next to COMMAND and press the ENTER key.

System Configuration

Customer (QFO) This screen contains the facilities for setting the IML powering conditions, the console copy device and printer/keyboard assignment, and the optional byte channel assignments.

Service (QFS) This screen is a service-oriented screen and displays the system identifiers, the storage size parameters, ROCF and CTC feature settings, and the number of channels. (Refer to the QFS directions in the programmer/analyst section).

Language Support (QFL) This screen presents the international languages that are supported by the 4381, the current language setting, and the provision to change language presentation on the screens for problem analysis.

Time-Of-Day Clock (QFY) This selection sets the support processor clock, but does not affect the processor clock.

Remote Support Facilities

Remote Operator Console Facility (QFB) This feature supplies the selections to assist you in operating the system in a distributed data processing environment (where a remote console can, for example: IML/IPL, set and reset, and issue system commands through telephone lines).

Communication (QFC) Screen This selection is a screen for operator communication between the host and satellite processor sites in a message-only mode when ROCF is active.

Remote Console Initialization (QFR) This selection contains the screen to initialize the remote console service connections. This function should only be used at the direction of service personnel. (Refer to the QFR screen in the Directed Use section).

Console

Color Adjustment (QFA) This selection enables you to sharpen the color presentation of the color display through an adjustable pattern on the screen.

Test Pattern (QFP) This selection checks the intensity and field protection characteristics of a one-color screen with a test screen.

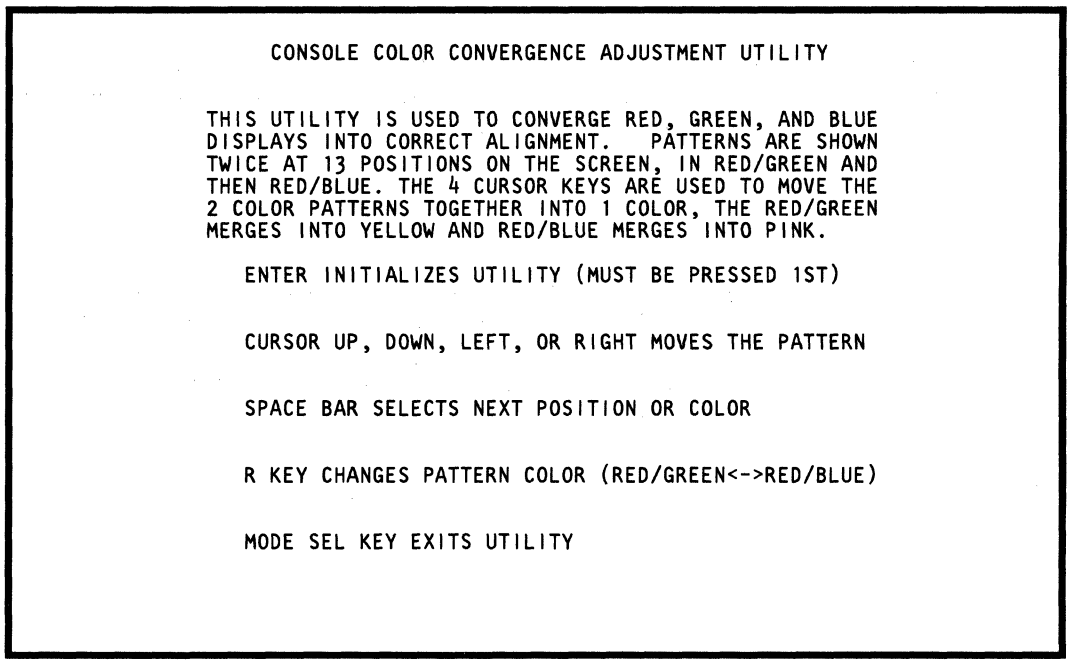
Return to General Selection (Q)

To return the display to the General Selection screen, enter **Q** next to QF at the COMMAND line.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, enter **Z** next to Q at the COMMAND line.

Console Color Convergence (QFA)



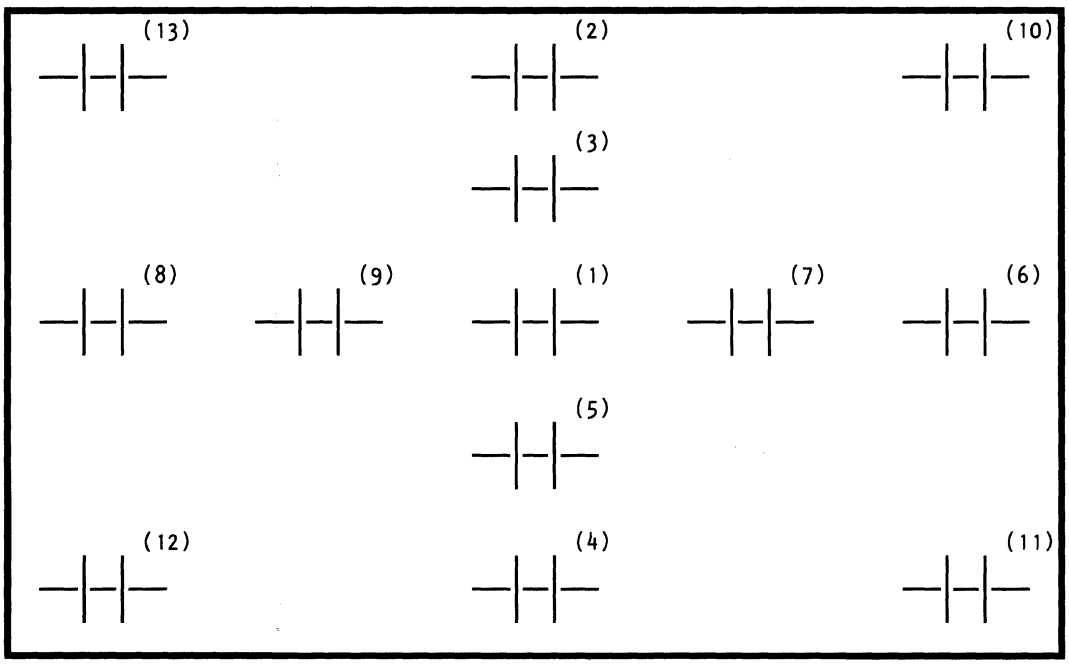
Console Color Convergence Utility

This screen and the associated pattern screen (on the following page) enable you to adjust the color on the 3279 Model 2C Color Display Console. The Convergence Utility screen displays when you key **QFA** after COMMAND and press ENTER. This screen describes the convergence adjustment and test procedures to adjust the color presentation. The convergence utility enables you to adjust the settings of the primary colors (red, green, blue), which combine to produce a pure compound color (for example, white contains all three primary colors). If convergence is wrong, you can see traces of each color at the edges of a white character.

Use this procedure when:

- Setting up a color console
- The console has been moved to another area
- The color is poor.

Console Color Convergence Pattern (QFA1) Screen



Note: The pattern adjusting positions are displayed in the order indicated by the number in parenthesis. The number is not displayed.

Convergence Adjustment Procedure

On the color convergence pattern screen, thirteen patterns display, one at a time, in the order shown on the above screen.

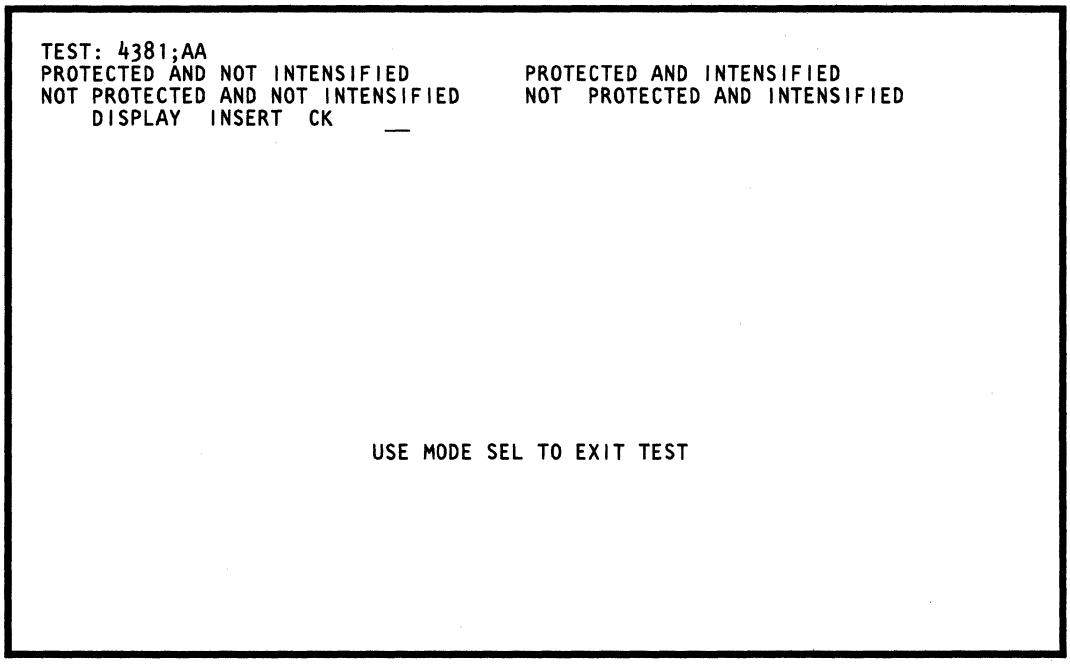
To start the adjustment procedure from the QFA screen, press the ENTER key. You will advance to the first position in the center of the screen. At each position, a pattern (- | - | -) first displays in two colors (red and green), which should appear as yellow on the screen. Use the cursor positioning keys on the keyboard to move the colors together until you produce pure yellow. (The cursor positioning keys are typematic and can be held down until the adjustment is satisfactory.)

After the adjustment is satisfactory (you see pure yellow, with no traces of red or green), use the space bar to advance to the next pattern, which uses red and blue to produce pink. Adjust these colors as you did the previous pattern (move the colors together until a pure pink pattern displays). After this adjustment is satisfactory, use the space bar to advance to the next pattern position. After the 13th position has been adjusted, pressing the space bar displays all 13 positions for a final visual check.

If you want to repeat a step at any time, press the R key. This permits you to check and adjust again the color at the previous position.

To repeat the adjustment procedure, simply press the space bar to advance to the first pattern position. To exit from the procedure, press the MODE SEL key after the final position.

Console Test Pattern (QFP)



Console Test Pattern

This screen allows you to determine the characteristics of the fields on the manual function screens. The fields can include the following characteristics:

- Unprotected – The information can be changed by the user on the screen at that field position.
- Protected – The information at that field cannot be changed by the user on the screen.
- Unintensified – The information on the screen has no special significance (3278 only).
- Intensified – The information on a screen has special significance; it **stands out** from the rest of the screen (3278 only).

The QFP screen displays the four possible combinations of the characteristics of the field states. If the console is a 3278-2A, the presentation is in intensified green or in unintensified green.

If the console is a 3279-2C, the four characteristic combinations are shown in the four colors that were determined by the system programmer and are contained in the system control program.

The first line contains the word TEST, the system model type, and the console port to which the display is connected (AA).

Line four starts the area where the user can insert characters to test the keyboard display screen interface; this area is from lines 5 through 20.

To exit the Console Test Pattern, press the MODE SEL key.

System Configuration – Customer (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
IML AND IPL AT POWER-ON: Y                     -CHNL PRT   : N  ADDR: 0000


                                      BYTE MODE-CHNL 5:   N

CONSOLE MODE -PRT/KYBD: N
             -DISPLAY   Y             CONSOLE PORTS    P0   P1   P2   P3
                                      INSTALLED:        Y    Y    Y    N
                                      OPERATIONAL       Y    Y    Y    N
I I/O CONFIGURATION                   HARDCOPY :             N    N    N
Q GENERAL SELECTION                   ADDRESS S/370:  001F DISC DISC 0002
Z RETURN TO PROG SYS                 (CONNECTED:        Y    N    N    Y)XA only

COMMAND: QFO                                    ==>
```

This screen enables you to configure your system. You can select startup and IML/IPL controls, the console device assignments, and the functions for these devices. The QFO screen has six configuration sections:

- The two-line diskette section defines the type of diskettes you have installed.
- The three startup control lines show what your system is set to do at power on and the time prescribed to do it.
- When you are in System/370 mode, the two CONSOLE MODE lines indicate the mode you want the console to operate in—either display or printer keyboard mode. The setting of your PRT/KYBD mode determines which line will be followed by **Y**; one of these lines must always be followed by **Y**. When you are in 370-XA mode, the display line will always indicate Y.
- The two COPY KEY lines show which device, either the console printer or the channel printer, is assigned to copy the contents of the display screen when the COPY key is pressed. Only one device can be assigned at a time.
- The BYTE MODE line indicates whether channel 5 operates as a second byte multiplexer channel.
- The CONSOLE PORT section shows the current state of the four available ports to which you can attach console devices (displays and printers). The four port columns are displayed as PO, P1, P2, and P3. The recorded conditions for each port are under CONSOLE PORTS; these conditions indicate whether:
  - The port is installed
  - The attached device is operational
  - The port is a hard-copy device (printer)

- The address, if you are in System/370 mode.

Except for the console mode fields and the last line of the console port area, all fields in the QFO screen apply equally to System/370 mode and 370-XA mode. When you are in System/370 mode, the last line will be ADDRESS S/370. When you are in 370-XA mode, the second to last line will be DEVICE NUMBER. In 370-XA mode, the device numbers will be 00F2, 00F3, 00F4, and 00F5; you cannot change these numbers on the screen. Also, in 370-XA mode, an additional last line will be displayed as CONNECTED; this indicates the state of each port.

If you want to change a condition or assignment and the field is followed by a colon (:), simply move the cursor to the **Y** or **N** position, and type your choice (**Y** or **N**).

> **Note:** For restrictions concerning the QFO screen, refer to the instructions for the QFO screen in the programmer section.

In System/370 mode, when you are in printer/keyboard mode, two devices can share a common address with the display console so that when the system displays a message on the terminal, that message will be printed on the attached devices as well. A second terminal and printer can be coupled and share another address. In these cases, the printer will print the terminal content.

Remote Operator Console Facility (ROCF)

The remote operator console facility (ROCF) supplies selections that help to operate a 4381 in a distributed data processing (DDP) environment.

The selections include IML/IPL, Reset, Restart, Compare/Trace, Display/Alter functions, and operating system commands and responses. Also, to protect your data in the system, a password identification function is in the ROCF.

Once the remote 4381 system is successfully initialized by the host system (controlling computer), normal control and data transfer between the host system and remote system occurs through conventional channel communication controllers. A host system can control any number of remote systems, while a remote system can be controlled by only one host system at a time.

To start a DDP operation:

1. The remote system is initially powered on by personnel at the remote site. This operation loads the ROCF microcode into the remote system. This operation includes setting the time-of-day clock on the QFY screen.
2. The host system personnel dial-up the remote 4381 system through standard dial-up hardware.
3. The remote system answers and sends the ROCF LOGON screen to the host ROCF console.
4. The host system operator enters the password of the remote system on the ROCF LOGON screen.
5. The remote system verifies this password and sends the General Selection (Q) screen to the host ROCF console. Normal manual control functions (such as IML/IPL) are now available as console selections.
6. The host system operator IPLs the remote 4381 and then disconnects the ROCF link. Part of the IPL procedure of the remote system starts applicable system control programs that establish the DDP environment.
7. From this point on, the remote 4381 system is controlled from an operator console at the host system's site through normal channel network hardware.

Notes:

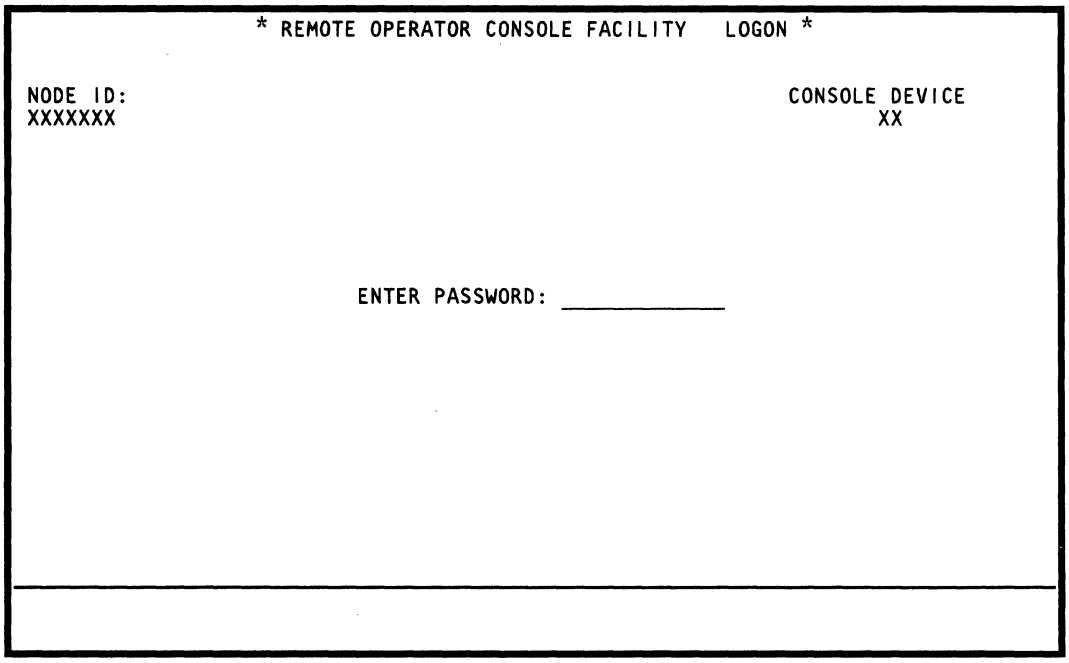
1. The ROCF feature will not answer an incoming call during IML of the 4381 or color convergence testing on a 3279 Model 2C Color Display Console.

   If an ROCF host link is active, no color console convergence can be performed. If you turn on a 3279-2C that has a ROCF host link active, the 3279-2C displays the screen content in one color until the link is disconnected.

2. The ERASE EOF, ERASE INPUT, and DELETE keys on the 3275 or host ROCF console should not be used because characters that are deleted on the operator's screen are not deleted at the receiving processor. To erase data to the end of a line, use the space bar.

Remote Operator Console Facility (ROCF) LOGON Screen

This screen is not part of the manual control mode screens, but is used when linking a host system to a remote system. This screen is sent by the remote system to the host system as a result of the dial-up/auto-answer operation. The password entered on this screen by the host system operator is verified by the remote system, and further operation is determined by the verification result.



The password of the remote system is entered following the ENTER PASSWORD label and is sent to the remote system by pressing ENTER. (For password information, refer to the QFB function screen.) Password entry is entered into a nondisplayed field and is not shown on the screen as it is entered.

The NODE ID (system node identification) of the remote system and the CONSOLE DEVICE being used for the ROCF session at the remote system are noted on this screen. These assignments can be changed by using the QFB screen.

ROCF Messages

The following messages appear after password errors or exceptional conditions.

```
PASSWORD INCORRECT, RETRY
PASSWORD DATED - MM/DD/YY
```

Meaning: 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 indicated.

```
LINE DISCONNECTED: TOO MANY INCORRECT PASSWORDS
```

Meaning: Three incorrect passwords were entered. The ROCF session terminates.

```
LINE DISCONNECTED: NO PASSWORD ENTERED IN 1 MINUTE
```

Meaning: The operator has not sent a password to the remote system by pressing ENTER within 1 minute since the ROCF LOGON screen was displayed or an incorrect password was entered. The ROCF session terminates.

```
SYSTEM IS IMLED
```

Meaning: The system that has been dialed by the operator has been IMLed. *A re-IML of this system will alter the present IML status.*

```
SYSTEM IS IPLED
CURRENT PSW IS XXXXXXXX XXXXXXXX
```

Meaning: The system that has been dialed by the operator has been IPLed. The current PSW of this system is XXXXXXXX XXXXXXXX. *A re-IPL will alter the present status.*

```
SYSTEM IS IPLED
MACHINE IS IN A CLOCK STOPPED STATE
```

Meaning: The system that has been dialed by the operator has been IPLed and is in a clock-stopped state. *IPL of this system will alter this state.*

```
SYSTEM IS IPLED
MACHINE IS IN AN ERROR STOPPED STATE
```

Meaning: The system that has been dialed by the operator has been IPLed and is in an error-stopped state. *IPL of this system will alter this state.*

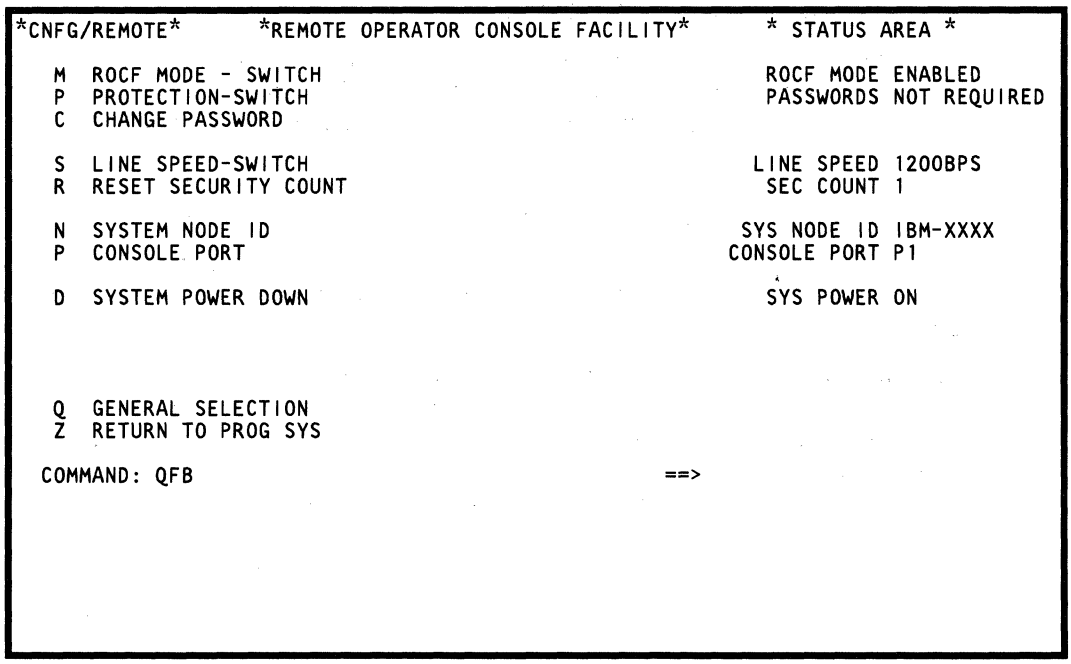
```
*** WARNING **** WARNING **** WARNING *** WARNING ***

REMOTE OPERATOR SUPPORT HAS BEEN INITIALIZED ON CONSOLE Py.
CONSOLE Px WAS NOT OPERATIONAL
```

Meaning: The remote system console (Px), selected from the QFB screen for use during ROCF sessions, was not operational. The remote system has automatically selected an alternate console (Py) for this ROCF session.

```
*** WARNING **** WARNING **** WARNING *** WARNING ***

THE INVALID PASSWORD SECURITY COUNT IS (xxx), UNAUTHORIZED
ACCESS TO THE REMOTE OPERATOR CONSOLE FACILITY MAY HAVE BEEN
ATTEMPTED
```

Meaning: More than ten incorrect passwords were entered from this and previous sessions. The actual number of incorrect passwords replaces (xxx) in the message above. An unauthorized user may have attempted to gain access to the remote system through ROCF. Note that any incorrect password is counted, even if a good password is subsequently entered.

Remote Operator Console Facility (QFB) Screen



This screen helps you establish a ROCF environment. This screen is selected through the Configuration (QF) screen. The selection options are printed on the left half of the screen, with the existing settings of these selections intensified in the status area on the right half of the QFB screen.

You can protect ROCF selections by using your password. When passwords are required, the ROCF password must be entered and verified before any ROCF screen function is performed. This ensures proper authorization before any changes are made.

To prevent accidental changes when passwords are not required, some ROCF screen functions must be entered twice. Your password is always required for changing the password, changing password protection, and for logging on through ROCF (refer to "Security Keylock").

The password on a new diskette is PASSWORD and the diskette is dated 01/01/82. All password changes and the dates they were changed should be recorded locally. If the password is lost, a new diskette must be ordered.

ROCF Mode – Switch (M)

The ROCF enabled/disabled state is changed by entering **M** after QFB on the COMMAND line and pressing ENTER. If ROCF is disabled, entering **M** changes ROCF to enabled; if ROCF is enabled, entering **M** changes ROCF to disabled. The enabled state allows the ROCF monitor to respond to incoming calls and initialize the ROCF link. When passwords are not required, the **M** must be entered again (when prompted) to avoid an accidental change to the enabled/disabled state. The **M** entry is not permitted from the host location through the RSF link. However, the word **MODE** entered on the COMMAND line is valid through the RSF link and does not require a double entry.

Protection-Switch (P)

The protection status can be altered by entering **P** following QFB on the COMMAND line and pressing ENTER. When password protection is in effect, the user enters the password when a QFB alteration is requested. Passwords are always required for this selection.

Change Password (C)

A user can change the password of the remote system by entering **C** following QFB on the COMMAND line and pressing ENTER. To change a password:

1. When prompted, enter the new password on the COMMAND line . The password is entered into a nondisplayed field. (The password must be at least four and no more than eight characters, and must be different from the password it replaces.)
2. To assure the password is correct, enter the same password again when prompted.
3. To assure authorization, enter the current password when prompted.
4. When the above steps are correctly completed, PASSWORD CHANGED is displayed.

Line Speed-Switch (S)

The speed setting is alternately changed from 600 to 1200 bits per second by entering **S** following QFB on the COMMAND line and pressing ENTER. If passwords are not required, the S must be entered a second time when prompted.

Reset Security Count (R)

This counter adds one to itself when the remote system receives an incorrect password (from a host request) to initiate an ROCF session. The current count value is intensified in the status area and is reset by entering **R** following QFB on the COMMAND line and pressing ENTER.

System Node ID (N)

The current system node identifier is displayed in the status area. The node identification can be changed by typing **N** and the new node identifier. If only **N** is entered after QFB on the COMMAND line, enter the new node identifier when prompted. The new node ID must be at least one and no more than eight characters.

Console Port (P)

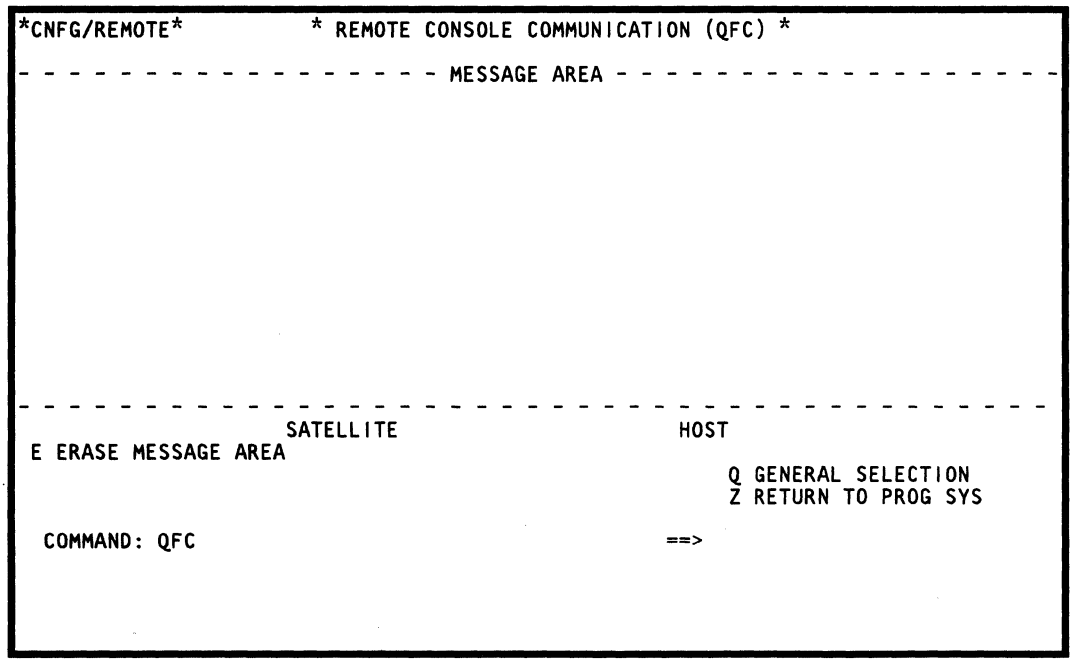
The ROCF console port assignment (P0, P1, P2, or P3), which is linked to the host, is displayed in the status area. To change this device assignment, type **P**(n) after QFB on the COMMAND line and press ENTER; (n) defines one of the four available ports: 0, 1, 2 or 3. If only P is entered, the valid device assignments are displayed in the message area.

System Power Down (D)

To power down the remote system, including the I/O devices attached to the remote system, type **D** after QFB on the COMMAND line and press ENTER. If passwords are not required, enter **D** again when you are prompted. This action helps prevent accidental selection. The word DOWN may also be used without requiring a second entry. If passwords are required, the second entry is replaced by a prompt for the current password. When the request is accepted by the 4381, the message SYS POWER OFF is displayed on the screen in the status area; the message ROCF LINK DISCONNECTED is displayed in the message area. At this time, the 4381 system is disconnected and powered off.

Remote Operator Console Facility Communication (QFC)

This screen is a ROCF communication facility that allows the operators at the host and satellite systems to communicate in a message-only mode. This screen is valid only when the ROCF link is active and only between the host and the 4381 console configured to ROCF mode.



Message Area

The message area contains text that either the host or remote operator has sent to or received from the other operator. This message is entered by either operator, as determined by the SATELLITE or HOST indication. Each new line entry must be manually advanced by using the cursor. (The ENTER key, usually used for new line advance, is used to send the message when completed.)

The message area can be cleared at any time by entering **E** (erase) next to the C on the COMMAND line and pressing ENTER. Refer to Note 2 under "Remote Operator Console Facility" (OPR 82) for information on erasing.

Satellite and Host

The Satellite and Host intensified indicators show which operator is in message-sending mode. The Host indicator refers to the ROCF controlling console operator; the Satellite indicator refers to the ROCF controlled system operator. Pressing ENTER changes the indication from the Satellite message-sending state to the Host message-sending state and vice versa. These indicators help avoid data loss when both operators attempt to send messages at the same time.

Configuration – Set Time-of-Day Clock (QFY)

```
                    *LOCAL TIME CLOCK*

                    YEAR / MONTH / DAY
                     YY  /  MM   /  DD
ENTER DATE:          __  /  __   /  __

                    HOUR : MINUTE : SECOND
                     HH  :   MM   :   SS
ENTER TIME:          __  :   __   :   __

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

                                    ==>
```

Setting the Time-of-Day Clock

The screen shown appears when an unpowered 4381 processor is initially powered on. A similar screen is available at any time by using the QFY command.

To set the clock, enter the date and the current time. When this time occurs, press ENTER, the time will then be the current time. Entries are made on the screen, where the underline characters appear at the ENTER DATE and ENTER TIME lines. All the required fields must have an entry. The date is in yy/mm/dd (year/month/day) notation (for example, 84/02/14 represents February 14, 1984). The time is in hh:mm:ss (hours:minutes:seconds) notation and a 24-hour clock is used (for example, 14:25:00 would be 2:25 in the afternoon).

You can use this screen to reset the support processor clock at any time by entering **QFY** at the command line of any manual function screen. If the clock is already running, press ENTER to display the current time. You can change any field without affecting the other fields; the other fields remain at their current setting.

Synchronizing Processor and Support Processor Clocks

There are two clocks in the system, one in the instruction processor and one in the support processor.

The clocks are not synchronized by the 4381. To get the instruction processor clock and support processor clock approximately synchronized, both the instruction processor clock (using the system control program clock setting mechanism) and the support processor clock (using the QFY screen) must be individually set referencing a common external clock.

Language Support (QFL) Screen

```
                          *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/AERTY       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                                      ==>
```

You can use this screen to select the keyboard language desired for the screen presentation. You also use this screen to select one of the Problem Analysis languages available. To make these selections, first key in **QFL** after COMMAND and press ENTER. This operation displays the QFL language support screen. The language code number currently in effect is intensified on the screen.

Language Codes

To change the keyboard language code, set the cursor at the current language code position and enter the desired two-character language code from the list below.

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

Press the ENTER key. Follow the prompting messages on the screen; you will be directed to install the DIAG1 diskette to obtain necessary microcode to effect this change. Press the **POWER ON/IML** switch. (This does the required SP-IML.)

Note: The Canadian/French keyboard has the same character set and keyboard layout as the U.S. English, but has French nomenclature on the keys. A support processor IML does the console language change.

Current Problem Analysis Language

You also use this screen to select one of the languages available for the PA operation screen presentations. The PA language code currently in effect is intensified on the screen. Move the cursor to the current Problem Analysis language code and enter the desired language change.

To change the language, key the corresponding number for the language you want:

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

Press the ENTER key. Follow the prompting messages on the screen.

Alternate Problem Analysis Language

For Problem Analysis, the user may have English and one other language resident in the functional diskette. If the second, or other language, must be changed, you will be directed to install the DIAG1 diskette to obtain the necessary microcode to effect the change.

Incompatible Selections

The keyboard and Problem Analysis language selections must be compatible. When the message SELECT A PA LANGUAGE THAT IS COMPATIBLE WITH KEYBOARD LANGUAGE appears on the QFL screen, you must select a PA language that is compatible with the keyboard language selection.

General Selection (Q)

This function returns the display to the General Selection (Q) screen. Enter **Q** after QFL on the COMMAND line and then press the ENTER key.

Return to Prog Sys (Z)

This function returns the display to the control of the operating system. Enter **Z** after QFL on the COMMAND line and then press the ENTER key.

Problem Analysis

```
                    *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




Q GENERAL SELECT
Z RETURN TO PROG SYS

  COMMAND: QP                                    ==>
```

The 4381 Problem Analysis process is a multiple-part program that collects data from storage, error logs, program status words, channels, and others, and then attempts to determine the type of problem that can exist. For example, these problems may be I/O errors, IPU errors, incorrect loops, hangs, and wait states.

The Problem Analysis program lead the user through the correct sequence of steps to determine and resolve the problem.

Once a problem is suspected, the user exits manual control mode, and enters the Problem Analysis phase. The *IBM Problem Analysis Guide*, GA24-3955, leads the user through the procedures of Problem Analysis. This interactive process instructs you to enter commands, and then displays the results of the commands.

The Problem Analysis screen information is contained in the PA Guide and on the screens themselves.

Some of the Problem Analysis screens contain detailed system information, which may require in-depth study; these screens are displayed while using the Problem Analysis program. They are also described in the programmer section of this manual.

These detailed screens contain information about the program status word (PSW), interface control checks (IFCC), instruction and microprogram loops, microprogram load problems and others.

The display information of the Option 5 detail screens contain a header line that indicates the area of a suspected problem. These general areas include:

- Initial program load (IPL)
- Machine check (MCK)
- Program: wait state (PGM:WAIT)
- Interrupt (INT)
- Other.

Note: The IOCP function of the 4381 is a stand-alone operation that generates the channel subsystem configuration. When IOCP detects a problem during execution and messages are generated during this operation, the Problem Analysis program should not be run. Only the IOCP messages and recovery instructions should be followed.

Programmer and Analyst Introduction

The chart on the next two pages gives you an overview of the screens that are described in this section. Some of the screens are covered in the Operator section and are repeated in this section to more fully describe their functions.

System Programmer/Analyst Functions

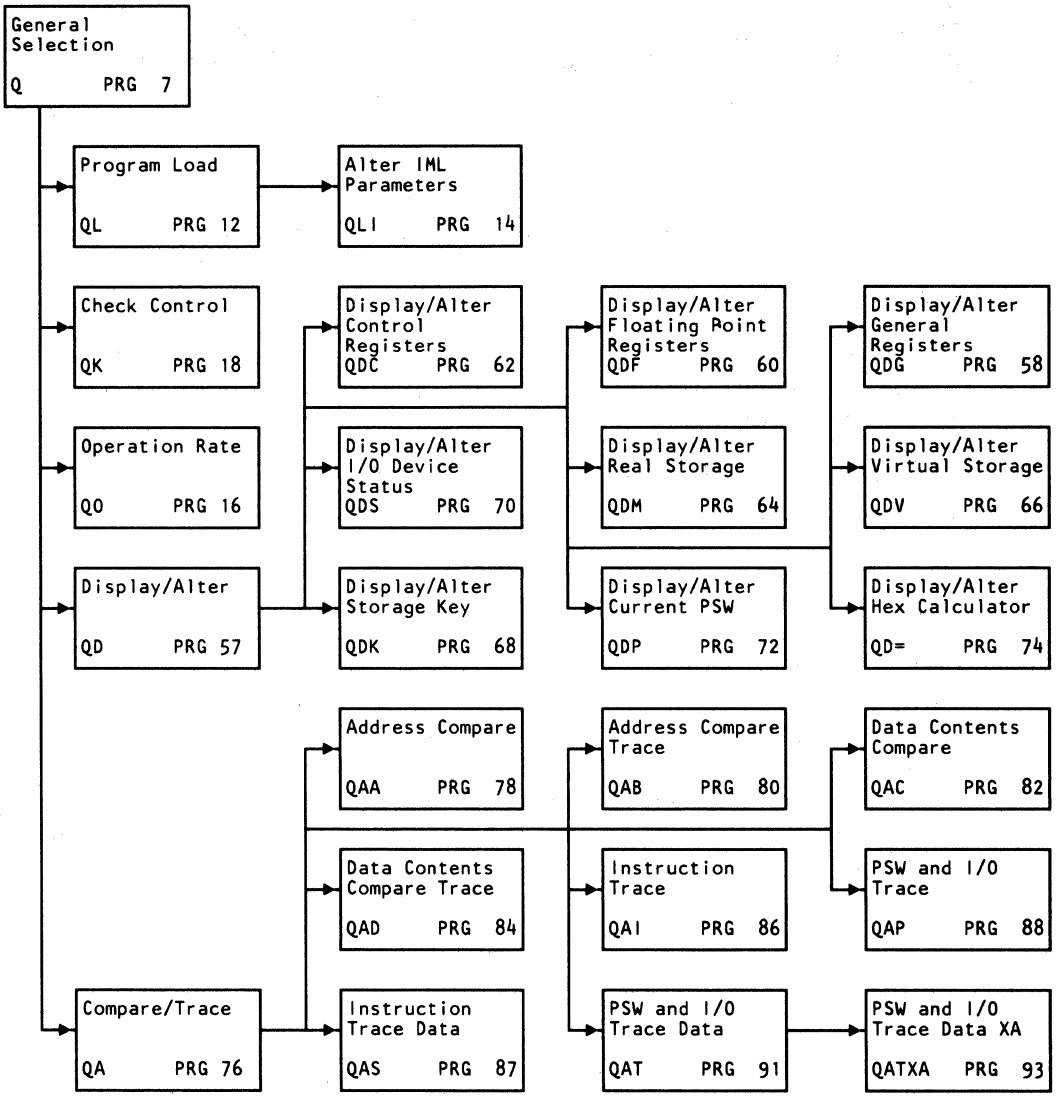
The operator section of this manual describes the operations and screens that are normally used by a computer operator; these functions are described in the operator's section so that you can operate the system in a normal running condition.

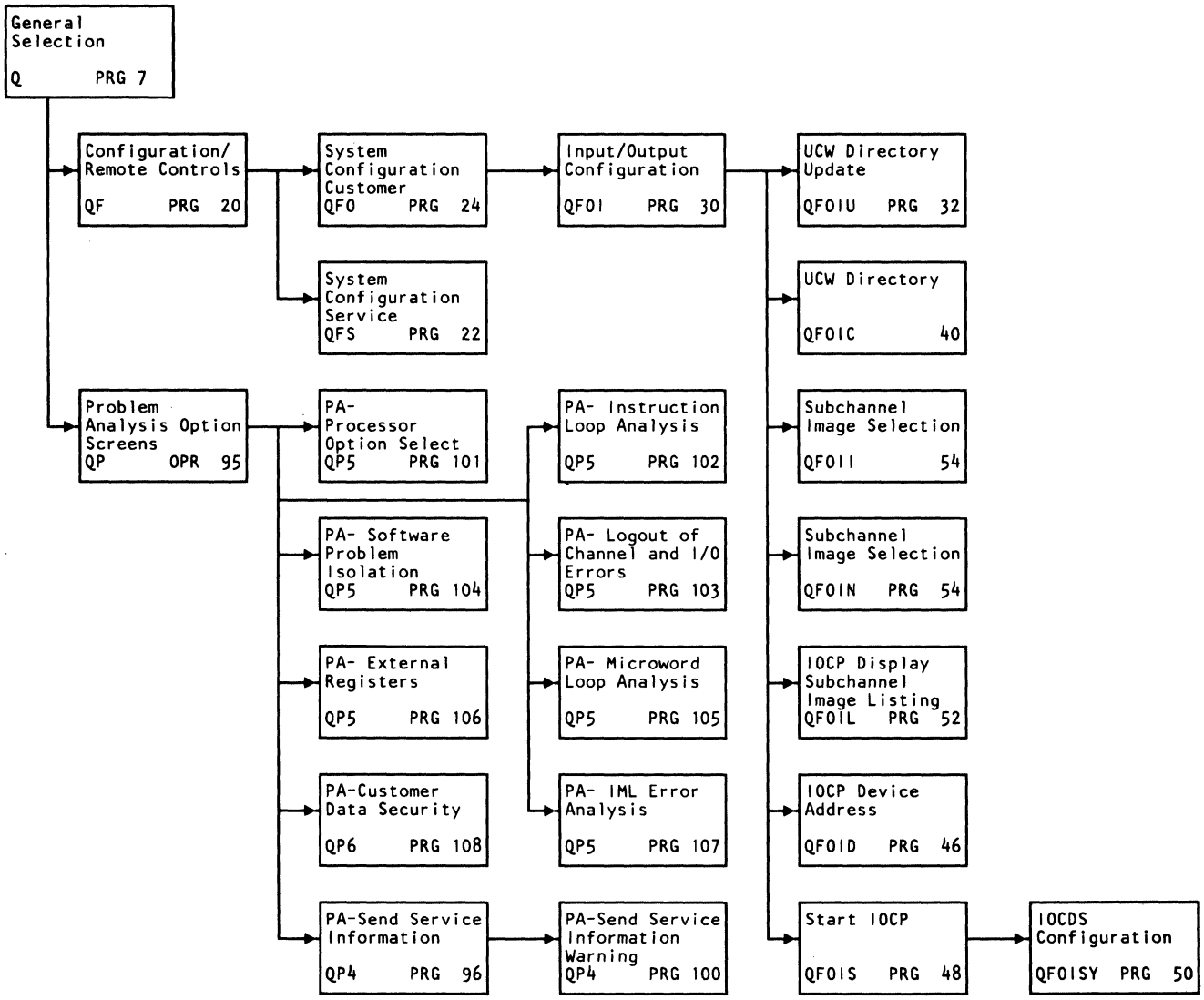
This section, Programmer/Analyst, describes functions and screens within the area of responsibility of the system programmer or analyst. Five major topics are covered in this section:

- Program load, check control, operation rate functions—see PRG 12.
- System configuration functions—see PRG 20.
- Display and alter functions—see PRG 57.
- Compare and trace functions—see PRG 78.
- Problem Analysis functions—see PRG 95.

These functions are normally used to display, alter, or analyze the system when it is in a stopped state. The functions in this section are not ordinarily used by an operator (due either to the complexity of the procedure or the type of function—that is, the function is in the area of system configuration or analyzation). The functions and screens covered in this section should not be used without the direction of qualified personnel.

Overview of Programmer and Analyst Screens




General Selection
Q PRG 7
Configuration/ Remote Controls
QF PRG 20
System Configuration Customer
QF0 PRG 24
System Configuration Service
QFS PRG 22
Input/Output Configuration
QF01 PRG 30
UCW Directory Update
QF01U PRG 32
UCW Directory
QF01C 40
Problem Analysis Option Screens
QP OPR 95
PA- Processor Option Select
QP5 PRG 101
PA- Instruction Loop Analysis
QP5 PRG 102
Subchannel Image Selection
QF01I 54
PA- Software Problem Isolation
QP5 PRG 104
PA- Logout of Channel and I/O Errors
QP5 PRG 103
Subchannel Image Selection
QF01N PRG 54
PA- External Registers
QP5 PRG 106
PA- Microword Loop Analysis
QP5 PRG 105
IOCP Display Subchannel Image Listing
QF01L PRG 52
PA-Customer Data Security
QP6 PRG 108
PA- IML Error Analysis
QP5 PRG 107
IOCP Device Address
QF01D PRG 46
PA-Send Service Information
QP4 PRG 96
PA-Send Service Information Warning
QP4 PRG 100
Start IOCP
QF01S PRG 48
IOCDS Configuration
QF01SY PRG 50

Program Load, Check Control, Operation Rates

The Program Load screens initiate the IPL and IML functions, select the mode of operation, and supply the facility for changing the parameters.

The Check Control screens contain the controls for starting and stopping the processor on selected conditions.

The Operation Rate screens contain the controls for running the processor in a normal mode or in instruction-step mode.

System Configuration Functions

These functions enable you to configure:

- The system
- System internal facilities (such as IML and IPL controls)
- Display console setup.

Included in the description of these functions are the procedures for:

- Configuring the input/output control units and devices, their UCW directories and controlling parameters, and I/O device characteristics.
- Operating the remote operator console facility (ROCF) in a distributed data processing (DDP) environment.

The screens for defining the I/O devices for the IOCP input record data set and the screens that display the results of the IOCP program are also described. The instructions for generating the IOCP input, which is the basic input to the IOCP program, are **not** described in this document; they are described in the *IBM 4381 Input/Output Configuration Program User's Guide and Reference*, GC24-3964.

Display and Alter Functions

The Display and Alter functions enable you to display (and alter, if desired) those internal registers and facilities that may be useful in controlling and diagnosing programs. These facilities are the general purpose, control and floating point registers, the virtual and real storage facilities, the storage keys, and PSW and prefix registers. A hexadecimal calculator (for calculating storage addresses) is also described.

Compare and Trace Functions

The Compare and Trace screens provide trace functions within the processor facilities, such as the storage addresses, instruction counters, data contents and PSW and I/O facilities. The compare facility permits the user to stop on parameters or addresses selected in the trace function.

Problem Analysis Functions

There is a brief explanation of the Problem Analysis (PA) program, which analyzes system problems, in the Operator section. This facility is screen driven: the screens give the directions and instructions for the next step in the Problem Analysis procedures. For detailed information on the Problem Analysis program, refer to *IBM 4381 Processor Problem Analysis Guide*, GA24-3955.

Problem Analysis options 1, 2, and 3 are the normal run options. However, options 4, 5, and 6 may need some additional explanation so that you can use the contents of the screens contained in these options. Further detailing of these three options are given in this section, starting on PRG 95.

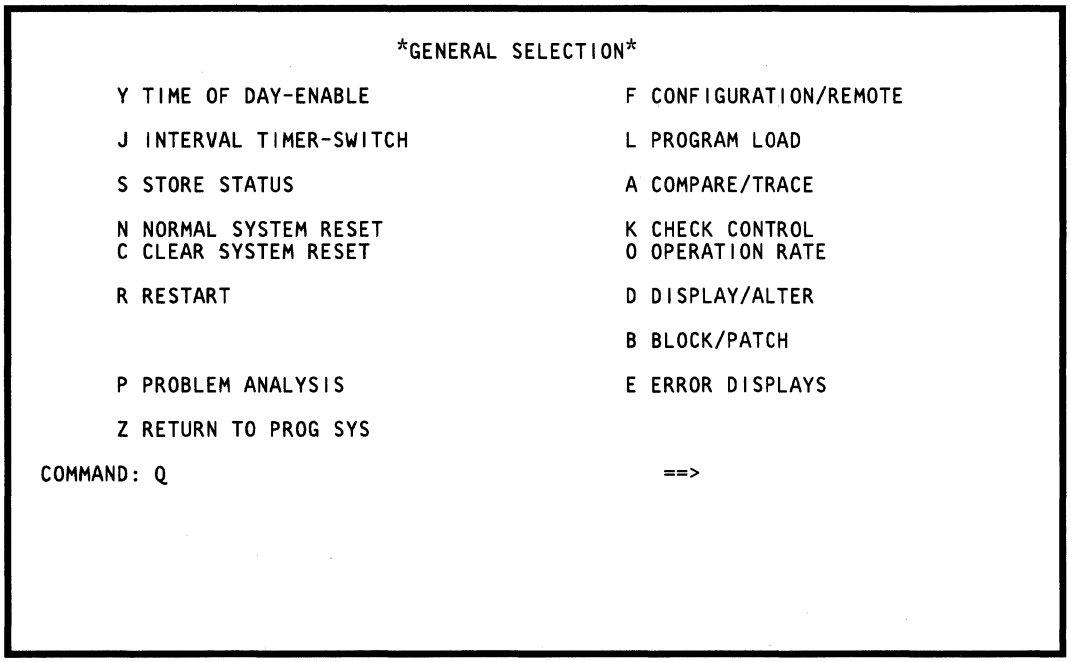
Option 4 screens give you directions for running the service connection procedure so that you can communicate the Problem Analysis results to the IBM support facility.

Option 5 screens contain the contents of storage locations, the processor and channel registers, channel and I/O errors, instruction and microcode loop detection PSWs, and some storage contents at the time of Problem Analysis.

Option 6 contains the screens that give the customer the ability to initiate internal data security procedures.

Programmer and Analyst Screens

General Selection (Q) Screen



The General Selection screen (Q screen) is the main screen and is the first to appear when you enter manual control mode. The screen is displayed when the MODE SEL or CHG DPLY key is pressed, or **Q** is entered in the selection area of another screen.

The General Selection menu is divided into two sections. The selections on the left half of the screen are immediate operations [however, unlike the other immediate operations, which perform their particular function and continue to display the General Selection screen, Restart (R) and Problem Analysis (P) generate another screen].

The selections on the right half of the screen generate another manual control screen to complete their function.

The commands Store Status (S), Normal System Reset (N), Clear System Reset (C), and Restart (R), may be entered at the COMMAND line as Q followed by from three letters of the command (that is, QCLE, QRES, etc.) up to the complete word (that is, QCLEAR, QRESTART, etc.).

General Selection Screen Functions (Left Side of Screen)

Time-of-Day Enable (QY)

The time-of-day (TOD) switch is set (enabled) by entering **QY** after COMMAND and pressing ENTER on the keyboard. When set, the TOD clock remains enabled for six seconds and TOD is indicated on line 23 of the display console. An automatic CHG DPLY function occurs when the switch is set; the display area returns to the operating system screen.

Interval-Timer Switch (QJ)

The interval-timer function is available when the system is operating in S/370 mode. The interval-timer switch is turned ON at the first IML following power on. The timer can be turned off by entering **QJ** after COMMAND and pressing ENTER. The interval timer is alternately turned on or off each time QJ is entered. On later IMLs, the on/off state of the interval timer is unchanged.

The status of the interval timer is indicated on line 23 of the console display.

Problem Analysis (QP)

This selection allows you to run the Problem Analysis program, which enables the system to run a series of microcode routines to detect and analyze failures.

This Problem Analysis program is explained in the *IBM 4381 Problem Analysis Guide,* GA24-3955. To begin the Problem Analysis program, follow the instructions in the *Problem Analysis Guide.* Before you begin Problem Analysis, be sure you are familiar with its steps.

Store Status (QS or QSTORE)

This function is started by entering **QSTORE** after the COMMAND line and pressing ENTER.

In S/370 mode, the store status function stores the following in main storage:

- CPU timer – 8 bytes at X'D8' (216 dec.)
- Clock comparator – 8 bytes at X'E0' (224 dec.)
- Current PSW – 8 bytes at X'100' (256 dec.)
- Prefix Reg – 8 bytes at X'108' (256 dec.)
- Floating point registers – 32 bytes at X'160' (352 dec.)
- General Registers – 64 bytes at X'180' (384 dec.)
- Control Registers – 64 bytes at X'1C0' (448 dec.).

When store status is complete, SAVE is indicated on line 22 of the system console and the system goes into the stopped state.

System Resets (QNORMAL and QCLEAR)

Most machine check/check stop conditions indicated on line 21 of the status area can be cleared using either the system reset QNORMAL or the system reset CLEAR command. [QNORMAL (Normal) is preferable.] However, a few checks cannot be cleared with these resets. If a system reset fails to clear a check, a re-IML of the processor may be necessary (see "Program Load Screen" on PRG 12). If another check stop occurs after an IML is performed, the error is probably not occasional, and a service representative should be notified. If a program problem or a program-caused hardware problem is suspected, the following steps can be helpful to your service representative:

- Execute a trace wrap on the instruction counter (see "Compare/Trace Screen" on PRG 76), and
- Execute a main store dump before any Clear Reset or re-IML.

The normal reset and clear reset functions are implemented by entering **QNORMAL** or **QCLEAR** after the COMMAND line and pressing ENTER.

Either of these resets will:

- Clear waiting interrupts or machine check conditions.
- Stop the following:
  - Execution of the present processor unit instruction (if any)
  - All channels and their control units
  - All adapters
  - All I/O devices (channel and natively attached).
- Reset manual functions:
  - Time-of-Day enable
  - Save indicator.

A normal reset does not affect the values of:

- CPU timer
- Clock comparator
- General registers
- Floating-point registers
- Control registers
- Main storage.

A clear reset initializes the control registers and sets to zero the values of any storage or registers whose contents can be changed by the system program. These include:

- Current PSW
- CPU timer
- Clock comparator
- General registers
- Floating-point registers
- Main storage.

Note: A clear reset causes an untrue MATCH STOP to occur if a *trace* or *stop on main storage data compare (nonzero)* function is in effect.

Restart (QR or QRESTART)

The restart function is implemented by entering **RESTART** after COMMAND and pressing ENTER. If the machine is in the stopped state, it loads the program restart PSW from storage location 000000 as the current PSW. If the machine is in the operating state, the PSW exchange occurs at the end of the current instruction after all interrupts (for which the processor is enabled) are handled. (This function can only be used if your operating system being used supports it.)

If the operating system is MVS, a restart selection causes a new screen to appear. The screen is defined for and under control of the MVS operating system and is not described in this manual. The screen contains several types of program restarts for the user to select; select the choice desired, press ENTER, and normal operation continues.

Return To Prog Sys (QZ)

In manual control mode, entering **QZ** after COMMAND and pressing ENTER returns the screen to the operating system.

Command Abbreviations

The commands QSTORE, QRESTART, QNORMAL and QCLEAR may be abbreviated at the COMMAND line to three characters (for example, QRES, QNOR). Also, if only three characters are entered, the complete long form is presented at the COMMAND line.

General Selection Screen Functions (Right Side of Screen)

Configuration (QF)

This screen enables you to test the selections for:

- Console intensity and color convergence
- Remote operator console facility (ROCF) and remote console communication screen selections
- Configuration selections; the screen is selected by entering **QF** after COMMAND and pressing ENTER.

Program Load (QL)

Select this screen by entering **QL** after COMMAND and pressing ENTER.

Compare/Trace (QA)

This selection causes the Compare/Trace screen to display on the console. Select this screen by entering **QA** after COMMAND and pressing ENTER.

Check Control (QK)

This selection causes the Check Control screen to display on the console. Select this screen by entering **QK** after COMMAND and pressing ENTER.

Operation Rate (QO)

This selection causes the Operation Rate screen to display on the console. Select this screen by entering **QO** after COMMAND and pressing ENTER.

Display/Alter (QD)

This selection causes the Display/Alter screen to display on the console. Select this screen by entering **QD** after COMMAND and pressing ENTER.

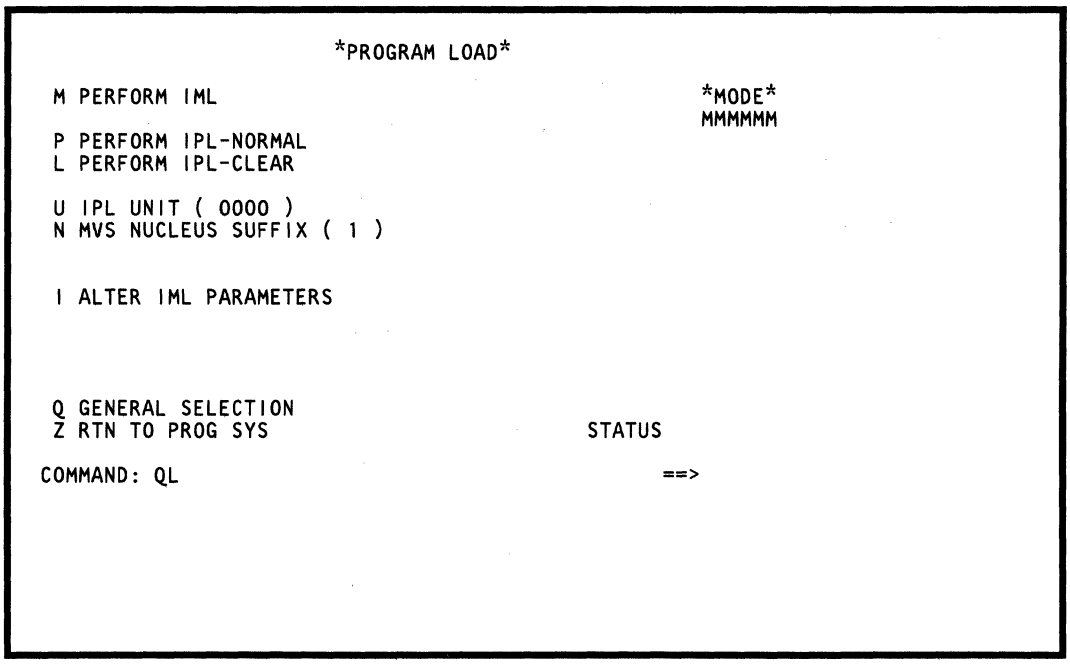
Block/Patch (QB)

This selection displays the Block/Patch screen. Select this screen by entering **QB** after COMMAND and pressing ENTER.

Error Displays (QE)

This selection displays the Error Display screens. Select this screen entering **QE** after COMMAND and pressing ENTER.

Program Load (QL) Screen



The Program Load screen (QL) controls and displays the state of the processing unit initial microprogram load (IML) and the system initial program load (IPL). The *Mode* field displays the name of the last successful IML, System/370 or 370-XA mode. This screen can be obtained during initial power on or can be selected from the General Selection screen. To display the QL screen, key **QL** after COMMAND and press ENTER.

Perform IML (QLM)

This function controls the loading of the processor unit microcode. By entering **M** after QL at the COMMAND line and pressing ENTER, the current microcode mode is loaded into storage.

Perform IPL – Normal (QLP)

Before performing this command, check the parameters on the screen. If the parameters are correct, enter **P** after QL at the COMMAND line and press ENTER. The QLP command does not clear storage.

If the parameters are not correct, they can be altered. You can change the parameters by keying in the parameters to be changed and **L** after the COMMAND line and pressing ENTER.

For systems running the MVS system control program, later IPLs perform an automatic store status (QSTORE) if the previous IPL was MVS. This function assures that the store status data is present for IPLing the next operation (for example, a stand-alone storage dump).

Perform IPL – Clear (QLL)

Before you perform this command, check the parameters on the screen. If the parameters are correct, enter **L** after the QL at the COMMAND line and press ENTER. This clears storage and loads the program from the device indicated at the IPL UNIT.

If the parameters are not correct, they can be altered. You can change the parameters by keying in the parameters to be changed and **P** at the COMMAND line, and pressing ENTER.

For systems running the MVS system control program, later IPLs perform an automatic store status (QSTORE) if the previous IPL was MVS. This function assures the store status data is present for IPLing the next operation (for example, a stand-alone storage dump).

You can automatically execute an IPL from a power off condition. For this to occur, enter (on the QFO screen) **Y** next to IPL AND IML AT POWER-ON. With this option selected, IPL automatically occurs at the next power on.

IPL Unit (0000) (QLU)

This field displays the address of the device (in System/370 mode) from which the program is loaded when the PERFORM IPL (P or L) function is initiated. To change the address, key the following at the COMMAND line and press ENTER:

- **U**
- A one-character hexadecimal control unit address
- A two-character hexadecimal device.

  Note: In 370-XA mode, the IPL unit address is a four-character hexadecimal device number. This number can be entered as a one- to four-digit number.

MVS Nucleus Suffix (1) (QLN)

To specify a nucleus, key **QLN(X)** next to COMMAND; **(X)** represents a one-character MVS nucleus suffix.

Alter IML Parameters (QLI)

This screen allows you to change the control mode of operation and the extended architecture (XA) I/O configuration data set (IOCDS).

Fast-Select IML/IPL (QLMP)

To perform both an IML and IPL from the Program Load screen:

- Key **QLMP** next to COMMAND and press the ENTER key.

  Note: The IML and IPL operate with the previous parameter settings.

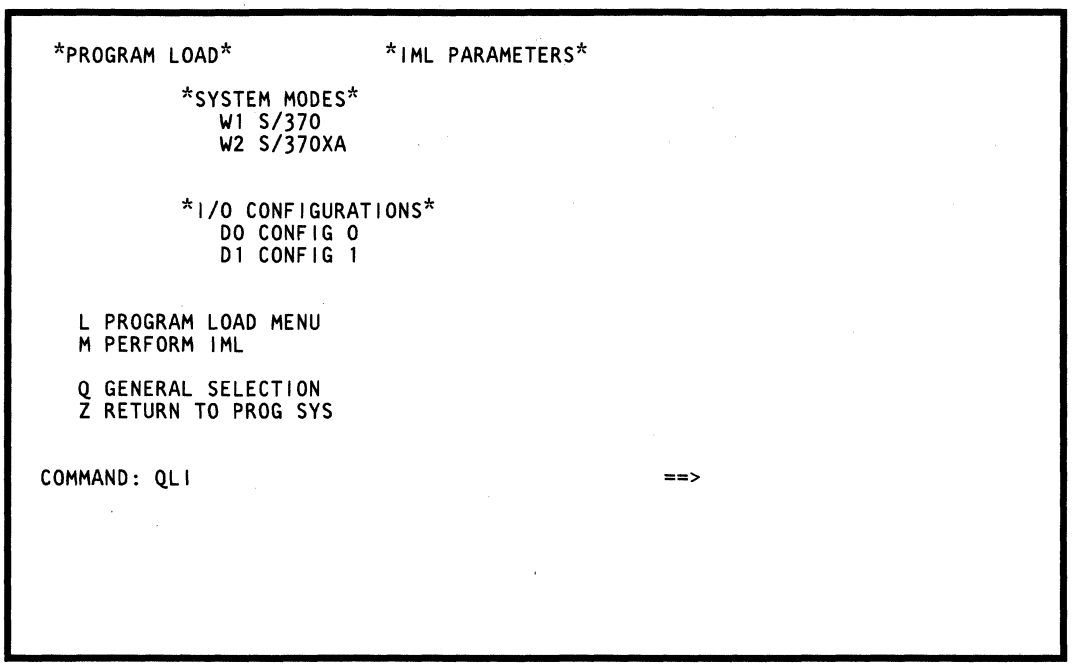
Return to General Selection (Q)

To return the display to the General Selection screen, enter **Q** next to COMMAND.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, enter **QZ** after COMMAND.

Alter IML Parameters (QLI) Screen



You can use this screen to change any of the IML parameters described below.

CAUTION
If you use the QLI screen to change an IML parameter, you must load the change before you leave the Program Load area, otherwise you lose the change(s). To load the change, specify QLM or QLIM on the COMMAND line, and then press the ENTER **key.**

System Modes

The system mode (either W1 to specify that the system is in System/370 mode, or W2 to specify that the system is in 370-XA mode) is intensified on the screen. To change it, key in the desired code (**W1** or **W2**) after QLI on the COMMAND line, and then press the ENTER key.

I/O Configurations

These two selections apply to 370-XA only. The D0 and D1 specify which input/output configuration data set (IOCDS) is to be loaded at the next 370-XA initial microprogram load (IML). Refer to the I/O configuration function (QFOI) for details on the D0 and D1 selections.

Program Load Menu (L)

This selection returns the display to the Program Load (QL) screen. To display the Program Load menu, enter L after QLI on the COMMAND line and press the ENTER key. At this point, an IML (QLM) will reflect any changes made on the ALter IML parameters screen.

Perform IML (M)

This selection performs an IML and returns the display to the Program Load (QL) screen. To execute an IML, enter **M** after QLI on the COMMAND line and press ENTER.

Return to General Selection (Q)

This selection returns the display to the General Selection (Q) screen. To display the General Selection menu, enter **Q** on the COMMAND line and press ENTER.

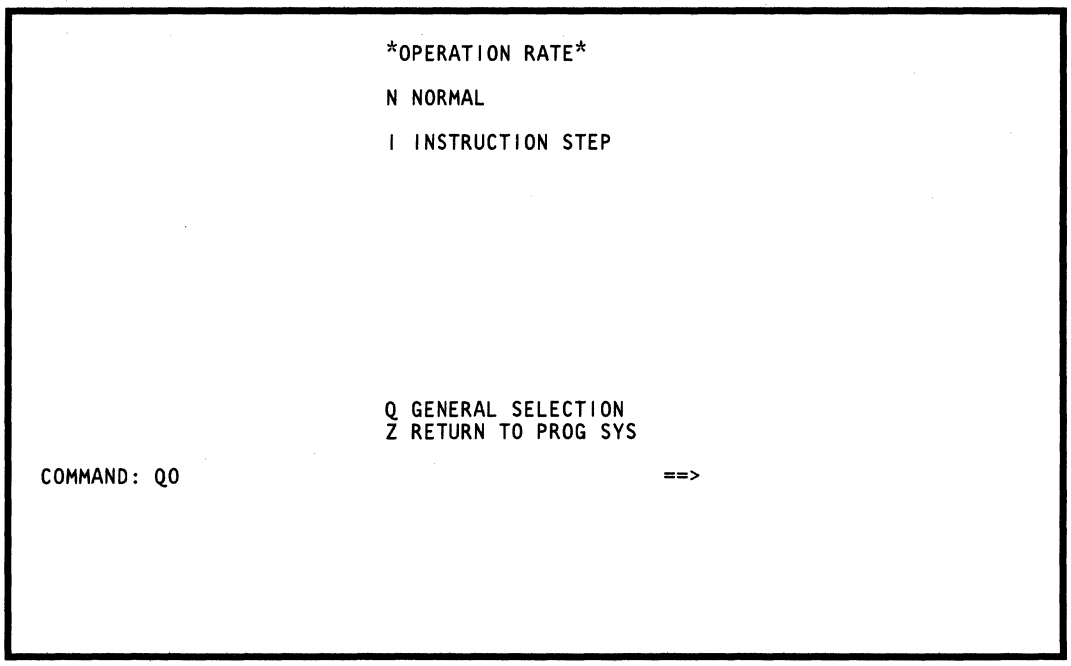
See **CAUTION** under "Alter IML Parameters Screen" on PRG 14.

Return to Prog Sys (Z)

You can use this selection to return the display to the control of the operating system. Enter **Z** after QLI on the COMMAND line and then press the ENTER key.

See **CAUTION** under "Alter IML Parameters Screen" on PRG 14.

Operation Rate (QO) Screen



Use the Operation Rate screen to set the operating rate of the processing unit. The Operation Rate screen (QO screen) controls the rate at which instructions are performed if the rate control is set to other than normal. The operation rate is displayed on line 22 of the display console.

This screen can be selected from the General Selection screen (Q screen) by entering **QO** after COMMAND and pressing ENTER. When the Operation Rate screen is displayed, the desired rate control is selected by entering the appropriate code, **N** or **I**, after the QO at the COMMAND line and pressing ENTER.

You can also select the operation rate from other manual control screens by entering **QO** and the appropriate character (such as QON for normal operation rate). If the selection is accepted, the present manual control mode screen remains, but the operation rate changes. If the selection is not accepted (entry error, etc.), the Operation Rate screen displays.

Normal (QON)

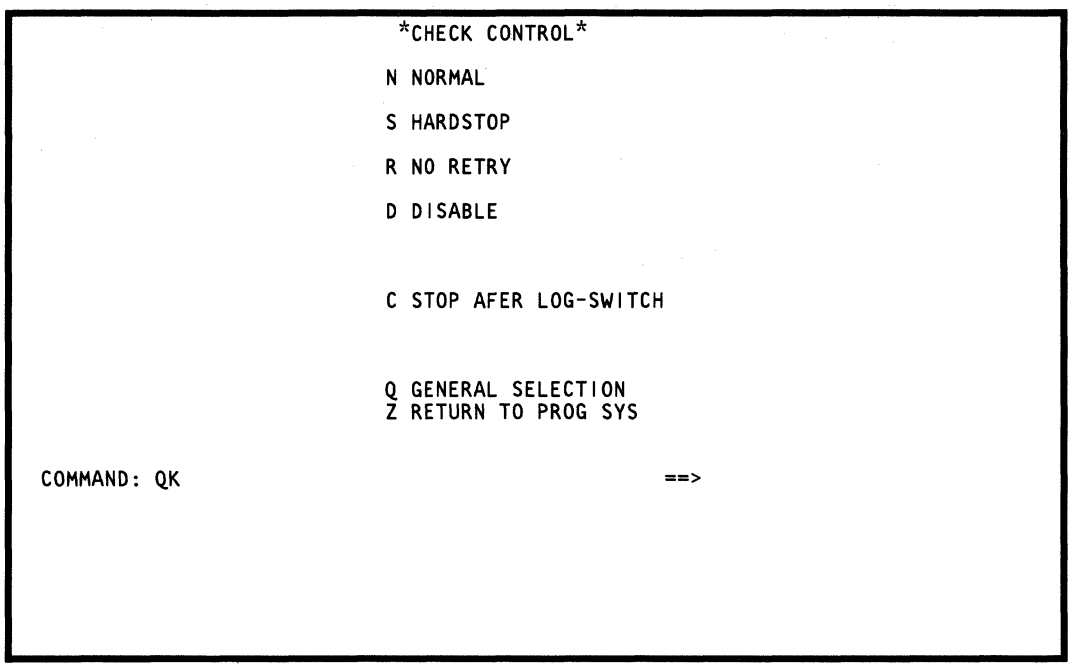
When the operation rate is set to normal (QON), the processor performs instructions at normal machine speed. When selected, this mode resets the instruction step mode.

Instruction Step (QOI)

When the operation rate control is set to Instruction Step (QOI), TEST displays on line 22 of the display console. In this mode, the processor executes one instruction step each time that the START key is pressed and stores the instruction address in the trace area. [Refer to the Display Instruction Trace Area screen (QAS).] The system accepts all pending interrupts, then returns to the stopped state. The next instruction address and first two bytes of data at that address are displayed on line 22 of the display console.

Other manual functions, such as display/alter, can be selected when you are in instruction step mode. Instruction step mode remains in effect until you reset it by returning to normal (QON).

Check Control (QK) Screen



Use this screen to specify processor action if a machine check occurs. The options Normal (N), Hardstop (S), No Retry (R), and Disable (D) are mutually exclusive. The Stop after Log Switch (C) is an independent function.

Before selecting a check control option, press the STOP key. After the WAIT indicator appears, wait about 30 seconds before selecting an option. This prevents an I/O error from occurring under certain conditions. To select the Check Control screen, key **QK** after COMMAND and press ENTER.

To select one of the check control options, key the desired option next to QK after COMMAND and press ENTER.

You can also select a check control option by keying in **QK** and the appropriate character after COMMAND (for example, QKS causes a hardstop if a machine check occurs).

Normal (QKN)

The processor determines how to handle machine checks; this option does not change the C (Stop After Log-Switch) function.

Hardstop (QKS)

The processor enters the machine check state when an error latch is set. No retry is permitted, and no reference code is generated. To resume normal operation after a hardstop, key in **QKN** after COMMAND and press the START key. The processor logs the machine-check condition.

No Retry (QKR)

Processor unit retry is not allowed when a machine check appears. Logging occurs normally.

Disable (QKD)

This option prevents the system from entering the check stop state by suppressing the error handling function. The PU ignores all conditions that normally cause machine checks, and attempts to continue processing without a retry.

CAUTION
Use of the QKD function should be limited to emergency situations or those cases where the service representative diagnoses the checks as false and cannot make the repair immediately.

If valid checks are occurring and the system is made to run with this disable function active, results are unpredictable.

Stop After Log-Switch (QKS)

If programs written for System/360 are used on the 4381, an error log can overlay either instructions or data. The Stop After Log switch avoids this by stopping the system after logging takes place. In this mode, the retry mechanism to correct errors is still available, but erroneous program execution (due to logging) is avoided.

The Stop After Log switch is alternately set and reset each time that the **C** option is entered on the COMMAND line and the ENTER key is pressed. When it is on, the Stop After Log switch is active in all modes.

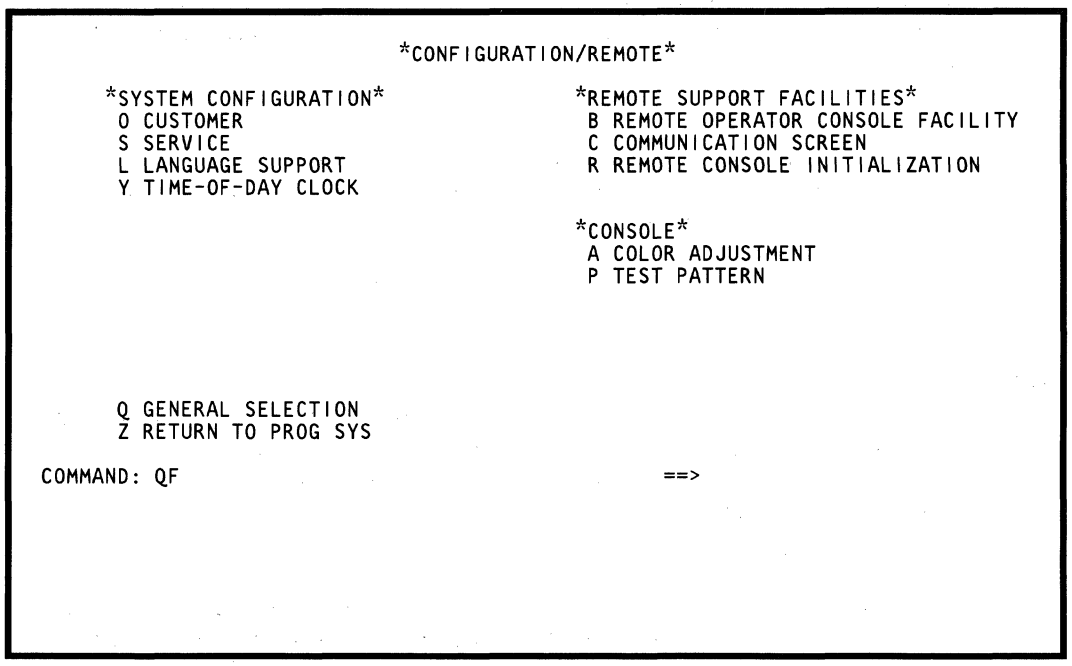
Return to General Selection (Q)

To return the display to the General Selection screen, key **Q** next to QK at the COMMAND line and press ENTER.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, key **QKZ** after COMMAND and press ENTER.

Configuration/Remote (QF) Screen



You can use this screen to change the state of the system or test the system from a remote site. To display the options available on the Configuration/Remote screen, key **QF** after COMMAND and press ENTER. The available options include *System Configuration*, *Remote Support Facilities*, and *Console*.

System Configuration

Customer (QFO) This screen contains the facilities for setting the IML powering conditions, the console copy device and printer/keyboard assignment, and the optional byte channel assignments.

Service (QFS) This service-oriented screen displays the system identifiers, the storage size parameters, ROCF and CTC feature settings, and the number of channels.

Language Support (QFL) This screen presents the international languages that are supported by the 4381, the current language setting, and the provision to change language presentation on the screens for Problem Analysis.

Time-Of-Day Clock (QFY) This selection sets the support processor clock, but does not affect the processor clock.

Remote Support Facilities

Remote Operator Console Facility (QFB) This feature supplies the selections to help you operate the system in a distributed data processing environment (for example, where a remote console can: IML/IPL, set and reset, and issue system commands through telephone lines).

Communication Screen (QFC) This selection is a screen for operator communication between the host and satellite processor sites in a message-only mode when ROCF is active.

Remote Console Initialization (QFR) This selection contains the screen to set up the remote operator console facility (ROCF) connections. This function should only be used at the direction of service personnel. (Refer to the QFR screen in the **Directed Use** section.)

Console

Color Adjustment (QFA) This selection enables you to sharpen the color presentation of the color display through an adjustable pattern on the screen.

Test Pattern (QFP) This selection checks the intensity and field protection characteristics of a monochrome screen by using a test screen.

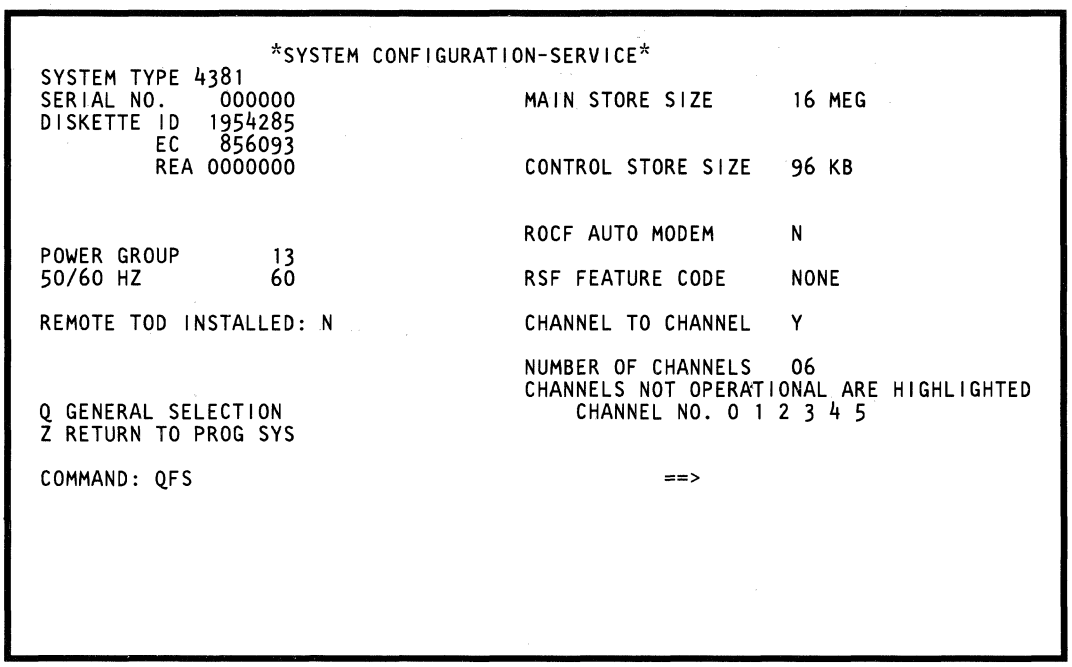
Return to General Selection (Q)

To return the display to the General Selection screen, enter **Q** next to QF at the COMMAND line.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, enter **Z** next to QF at the COMMAND line.

System Configuration – Service (QFS) Screen



This screen (QFS) displays the system configuration. Only service personnel can change the facilities of this displayed screen. To display the QFS Screen, key **QFS** after COMMAND and press ENTER. The fields of the QFS screen are listed in the following text.

System Identification Fields

System Type This field displays the processor type and model number (if applicable).

Serial NO. The serial number of the processor displays in this field.

Diskette Identifiers These three fields show the processor diskette serial number, the engineering change (EC) level, and the latest engineering activity.

Power Specification Fields

Power Group This number is the Power Group code number determined from the feature bill of material.

50/60 HZ This field displays the power-cycle specification of the system.

TOD Field

Remote TOD Installed This field shows whether the remote Time-of-Day clock feature is installed.

Storage Specification Fields

Main Store Size This field shows the main storage size (in megabytes) for both customer programs and 4381 microprogram tables.

Control Store Size This field shows the current size of the control store.

Remote Support Facility Specification Fields

ROCF Auto Modem This shows whether the remote operator console facility modem is installed on the system.

RSF Feature Code This field shows the four-digit feature that should match the installed hardware. This field can also be NONE if no remote support facility feature is installed.

Channel Specification Fields

Channel to Channel This display shows whether the channel-to-channel facility is installed on the processor.

Number of Channels This shows the number of I/O channels on the system.

Channels Not Operational Are Highlighted A highlighted channel number shows that the channel has been taken offline by either: (1) the system control program or the processor microprogram or (2) a hardware failure.

If DEG is displayed next to OPERATING on line 22 of the display screen, at least one of the channels is offline because of a hardware problem. A system reset will restore all offline channels, except those caused by hardware failure. These can only be restored by contacting your service representative.

System Configuration – Customer (QFO) Screen

```
                        *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
IML AND IPL AT POWER-ON: Y                     -CHNL PRT   : N  ADDR: 0000

                                      BYTE MODE-CHNL 5:   N

CONSOLE MODE -PRT/KYBD: N
             -DISPLAY   Y             CONSOLE PORTS    P0   P1   P2   P3
                                      INSTALLED:        Y    Y    Y    N
                                      OPERATIONAL       Y    Y    Y    N
I I/O CONFIGURATION                   HARDCOPY :             N    N    N
Q GENERAL SELECTION                   ADDRESS S/370:  001F DISC DISC 0002
Z RETURN TO PROG SYS                 (CONNECTED:        Y    N    N    Y)XA only

COMMAND: QFO                                    ==>
```

This screen supplies the facilities to configure the system and the I/O devices that attach to it. The diskette addresses, the display/console and copy device address, and optional byte channel and IML/IPL controls are assigned on this screen.

All fields of the QFO screen appear the same for System/370 and 370-XA mode, except for the console mode and console port address lines. When you are in System/370 mode, the last line on the right side shows ADDRESS S/370. However, when you are in extended architecture, or 370-XA mode, this second to last line shows DEVICE NUMBER. In 370-XA mode, the device numbers will be 00F2, 00F3, 00F4 and 00F5, and cannot be changed by the user on this screen.

Also, in 370-XA mode, an additional last line specifying CONNECTED displays and shows the state of each port.

Any time that you want to change any of the fields on this screen and the field is preceded by a colon (:), simply move the cursor (using the cursor-positioning keys) to the field location and type in your choice. Only the fields that are followed by a colon (:) can be changed.

Use the QFO screen to:

- Key the system configuration
- Change the system configuration
- Go to the I/O UCW Selection (QFOI) screen.

Only the fields that are followed by a colon (:) can be keyed or changed. To display the QFO Screen, key **QFO** after COMMAND and press ENTER.

Diskette Identifier Fields

Drive1* *Drive2 These fields cannot be changed; they show the type of diskette in each diskette drive.

Assigning the Power-On Control Fields

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. Press the ENTER key. If, when the system is powered on, the I/O stepping is not completed in the specified time, a reference code is issued.

IML At Power-On Key in **Y** at this field to cause an IML at power on; Key in **N** to not IML at power on;. then press the ENTER key.

IML and IPL At Power-On Key in **Y** to cause an automatic IML followed immediately by an IPL at power on. If you do not want to IML and IPL at power on, key **N** at this field. Press the ENTER key.

Assigning the Console Mode Controls

Console Mode You change the console mode of the processor by changing only the state of the PRT/KYBD line. The DISPLAY line reflects the opposite state from the PRT/KYBD.

When you are in 370-XA mode, the DISPLAY line automatically sets to Y and cannot be changed on this screen. The setting is made at IML time.

Assigning the Copy Key Device

Copy Key The COPY key can be assigned to either the console printer or the channel printer. Selections are made by entering **Y** or **N** after COMMAND and pressing ENTER. The PORT for the console printer is assigned from P1, P2 or P3. (P3 is used in the screen example.) The channel printer address for the channel printer must be assigned at the ADDR line on the screen (where 0000 is used in the screen example).

Using the COPY Key

Pressing the COPY key copies a display screen to either:

- A console printer
- A channel printer (if the SCP has not yet been IPLed).

You can copy all screens to the console or channel printer. (Refer to the instructions on the COPY key later in this screen description).

Assigning the Optional Byte Multiplexer Channel

Byte Mode-Chnl 5: Key **Y** 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. Press the ENTER key. A processor unit IML is required (QLM) to have the change take effect.

Assigning the Console Ports

Console Ports There are four console ports or addresses available for natively-attached display consoles or printers. These ports are assigned the labels P0, P1, P2 and P3. There may be a mix of valid devices on these ports, but at least one must be a display console for system communication. If you are in PRT/KYBD mode, only two ADDRESS S/370 assignments can be made; if you are in DISPLAY mode, four ADDRESS S/370 assignments can be made (and CONNECTED in 370-XA mode). The system configuration screen shows whether:

- Each port has a device installed on it
- Each port is operational
- The device is a printer (it displays its device address).

Listed below are the labels, their meaning, and the procedures for changing the device configurations.

Installed: Key in **Y** if a console or printer (P0 to P3) is installed; **N** if a console or printer is not installed.

Operational: This field cannot be changed; it reflects the state of the device and is for your information only.

Hardcopy: Key in **Y** to specify a port (P1, P2, or P3) as a hard-copy device; key in **N** to not specify it. (You must also key in **Y** next to INSTALLED.) Press the ENTER key.

Address: ADDRESS displays for System/370 mode; DEVICE NUMBER displays for 370-XA mode.

You can change the address in System/370 only. Addresses X'0000' through X'00EF' are used for native devices only and cannot be used for other device attachments. To change the console configuration, key in either **DISC** (disconnect) or the four-digit console address for ports P0 to P3.

In 370-XA mode, the console device numbers can only be displayed and cannot be altered by the user on the screen. The assignment of these device numbers is made by an input record in the IOCP. This field in 370-XA displays the required console assignments 00F2, 00F3, 00F4 and 00F5, or disconnect (DISC). When CONNECTED (370-XA only) displays, key in a **Y** or an **N** to show if the device should be logically connected to the processor.

Configuration Selection

I/O Configuration (QFOI) This screen and the screens operating under the QFOI function contain the facilities to change and display the unit control word directories and execute the Input/Output Configuration Program (IOCP). The IOCP configures the I/O device assignments for 370-XA mode.

Return to General Selection (Q)

To return the display to the General Selection screen, enter **Q** next to QF at the COMMAND line and press ENTER.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, enter a **Z** next to QF at the COMMAND line and press ENTER.

Copying a Screen to the Console Printer

Before you can copy a screen to the console printer, you must 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 CHNL PRT.
4. Specify port **P1**, **P2**, or **P3** (next to PORT).
5. Press the ENTER key

The console printer is now configured as the hard-copy device; when 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) sign preceding the field.

You can now resume normal operations.

Copying a Screen to the Channel Printer

Before you can copy a screen to a channel printer:

- The processor must be IMLed, but not IPLed. If it has been IPLed, the message QCLEAR RESET REQUIRED appears.
- You must configure a channel printer as the copy device. Do the following:
  1. Enter **QFO** next to COMMAND and press the ENTER key. This displays the System Configuration screen.
  2. Enter **Y** next to CHNL PRT and **N** next to CONSOLE PRT.
  3. For 370 mode, enter **0**, the channel number, and printer address next to ADDR.
  4. For 370-XA mode, enter the printer device number 0000-FFFF next to ADDR.
  5. Press the ENTER key.

The channel printer is now configured as the copy device; whenever you press the COPY key, the displayed screen is printed on the channel printer.

Input/Output Configuration Functions (UCW and IOCP)

The QFOI screen displays the available selections for I/O configuration. This screen shows you the available options so that you can either execute the UCW assignment (for System/370 mode) and display the results, or execute the IOCP (for 370-XA mode) and display the results.

Overview of I/O Configuration in System/370 Mode

When operating in System/370 mode, all the input/output devices that are attached to the 4381 system must have an area of storage to control that unit, a unit control word (UCW). The UCW contains:

- The device address
- A count of the data to be processed
- The most recent state of the device
- Other control information associated with an I/O operation executed on the device.

Each device attached to the processor has an address, specified by a channel specification (C) and a two-character unit specification (UU). Each channel on the system has a total of 256 available entries (labeled in hexadecimal), one for each possible device address (00-FF). (The address range of X'F0' through X'FF' for channel 0 is not available to the user; this range is reserved by the system for internal assignments.)

The UCWs are created when the processor is IMLed, depending on the contents of the UCW directory. A UCW directory entry is created by specifying the range of device addresses attached to a control unit and their associated characteristics. The characteristics depend on the type of UCW required, as follows:

- SHR – This shows that the UCW is shared by many I/O devices; however, only one I/O device can use the UCW at a time.
- BYT – Specifies that the entry is to be attached only to a byte multiplexer channel (channel 0 or channel 5).
- BLK – Specifies that the entry is to be attached only to a block multiplexer channel.
- SIOFQ – Specifies that the operating system program does not wait for a response from the channel since the I/O request is automatically queued and is retried if the device, control unit, or channel is busy. Note that the complete range of addresses of a control unit must be specified for a SIOFQ UCW, even if the devices do not exist for the complete range of addresses. For best performance, this option should be specified where indicated.
- SEL – This shows selector mode.
- DST – Data streaming mode shows that the channel does not require a response from the control unit to continue processing.
- CPORT – This indicates a console port.
- DND – This shows that checking is disabled and channel interface errors are not checked.

  Note: The unit control word assignment is critical to the efficient operation of the processor. Changes to the UCW directory (for example, new channel and

device addresses) should be supplied by personnel responsible for system configuration. System programmers, system analysts, or service personnel are trained to efficiently configure the input/output devices and control units for best processor operation. Inefficient device assignments can result in degraded processor performance.

If I/O equipment is expected in the near future, be sure to reserve addresses for this equipment. Early address definition will make installation and testing (of the I/O devices) easier.

The QFOIU and QFOIC screens are used to configure and display the UCW directory for System/370 mode.

The QFOIU screen permits the operator to change the UCW directory by adding and deleting UCW addresses in the directory.

The QFOIC screen displays the UCW directory as it is currently stored on the system diskette.

I/O Configuration (QFOI) Screen

```
 *I/O CONFIGURATION*

     *370*
  *UCW DIRECTORIES*
U CHANGE UCW
C DISPLAY UCW

    *370XA*
T CHANGE DATA SET SELECTION
  DISPLAYING DATA SET 0
I SUBCHAN IMG BY SUBCHAN NUM
N SUBCHAN IMG BY DEVICE NUM
L SUBCHAN IMG LISTING
D IOCP PARAMETERS
S START IOCP PROG

Q GENERAL SELECTION
Z RETURN TO PROG SYS

                                                    ==>
  COMMAND: QFOI
```

This screen contains the selections to assign and change the I/O directory for channel-attached I/O device assignments. In System/370 mode, this screen (indicated by QFOI at the COMMAND line) gives the user selections to update and display the UCW directory.

This screen also contains a selection for the user to assign the devices to be used in the IOCP. In 370-XA mode, the user monitors the IOCP, using the Start IOCP screen, which contains messages generated from the operation and gives the user the choice of accepting or rejecting the IOCP results. The QFOI screen also contains selections to choose the method of subchannel display following assignment.

370
UCW Directories

Change UCW (QFOIU) This screen is used to change the unit control word directory assignment on the diskette. In System/370 mode, these directories define the I/O devices.

UCW Display (QFOIC) This screen displays the UCW directory as it appears on the diskette at any time, and displays it to verify any changes made using the QFOIU screen.

370XA

Change Data Set Selection (QFOIT) This command is an immediate command; it does not generate another screen, but immediately changes the data set used by the 370-XA display selections (QFOII and QFOIN), from 0 to 1, or 1 to 0. Change the selected data set by entering QFOIT on the COMMAND line. The DISPLAYING DATA SET (0 or 1) shows the data set being displayed or indicates when the commands QFOII, QFOIL and QFOIN are selected.

Subchan IMG By Subchan NUM (QFOII) This function supplies a display of the subchannel image by an assigned subchannel number. The selected subchannel number must exist in the selected data set.

Subchan IMG By Device NUM (QFOIN) This function supplies a display of the subchannel image by an assigned device number. The selected device number must exist in the selected data set.

Subchannel Image Listing (QFOIL) This function supplies a list of subchannel images by the assigned subchannel number.

IOCP Parameters (QFOID) This screen supplies a method to change and display the input and output devices to be used by the IOCP to read in the IOCP input record data set and print the IOCP listing. It also supplies a method to change and display the model group number of the system for which the IOCP is to be made.

Start IOCP Prog (QFOIS) This screen is used to start and monitor the IOCP. Messages appear on this screen to show the progress of the IOCP. These messages are used to determine if the IOCP results will be retained or discarded.

When the IOCP completes, a subscreen appears that contains the option to save the IOCP result and identify which data set should be used. If the result is to be saved, show the data set choice and key a **Y** next to the QFOIS at the COMMAND line and press ENTER. If the result should not be saved, key **N** and press ENTER.

UCW Directory Update (QFOIU) Screen

```
 *I/O CONFIGURATION*                  *CHANGE UCW DIRECTORY*

                            FORMAT: F CXX -CYY CHAR.CODES
     *370*                          F = A OR R (A FOR ADD, R FOR REMOVE)
  *UCW DIRECTORIES*                 CXX = STARTING DEVICE ADDRESS
U CHANGE UCW                        -CYY = ENDING DEVICE ADDRESS (OPTIONAL)
C DISPLAY UCW                       CHANNEL: 0-BYTE    1-BLOCK   2-BLOCK
                                             3-BLOCK   4-BLOCK   5-BLOCK

   *370XA*
T CHANGE DATA SET SELECTION        CHAR.CODES (OPTIONAL, ANY ORDER)
  DISPLAYING DATA SET 1               S SHARED UCW
I SUBCHAN IMG BY SUBCHAN NUM          L SELECTOR MODE   -BLOCK ONLY
N SUBCHAN IMG BY DEVICE NUM           D DATA STREAMING MODE  -BLOCK ONLY
L SUBCHAN IMG LISTING                 C SIOF QUEUING CTL UNIT -BLOCK ONLY
D IOCP PARAMETERS
S START IOCP PROG

Q GENERAL SELECTION          ONE ENTRY MUST COVER ALL ADDRS FOR ANY CTL UNIT
Z RETURN TO PROG SYS         PU-IML REQUIRED AFTER CHANGES -USE LOAD SCREEN
                                                ==>
    COMMAND: QFOIU
```

Use this screen to make changes to the UCW directory. The device assignments should be supplied by a system programmer or by personnel familiar with channel assignment procedures.

How to Change the UCWs for System/370 Mode

Select the desired operation from the "Operation Examples" on PRG 34. To change the UCW directory, enter the required character field (or fields) next to the U on the COMMAND line, and press ENTER. The entry fields after the QFOIU at the COMMAND label are described in the following text.

Change UCW Directory
Format:

This line contains a sample of the character code format to be entered at the QFOIU label. The five lines below the FORMAT line on the screen contain the definition of the starting and ending addresses, the function desired, and the current channel configuration for byte and block multiplexer channels. Refer to "Operation Examples" for your specific requirement.

F = A or R (A for Add, R for Remove) An Add **A** or Remove **R** must precede the unit specification and follow the U in the COMMAND to specify the operation.

CXX = Starting Device Address
-CYY = Ending Device Address (Optional) These two lines define the specification for three or seven characters (CXX) or (CXX-CYY) for starting and ending addresses. The CXX or CXX-CYY sets the channel (C) and unit (XX or YY) designation. This field may be only three characters (which changes only one address) or seven characters; the first three representing the starting address and the second three (with the hyphen) representing the last of a string of addresses.

Channel This field is for reference and shows the mode setting of the installed channels. Channel 0 is always byte multiplexer mode; channels 1, 2, 3 and 4 are

block multiplexer mode. Channel 5 can be either byte or block multiplexer mode, specified by either **Y** or **N** on the QFO screen. If the six optional channels are installed, they are shown as channels 6, 7, 8, 9, A and B, and are block multiplexer mode.

Char. Codes (Optional, Any Order)

To help in the selection of the proper characteristics code, the selection table on the following pages may be used. Find your device or equivalent type in the device column. At the point where the device column meets the correct channel column, a characteristic entry is found. Use the character or characters S, L, D or C when entering your UCW characteristic entry in field 2 on the COMMAND line of the QFOIU screen.

If the characters NE (no entry) appear, make no characteristic entry (leave the field blank); the processor will make the correct assignment.

If the characteristic listed is a dash (-), the selection is an invalid condition and should not be considered.

The characteristic field is optional only where a characteristic entry is not necessary, or when Remove is specified. However, if the table on the following pages shows the device requires a characteristic entry, and it is not entered by the user, the performance of the device may be less than optimum.

Restrictions in Changing the UCW Directory

- If a device is added to a control unit, the old entry must be removed (QFOIUR CXX-CYY) and the complete new entry must be added (for example, QFOIUA CXX-CYY **SL**).
- Device addresses 0F0-0FF must not be used. These addresses are reserved for internal attachment of native devices.
- UCWs for natively attached devices must not be entered. These assignments are done using the QFO screen.
- The message ONE ENTRY MUST COVER ALL ADDRS FOR ANY CTL UNIT emphasizes that to change a group of devices on a control unit, the complete control unit range of addresses must be removed and then the complete new range of addresses must be declared, even though the physical devices do not exist for the complete range of the control unit.
- The message PU-IML REQUIRED AFTER CHANGES-USE LOAD SCREEN emphasizes that UCW changes do not become effective until the processor has been re-IMLed by using the Program Load screen (QL Function). In some cases, if the number of UCWs added does not require more storage than is reserved, new UCWs become effective on a QCLEAR.

When you have decided to save the new UCW directory for the channel subsystem, it is advisable to save the new UCW configuration on the backup FUNC1 diskette. This action assures you that you have a method of recovery in the event of a problem with the primary FUNC1 diskette.

Operation Examples

The format of your selection will depend on the operation you want to perform. Examples are listed below; remember, all entries in the **Format** column are preceded by QFOIU.

Desired Operation	Format
• Add one new device with no characteristics entry	A CXX
• Add a new group of devices with no characteristics entry	A CXX-CYY
• Add one new device with one characteristic entry	A CXX C
• Add one new device with two characteristics entries	A CXX LS
• Add a group of devices with one characteristics entry	A CXX-CYY D
• Add a group of devices with two characteristics entries	A CXX-CYY SL
• Remove a device	R CXX
• Remove a group of devices	R CXX-CYY

Characteristics Selection Tables – Part 1

These tables (shown in four parts) illustrate the most commonly used assignments. For additional information, refer to the applicable system library manuals.

I/O Assignment Table (S/370)

Characteristic Code (CHAR. Codes) Entries

Char. Code Description

- Invalid selection; do not use.

C Control unit queuable with start I/O fast release. (See note 8.)

D Control unit operating in data streaming mode.

L Device requires a block multiplexer channel to operate in selector mode.

NE No Entry—defaults to an unshared channel.

S Device requires a shared UCW.

Notes:

1. Preferred attachment is a byte multiplexer channel.
2. Preferred attachment is a block multiplexer channel.
3. The number of 1419 devices per byte multiplexer channel is limited;. consult your system engineer.
4. When CHAR. Code D or NE is selected, ensure that the control unit is properly set up to operate in correct mode. Follow necessary control unit guidelines and/or procedures.
5. Control units with 3350, 3370, 3375, 3380, or 3420 Model 8 are channel data rate sensitive.
   - 3370 and 3375 have a data rate of two megabytes and must be attached to the appropriate channel.
   - 3380 has a data rate of three megabytes and must be attached to the appropriate channel.
   - 3420 Model 8 can cause overrun errors on a channel that has a data rate of less than two megabytes. Use an appropriate channel.
6. Assign only one UCW for each 3272 or 3274 control unit.
7. 7170–Device Attachment Control Unit (DACU) attaches OEM UNIBUS and RS232C devices to IBM systems. This unit has five addresses, with the address range beginning with 0 or 8.
8. Use the following guidelines when the SIOF Queuing CTL Unit (C) Characteristic Code is selected:
   - In general, any block multiplex unshared control unit/device can have SIOFQ assigned to it.
   - The complete address range for a control unit must be specified if SIOFQ is assigned. For example, if a control unit is assigned 32 addresses starting at address 03A0, the assignment entry must contain addresses 03A0 through 03BF.
   - A control unit that has different devices with different address ranges for each device must have one SIOFQ entry covering the complete range. For example, a 3830 control unit has 3350s and 3330s assigned with different ranges (240-243 and 250-257, respectively) and must be reassigned to show one entry (for example, 240-257).
   - SIOFQ not allowed on a byte channel.
   - SIOFQ not allowed for shared UCW entries.
   - For optimum performance, this option should be specified when indicated..

Auxiliary Processor	Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit			
3838 – With Feature No. 4850	---	D	4
3838 – Without Feature No. 4850	---	NE	

Characteristics Selection Tables – Part 2

Channel-to-Channel Adapter	Charactter Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit			
CTCA (Integrated)	---	NE	2
3088	---	NE or D	2, 4

Communication/Data Acquisition/Process Control			Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit	*Channel Adapter*	*Device*			
2701			NE	---	
3704			NE	---	
3705	CA1		NE	---	
3705	CA2 and CA3		NE	NE	2
3705	CA4		NE	NE	1
3725			NE	NE	
4993			---	S	
4994			---	S	
7170			---	NE	7

Data Security Device	Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit			
3848	---	NE or D	4

Diskette I/O	Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit			
3540	NE	NE	

Characteristics Selection Tables – Part 3

Direct Access Storage Units			Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit	*Controller*	*Device*			
2835		2305	---	NE	
3830	3333	3330	---	NE or C	5, 8
	3340-A2	3340, 3344	---	NE or C	5, 8
	3350-A2	3350	---	NE or C	5, 8
3880 With Speed Matching Buffer					
	3333	3330	---	NE,D,C	4, 5, 8
	3375-A1, D1	3375	---	NE,D,C	4, 5, 8
	3380-A4, AA4	3380	---	NE,D,C	4, 5, 8
3880 Without Speed Matching Buffer					
	3333	3330	---	NE,D,C	4, 5, 8
	3340-A2	3340, 3344	---	NE,D,C	4, 5, 8
	3350-A2	3350	---	NE,D,C	4, 5, 8
	3370-A1	3370	---	NE,D,C	4, 5, 8
	3375-A1, D1	3375	---	NE,D,C	4, 5, 8
	3380-A4, AA4	3380	---	D,C	4, 8

Note: Char. Code D is recommended for use on a 3880 without a speed matching buffer.

Display and Console Printers		Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit	*Device*			
3258	3251, 3255	S	LS	1
3272	3277, 3284, 3286, 3287, 3288	---	S	
3274 - Models 1B, 1D, 21B, 21D, 31D		S	S	2, 6
	3268, 3276, 3277, 3278, 3279,	---	---	
	3284, 3286, 3287, 3288, 3289, 3290	---	---	
3274 - Models 1A, 21A, 31A		NE	NE	2, 6
	3268, 3276, 3277, 3278, 3279,	---	---	
	3284, 3286, 3287, 3288, 3289, 3290	---	---	
3791	3277, 3284, 3286, 3287, 3288, 3793	NE	NE	

Mass Storage System	Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit			
3850/51	NE	NE	

Characteristics Selection Tables – Part 4

Magnetic Character and Optical Reader	Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit			
1255	NE	L	1
1287	NE	NE	1
1288	NE	NE	1
1419	NE	NE	1, 3
3881	NE	NE	
3886	NE	NE	
3890	NE	NE	1
3895	NE	NE	

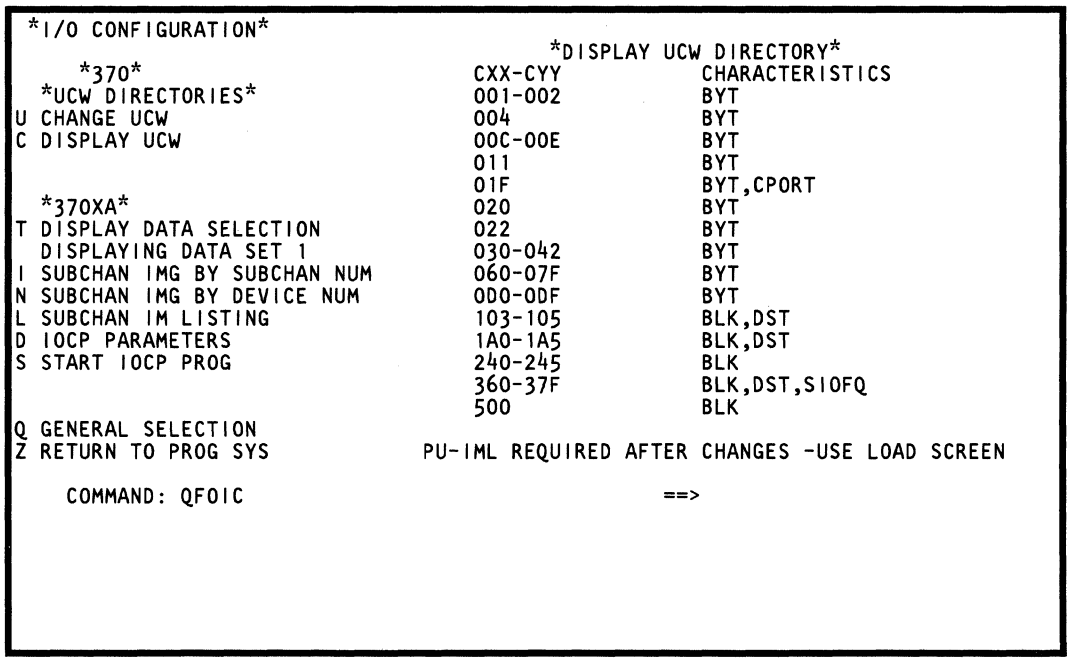
Punched Card I/O and Printers		Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit	*Device*			
2501, 2520		NE	NE	1
2821	1403, 2540	NE	NE	1
3203		NE	NE	2
3262 (Model 5)		NE	NE	1
3811	3211	NE	NE	2
3505, 3525		NE	NE	2
3800		NE	NE	2
4245		NE	NE	2

Magnetic Tape I/O		Character Code --- Byte Channel	Character Code --- Block Channel	Notes
Control Unit	*Device*			
3411	3410	---	LS	
3430	3430	---	LS	
3803	3420	---	LS	

Devices not listed on the Characteristics Selection Tables should be analyzed for their specific device characteristics. (Refer to the Characteristics Selection Tables, Part 2, for applicable characteristics, or to the specific device characteristic manual—if available.) A characteristic code can then be applied to the device and its position in the directory entry.

If an IBM device characteristic cannot be determined using the preceding procedures, contact your local IBM representative for additional information.

UCW Directory (QFOIC) Screen



This screen is used to display:

- The UCW directory as it appears on the diskette at any time.
- The UCW directory to verify that changes made using the CHANGE UCW DIRECTORY screen (QFOIU) in the UCW assignment procedure have been accepted. This screen is selected by keying **QFOIC** at the COMMAND line and pressing ENTER.

Display UCW Directory

To select a particular UCW directory display, key a one- to three-character device address (after the QFOIC at the COMMAND line) and press ENTER. If no UCW address is entered, the display will begin at address 000 and display the complete directory.

If the message MORE, PRESS ENTER appears, more data is available starting at the address at the COMMAND line. To display the additional information, press ENTER.

CXX-CYY The device address column contains either a single address if there is one control unit per address, or a range of addresses if all addresses share a control unit.

Characteristics The CHARACTERISTICS column contains the defined characteristics for the device addresses in the CXX-CYY column. When the channel configuration changes channel 5 from a byte channel to a block channel, or from a block channel to a byte channel, the control unit may become invalid for that channel configuration, and the characteristic INV may appear in the CHARACTERISTICS column.

After switching from one type of channel to another, any device indicating INV must be assigned again, using the QFOIU screen function. Also, all devices on that channel should be checked for validity.

A definition of the characteristics can be found in the "Characteristics Selection Tables," which begins on PRG 35.

Overview of I/O Configuration in Extended Mode

To operate in 370 extended mode, the I/O devices must be assigned in a manner significantly different from the manner they are assigned in System/370 mode. In 370-XA, the Input/Output Configuration Program is used to assign I/O devices. The IOCP in the 4381 is a resident microcode facility *that is run in System/370 mode*, and allows the user to configure up to 2048 I/O devices for the system so that it can run in 370-XA mode.

The input to the IOCP is an input record data set, which is generated by the user. This contains all the I/O information necessary for the program to assign the devices in a multiple-path configuration for the most efficient operation of the channel-attached devices in 370-XA mode. The data set contains the channel path identifier, and control unit and I/O device records.

The method of generation of the input record data set is described in the *IBM 4381 Input/Output Configuration Program User's Guide and Reference*, GC24-3964.

To run the IOCP, the 4381 is first IMLed in System/370 mode. The system must not be IPLed, as the loading of the IOCP would interrupt and overlay any operating system in effect. Any operating system would have to be cleared before loading IOCP; this can be done with a re-IML (no IPL of the system control program is required).

The input device to read in the input record data set is assigned for the IOCP on the QFOID screen.

The input device is then loaded and made ready with the system generation record data set, which contains the required channel and device information for the system.

The system generation record data set is a stand-alone input, which is generated independent of any machine operation. The input device (and output device, if report generation is desired) is made ready and the record data set is read into the 4381 by executing the S option on the QFOI screen. After initiating the IOCP, progress of the program is displayed on the QFOIS screen. The IOCP processes the input record data set and supplies program status to the user in a message area on the QFOIS screen.

Any action required by the operator is specified in the message area. (Refer to the list of associated documents in the Preface for specific information regarding IOCP system input record generation.) When the IOCP has completed, the user can:

1. Accept the results of the program, or
2. End the program without saving the results, where the error conditions dictate that the results are not acceptable.

A message requesting operator action to accept or not accept the results of the program is requested on the QFOIS screen in the form of a Y or N response at the COMMAND line. A Y response saves the Input Output Configuration Data Set (IOCDS) on the diskette as a valid I/O configuration for 370-XA mode.

The QFOIT, QFOII, QFOIN, QFOIL, QFOID and QFOIS screen functions are used to execute, monitor, and display the I/O device configuration for 370 extended mode.

IOCP Function Screens

The QFOI screen displays the available 370-XA IOCP generation tasks. The screens and commands described below contain the options available so that you can run the IOCP and display the results. (Refer to the next two pages for a diagram showing the screens that control the IOCP.)

The QFOIT selection supplies a selection to alternately select either data set zero or data set one for display, and is made on the COMMAND line.

The QFOII and QFOIN screens contain the display of the subchannel information (by subchannel or device number) that was generated by the IOCP and stored in the system for devices running in 370-XA mode.

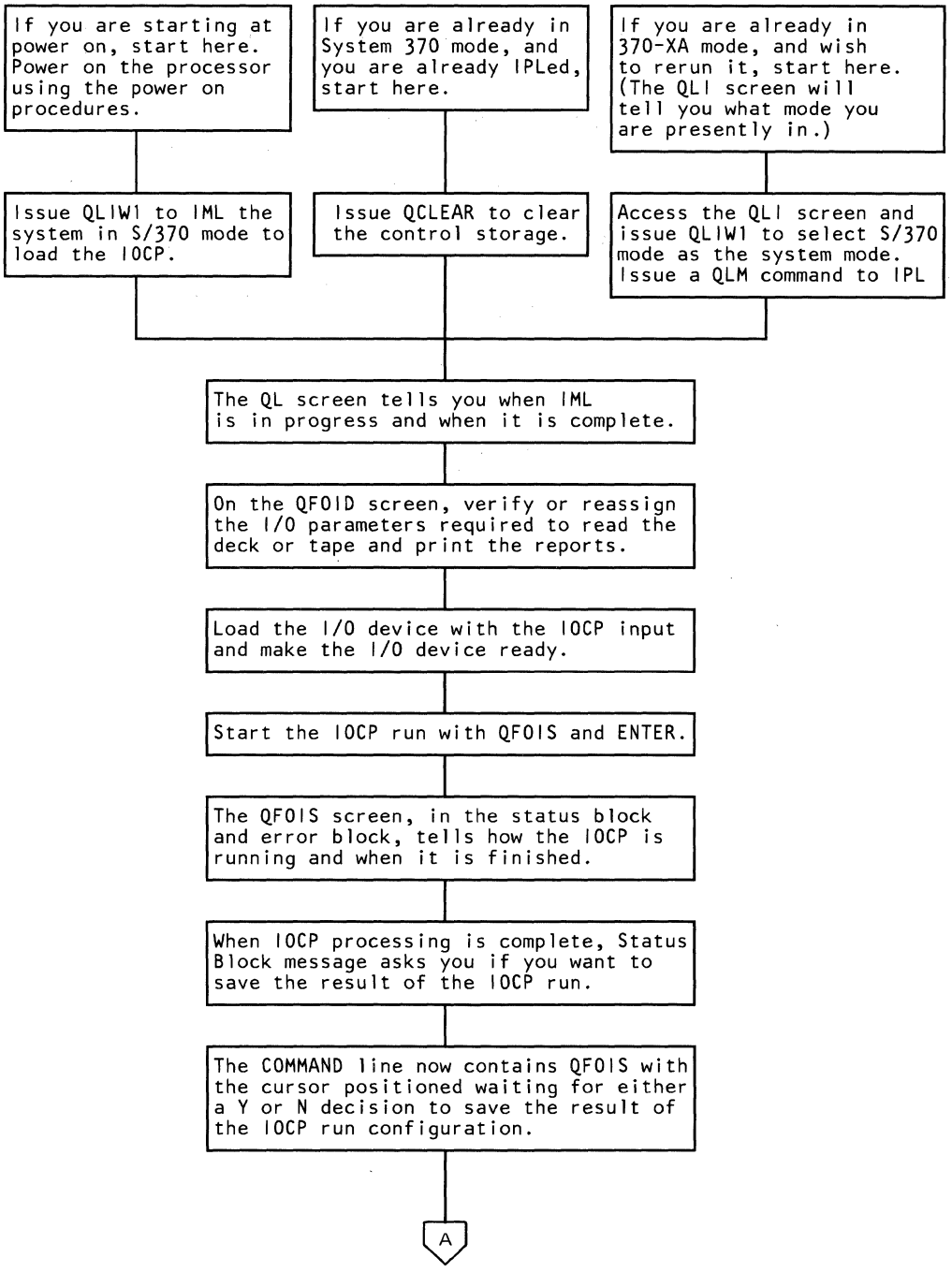
The QFOIL screen displays a listing of the subchannel images in summary form.

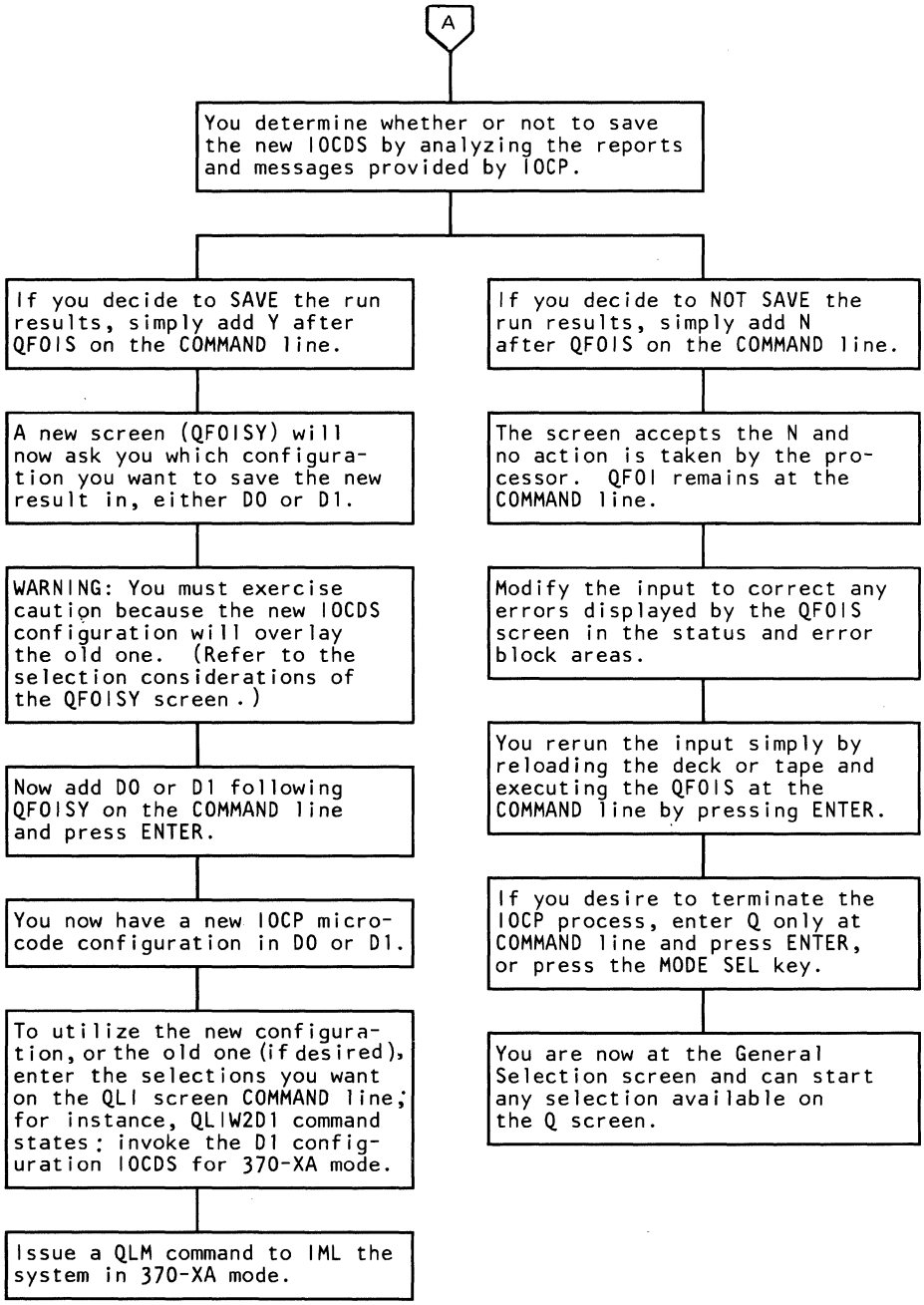
The QFOID screen contains the selections to define the addresses of the devices used in running the IOCP and the model group number for the target system. These devices must have a System/370 UCW assigned for them (QFOIU function).

The QFOIS function initiates and monitors the progress of the IOCP in the message area of the screen.

IOCP Operation Flow Diagram

The following diagram shows the events and screens that control and monitor the IOCP. Use this diagram with the descriptive text on the preceding page to gain an understanding of the IOCP from system power-on to system load.




A
You determine whether or not to save the new IOCDS by analyzing the reports and messages provided by IOCP.
If you decide to SAVE the run results, simply add Y after QFOIS on the COMMAND line.
A new screen (QFOISY) will now ask you which configuration you want to save the new result in, either DO or D1.
WARNING: You must exercise caution because the new IOCDS configuration will overlay the old one. (Refer to the selection considerations of the QFOISY screen.)
Now add DO or D1 following QFOISY on the COMMAND line and press ENTER.
You now have a new IOCP microcode configuration in DO or D1.
To utilize the new configuration, or the old one (if desired), enter the selections you want on the QLI screen COMMAND line; for instance, QLIW2D1 command states: invoke the D1 configuration IOCDS for 370-XA mode.
Issue a QLM command to IML the system in 370-XA mode.
If you decide to NOT SAVE the run results, simply add N after QFOIS on the COMMAND line.
The screen accepts the N and no action is taken by the processor. QFOI remains at the COMMAND line.
Modify the input to correct any errors displayed by the QFOIS screen in the status and error block areas.
You rerun the input simply by reloading the deck or tape and executing the QFOIS at the COMMAND line by pressing ENTER.
If you desire to terminate the IOCP process, enter Q only at COMMAND line and press ENTER, or press the MODE SEL key.
You are now at the General Selection screen and can start any selection available on the Q screen.

IOCP Device Address (QFOID) Screen

```
 *I/O CONFIGURATION*            *DEVICE ADDRESSES FOR I/O CONFIG PROG*

                                       *OUTPUT LISTING DEVICE*
    *370*
  *UCW DIRECTORIES*                 P PRINTER ADDR          000E
U CHANGE UCW                        Y PRINTER TYPE          3203
C DISPLAY UCW                       A PRINTER TRAIN         HN
                                    W APGE WIDTH(72/100)    0100
  *370XA*                           L PAGE LENGTH(40-160)   0068
T CHANGE DATA SET SELECTION           (8 LINES PER INCH)
  DISPLAYING DATA SET 1
I SUBCHAN IMG BY SUBCHAN NUM           *INPUT DECK DEVICE*
N SUBCHAN IMG BY DEVICE NUM
L SUBCHAN IMG LISTING               R CARD READER ADDR      000C
D IOCP PARAMETERS                   T TAPE ADDR             ----
S START IOCP PROG
                                         *TARGET SYSTEM*
Q GENERAL SELECTION                 M MODEL GROUP #         4381-02
Z RETURN TO PROG SYS

  COMMAND: QFOID                                ==>
```

This screen allows you to specify and display the input/output devices used during the IOCP, and the model group number of the target system. An input device is required to read in the system generation information. This device is a card reader or tape for the 4381. An output printer, which prints the configuration reports during the IOCP generation run is optional. The model group number of the target system indicates to the IOCP which system the operation is being generated for. For example, it is possible to run the operation for a Model Group 1 on a 4381 Model Group 2.

To use the QFOID Screen, key **QFOID** after COMMAND and press the ENTER key. The fields displayed on the screen contain the default values, unless device assignments are changed.

Output Listing Device

If the output device assignments are not correct, change them in the following manner:

- To change the printer address, key **P0XXX** on the COMMAND line next to QFOID, and press the ENTER key.

  A correct POXXX address has this format: P0 followed by a one-digit channel number (0-5) and two hexadecimal digits to specify the device on the channel (00-FF for all channels except channel 0; channel 0 is limited to 00-EF).

- To define an IOCP-supported printer type, key **Y** on the command line (next to QFOID), followed by **1403**, **3203**, or **3211**, and press the ENTER key.

- To specify the printer train, key **A** on the command line next to QFOID, followed by one of the trains selected from the lists below, and press the ENTER key. The default value for this field is PCAN.

  1403 or **3203**

AN	QN
HN	QNC
PCAN	RN
PCHN	SN
PN	TN
YN	

  3211

A11	G11
H11	P11
T11	

  Notes:

  1. To get a printed copy of the IOCP configuration reports, an output printer must be attached and assigned as described. If an output printer is not available on your system, key **P** on the COMMAND line next to QFOID, and press the ENTER key.
  2. A printer universal character set (UCS) buffer load will destroy any existing printer buffer character set resident in the buffer. To use a character set that is already in the buffer, enter the character **A** on the command line next to QFOID, and press ENTER.
  3. If the displayed printer page width is incorrect, key in **W** next to QFOID, and one of the available options (**072** characters or **0100** characters), and press ENTER. The default value for this field is 72 characters.
  4. If the page length displayed is incorrect, key in **L** and a valid page length next to QFOID, and press the ENTER key. Valid options are from 40 to 160 lines per page. The default value for this field is 54 lines.

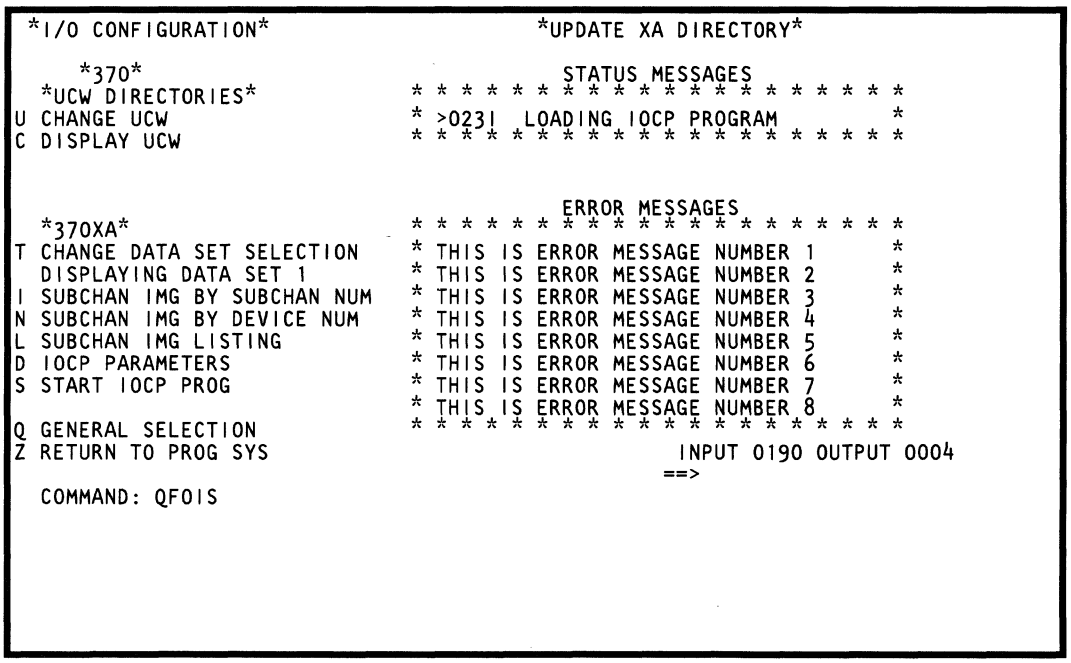
Input Deck Device

If the displayed input device address is not correct, key in a correct device address (that is, R0CUU for the card reader, T0CUU for a tape input) next to the QFOID on the COMMAND line, and press the ENTER key. [CUU denotes the channel (C) and unit address (UU) specification.]

Target System

If the displayed model group number is not correct, key in a correct model number (for example, M01 or M02 for a 4381 model group one or two) next to QFOID on the COMMAND line and press the ENTER key.

Start IOCP (QFOIS)



The QFOIS command starts the IOCP, which configures system input/output devices for System/370 extended architecture mode.

The source input record data set for the IOCP must be manually loaded into the input device assigned on the QFOID screen, and the input device must be ready.

To initiate conditions to process the IOCDS using the QFOIS command:

1. If needed, key **QLIW1** next to COMMAND, which sets the system mode to S/370.
2. If needed, key **QLM** next to COMMAND, which starts the 370 IML.
3. Key **QFOID** to define the I/O printer, reader, or tape devices to be used in the IOCP. Ensure that the input data is ready.
4. Key **QFOIS** next to COMMAND and press the ENTER key. This action loads the input record for the IOCP data set, and begins record processing.

Status And Error Messages

As the IOCP proceeds, status messages appear in the top block of the screen; error messages appear in the center of the screen (eight-line area), and display messages appear in the normal location. These messages inform the user of input device or printer conditions, the current status of the IOCP, and error conditions that may require user intervention or action. (Refer to the **Messages** section for details on IOCP messages, and their location, meaning, and recovery).

> **Note:** When IOCP detects a problem during its operation, the Problem Analysis program should not be run. Use only the IOCP-generated messages and recovery procedures to correct problems detected during the IOCP.

Input Data Set Processing and IOCDS Generation

Entering **QFOIS** displays the QFOIS screen and starts the IOCP. Error and status messages are displayed as they occur.

After the IOCP completes an IOCDS configuration, a status message asks whether the I/O Configuration Data Set (IOCDS) is to be saved. To save the IOCDS on the system diskette, enter **Y** after QFOIS at the COMMAND line, and press the ENTER key. To ignore the IOCDS as generated, enter an **N** on the COMMAND line, and press ENTER.

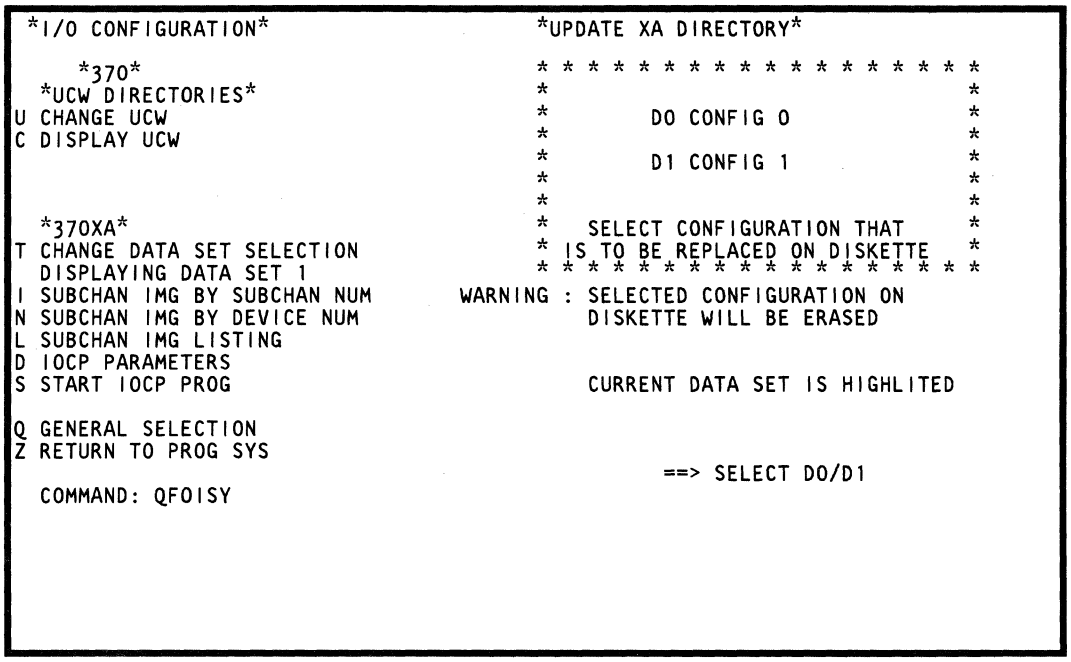
> **Note:** To use the IOCDS as generated, be sure the generated IOCDS is correct, return the system to 370-XA mode, key **QLIW2** (which will IML the 370-XA mode) and press ENTER. Then key **QLM** and press ENTER.

User-Initiated Termination

To end the IOCP, the user can press the CNCL (PA2) key or the INTR key.

> **Note:** Pressing the STOP key during IOCP operation produces unpredictable results. The START and STOP keys must not be used during IOCP operations.

IOCDS Configuration (QFOISY) Screen



Two configurations of an IOCDS can be stored on the functional diskette at one time. These configurations are labeled D0 and D1. The configuration to run the processor in 370-XA mode is selected for IML loading at IML time.

The QFOISY command loads a new Input/Output Configuration Data Set (IOCDS, as generated by IOCP) onto the diskette.

The WARNING message displayed on this screen tells you that when a newly generated IOCDS is specified to be loaded on the diskette, it overlays the existing D0 or D1 configuration.

To store the new IOCDS generated by the IOCP, key **D0** or **D1** next to the QFOISY at the COMMAND line and press ENTER. (If an invalid selection is made here, the QFOIS screen reappears, and the IOCDS selection choice of Y or N repeats.)

When you have decided to save the new IOCDS configuration for the channel subsystem, it is advisable to save the new IOCDS configuration on the backup FUNC2 diskette. This action assures that you can recover from a problem with the primary FUNC2 diskette.

IOCDS Selection Considerations

When IOCP generates warning and error messages, and the error messages are not severe errors, the user is given the option of ignoring the IOCP messages and saving the result. This option should be carefully considered.

If the errors or warnings were expected and you can determine that the IOCDS result does not contain serious violations of channel operating rules, saving the IOCDS may allow you to get the system running quickly.

However, if you do not ensure that the IOCDS conforms to channel operating rules, whether the operation was error free or not, saving and using the data set may result in errors. Some of these errors can be very difficult to diagnose. Examples of these errors include:

- Native consoles are not defined. (Warning messages are generated.)
- The full range of addresses for control units that require full ranges are not defined; an example is the 3830 control unit. (For specific information on these requirements, refer to the system library publications for the control units.) Note that the error can be the result of the user not defining all the required addresses, or IOCP may have dropped some devices because of the detection of syntax or path validation errors.
- Specification of more control units on a channel interface than can be accommodated within the specification of a channel. (For specific information on these types of restrictions, refer to *IBM S/360 and S/370 I/O Interface Channel to Control Unit Original Equipment Manufacturers' Information*, GA22-6974.)

Because you may not have all your control units attached at any one time, the IOCP permits more than the normal maximum eight control units to be defined for each channel. This allows you to alter your attachments without having to reconfigure your channel subsystem.

Subchannel Image Listing (QFOIL) Screen

```
 *I/O CONFIGURATION*                  *SUBCHANNEL IMAGE LISTING - DATA SET 0*
                                       SCHNUM 0001 TO 000C     SCHNUM 000D TO 0018
     *370*                           ---DEV---  CU --CHPID---|---DEV---  CU --CHPID---
  *UCW DIRECTORIES*                  ADR NO MOD TY 0  1  2  3|ADR NO MOD TY 0  1  2  3
U CHANGE UCW                         04 0004 B  2 00         |FF 00FF B  2 00
C DISPLAY UCW                        0E 000E B  2 00         |A0 01A0 CD 2 01 02
                                     1A 001A B  2 00         |A1 01A1 CD 2 01 02
    *370XA*                          20 0020 B  2 00         |A2 01A2 CD 2 01 02
T CHANGE DATA SET SELECTION          60 0060 B  2 00         |A3 01A3 CD 2 01 02
  DISPLAYING DATA SET 0              61 0061 B  2 00         |A4 01A4 CD 2 01 02
I SUBCHAN IMG BY SUBCHAN NUM
N SUBCHAN IMG BY DEVICE NUM          62 0062 B  2 00         |A5 01A5 CD 2 01 02
L SUBCHAN IMG LISTING                63 0063 B  2 00         |A6 01A6 CD 2 01 02
D IOCP PARAMETERS                    F2 00F2 B  2 00         |A7 01A7 CD 2 01 02
S START IOCP PROG                    F3 00F3 B  2 00         |A8 01A8 CD 2 01 02
                                     F4 00F4 B  2 00         |A9 01A9 CD 2 01 02
Q GENERAL SELECTION                  F5 00F5 B  2 00         |AA 01AA CD 2 01 02
Z RETURN TO PROG SYS                 DEVICE MODE KEY: B-BYTE, C-BLOCK, S-SELECTOR
                                                      D-DATA STREAMING, N-NATIVE
                                                       ==>
  COMMAND: QFOIL
```

This screen displays a listing of subchannel images for the indicated data set when you enter a one- to four-digit subchannel number next to QFOIL at the COMMAND line.

SCHNUM mmmm TO nnnn

This screen displays from one to 24 subchannel images, twelve in each column, starting at the entered subchannel number. If no subchannel number is entered, the list starts at subchannel number 0001.

DEV ADR The DEV ADR field specifies the physical unit address on each channel path. It is specified as a two-digit field (00–FF) to denote the device address.

DEV NO In 370-XA mode, an I/O device is uniquely identified by a device number (rather than by a device address as in System/370 mode). This four-digit (0000–FFFF) field is the number associated with the corresponding subchannel.

DEV MOD The device mode characteristic field is described at the bottom of the screen at the DEVICE MODE KEY label.

CU TY The control unit type may be type 1, which supports only one request at a time, or type 2, which supports multiple requests. This one-digit field (1–2) indicates the type of control unit specified for this device:

TYPE 1 – Selector;shared;single request only
TYPE 2 – Unshared;multiple requests available.

CHPID(N) A channel path is used to refer to the physical path between the channel subsystem and one or more control units. There are four channel paths available per device at a time on the 4381. CHPID(N) defines the channel path being used [where (N) can be 0–3]. The one-byte hex field (XX) below CHPID(N) specifies one of the twelve physical channels on which the device may be accessed (00–0B). If a channel path is blank, then it has not been assigned.

Note that in the example screen, subchannels 0001 to 000C are summarized on the left side of the screen, and subchannels 000D to 0018 are summarized on the right side. The top left entry (04 0004 B 2 00) is the summary for subchannel 1, the bottom left entry (F5 00F5 B 2 00) is the summary for subchannel 000C.

If one screen display does not contain all subchannels, the message MORE, PRESS ENTER appears. A page containing a specific subchannel may be displayed by entering the subchannel number after QFOIL at the COMMAND line.

Subchannel Image Selection (QFOII–QFOIN) Screen

```
 *I/O CONFIGURATION*                    *SUBCHANNEL ID nnnn*

    *370*                      CHPIDO     CHPID1     CHPID2     CHPID3
  *UCW DIRECTORIES*             XX         XX         XX         XX
U CHANGE UCW
C DISPLAY UCW                  CTL UNITO  CTL UNIT1  CTL UNIT2  CTL UNIT3
                                XXXX       XXXX       XXXX       XXXX
  *370XA*
T CHANGE DATA SET SELECTION    PIM        DEV ADDR   DEV NUMBER
  DISPLAYING DATA SET 1         XX         XX         XXXX
I SUBCHAN IMG BY SUBCHAN NUM
N SUBCHAN IMG BY DEVICE NUM    DEV MODE   CHARACTERISTIC     DATA SET
L SUBCHAN IMG LISTING           XX         CCC,CCC              X
D IOCP PARAMETERS
S START IOCP PROG              TIMER      CTL UNIT TYPE
                                X              X
Q GENERAL SELECTION
Z RETURN TO PROG SYS

                                                 ==>
  COMMAND: QFOII
```

This screen presents a display of generated subchannel images following execution of the IOCP. It displays the subchannel image with the entry of a one to four-digit device number following QFOII or QFOIN, depending on whether you want the display by subchannel number (QFOII) or by device number (QFOIN). If no number is specified, the default value is one. The fields of the QFOII and QFOIN screens are explained in the following text.

Subchannel ID nnnn

CHPID(N) A channel path is used to refer to the physical path between the channel subsystem and one or more control units. There are four channel paths available per device at a time on the 4381. CHPID(N) defines the channel path being used [where (N) can be 0–3]. The one-byte hex field (XX) below CHPID(N) specifies one of the twelve physical channels on which the device may be accessed (00–0B). If this field is displayed as NA, then this control unit has not been assigned.

CTL Unit(N) In 370-XA mode, the channel subsystem uses logical control units to represent a set of physical control units that either physically or logically attach common I/O devices. There are eight control unit paths available on the 4381. CTL UNIT(N) [where (N) can be 0–3] defines the control unit being used for the specified device. The two-byte hex field (XXXX) below CTL UNIT(N) specifies the sequential number of the control unit that had been specified in the IOCP SYSGEN input record data set (and can be from 0000–00FF). If this field is displayed as NA, then this channel path has not been assigned.

PIM The path installed mask (PIM) is a one-byte mask (00–FF) that indicates which logical path to the specified I/O device is physically installed. The maximum value is limited to a combination of the available paths. If more than four bits are on, the first four bits are used.

DEV ADDR The DEV ADDR field specifies the channel address of a device when it is used in System/370 mode. It is specified as a one-byte field (00–FF) to denote the device address on the physical channel interface.

DEV Number In 370-XA mode, an I/O device is uniquely identified by a device number (rather than by a device address as in System/370 mode). This two-byte (0000–FFFF) field is the number defined by IOCP for the subchannel or device specified for this screen.

DEV Mode This field is bit significant and is decoded in the CHARACTERISTIC and TIMER fields.

Characteristic The CHARACTERISTIC field, indicated by CCC or CCC,CCC, is an additional method of displaying the meaning of the device mode bits that are displayed in the DEV MODE field. The characteristic field displays the characteristic for the device or control unit in mnemonic form for easy recognition.

The CHARACTERISTIC and the DEV MODE fields include the same information, but present it differently (except for the timer function).

The information contained in the CHARACTERISTIC field reflects the protocol and type of control unit to which the device is attached, and the type of channel over which the device communicates with the processor unit. This field also indicates whether a device is natively attached.

The device mode reflected in the CHARACTERISTIC field is set according to the input given in the IOCP input data set by the TYPE parameters on the CTRLUNIT and CHPID macro, and by the PROTOCL parameters on the CTRLUNIT macro statement.

The device operates in selector mode (SEL) when the control unit is a type 1 (TYPE=Y or TYPE=YB was specified in the input data set on the CTRLUNIT macro statement) and the channel is a block multiplexer channel (TYPE=BL was specified in the input data set on the CHPID macro statement for that device).

The device operates in block multiplexer mode (BLK) when the control unit is a type 2 (TYPE=N was specified in the input data set on the CTRLUNIT macro statement or statements for that device) and the channel was specified as block multiplexer.

The device operates in byte multiplexer mode (BYT) when the control unit is a type 1 (TYPE=YB or TYPE=Y was specified in the input data set) and the channel is byte multiplexer (TYPE=B was specified on the CHPID macro statement).

The device can run with direct control interlock (DCI) in all three modes of operation, and is specified by PROTOCL=D on the CTRLUNIT macro statement. If data streaming (DST) or native device (NAT) is not shown, this mode is not displayed in the CHARACTERISTIC field (as it is in the default mode). The device operates in NAT mode if the address specified is 00F2 to 00F5.

The device can run with data streaming (DST or STREAMING) while in block multiplexer mode. This is determined from the input from the PROTOCL

parameter on the CTRLUNIT macro statement. If PROTOCL=S is specified, the device runs with data streaming.

The device will be assumed to be native (NAT) if it has a unit address of F2, F3, F4, F5 or FF, and is defined to be on channel 0 in the IOCP input data set.

Examples of the CCC (or CCC, CCC) field are shown below:

BLK
SEL
BYT
BLK,DST
SEL,DST
BYT,NAT
INV

INV indicates that the device does not have a valid characteristic. (This can occur when a device on channel five, which had been valid for a block multiplexer channel, has become invalid because of a change in the channel five configuration to a byte multiplexer channel.)

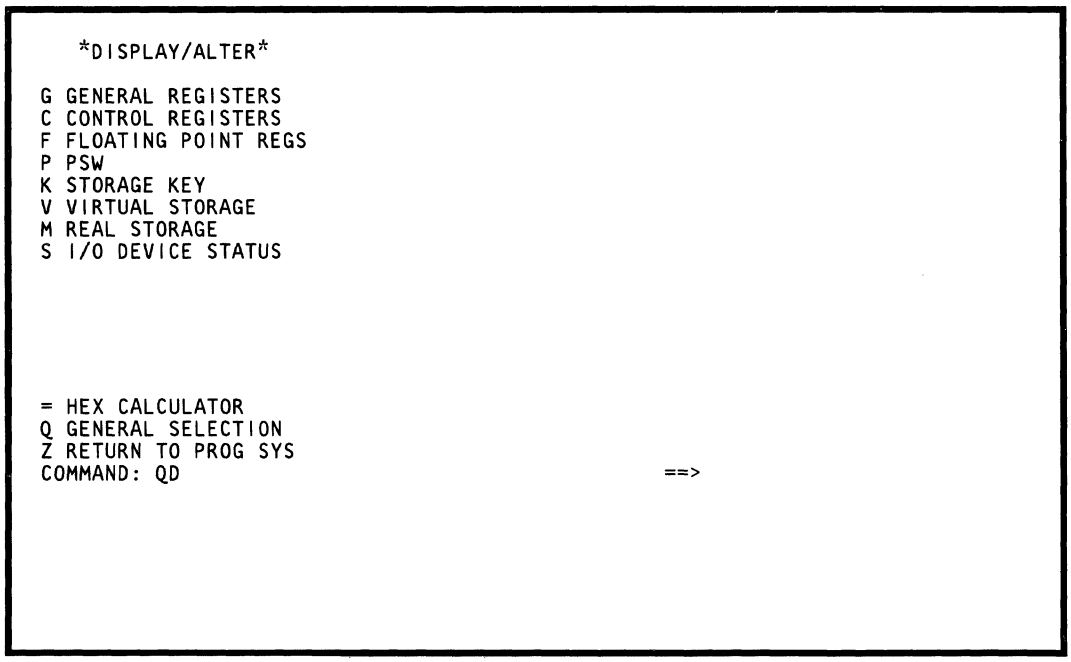
Data Set The 4381 can maintain two IOCDS configurations (labeled 0 and 1). The current operating IOCDS is specified in the QLI screen as D0 or D1. Either data set may be displayed on the QFOII or QFOIN screens. This one-bit field (0–1) indicates the data set that is being displayed on the screen. The user may display the alternate data set by entering **QFOIT**, which switches the value between 0 and 1, and pressing ENTER.

Timer This one-character field indicates whether the channel subsystem monitoring feature is installed (Yes or No).

CTL Unit Type The control unit type may be type 1, which supports only one request at a time, or type 2, which supports multiple requests. This one-digit field (1–2) indicates the type of control unit specified for this device:

TYPE 1 – Selector;shared;single request only
TYPE 2 – Unshared;Multiple requests available.

Display/Alter (QD) Screen



The Display/Alter (QD) screen lists areas that can be displayed or altered. Any area can be selected for display by entering the appropriate character code at the QD label and pressing ENTER on the keyboard. The area selected is displayed on the Display/Alter screen.

If you know the character code for the area to be displayed or altered without referring to the Display/Alter screen, the display or alter function can be made from any other manual control mode screen by prefixing the selection with QD. The format for displaying and altering various areas is shown in the individual display/alter screen descriptions.

When an area is displayed on the screen, it may be altered *directly* by positioning the cursor below the displayed data to be changed and entering it from the keyboard. When ENTER is pressed, the data is altered and displayed on the screen.

Display/Alter General Registers (QDG)

```
*DISPLAY/ALTER*
G GENERAL REGISTERS
C CONTROL REGISTERS                    GENERAL REGISTERS
F FLOATING POINT REGS
P PSW                        0          1          2          3
K STORAGE KEY                0000 0000  0000 0000  0000 0000  0000 0000
V VIRTUAL STORE
M REAL STORAGE               4          5          6          7
S I/O DEVICE STATUS          0000 0000  0000 0000  0000 0000  0000 0000

                             8          9          A          B
                             0000 0000  0000 0000  0000 0000  0000 0000

                             C          D          E          F
                             0000 0000  0000 0000  0000 0000  0000 0000
= HEX CALCULATOR
Q GENERAL SELECTION
Z RETURN TO PROG SYS

COMMAND: QDG                                ==>
```

The general registers (G) are displayed on the Display/Alter screen when a general register display or alter function is executed from a manual control screen. All general registers are displayed when any register or a portion of a register is specified in any display or alter operation.

To change the general registers from the COMMAND label, key the following before pressing ENTER.

- **QDG** (general register)
- The register number **0** to **F**
- The byte **0** to **3** within the register where the data string is to begin
- The operand
- The data to be inserted.

The operand can be an equal sign (=), which specifies a move of the data specified to the location specified, an ampersand (&), which specifies an *AND* function with the contents of the location specified, or a slash (/), which specifies an *OR* function with the contents of the location specified.

EXAMPLE

Assume general registers 4 and 5 are both 0000 0000, as shown in the Display/Alter General Register screen illustration.

```
COMMAND: QDG42=ffffff     (Press ENTER)
```

This changes general register 4 to 0000 FFFF and register 5 to FF00 0000. When altering data using the COMMAND line, a period may be used as a "don't care" character (data in that position is unchanged). This allows data to be changed in nonadjacent areas of a register in one step without affecting intermediate data. If a blank is inserted in the selection entry, it is compressed out (deleted from the entry).

Data can be *directly* altered by positioning the cursor under the general register data to be changed and entering the new data from the keyboard. Blanks and periods are considered "don't care" characters. When the ENTER key is pressed, the data is entered in the general registers.

Translate Function of Display/Alter screens

The translate function can be used with the Display/Alter screens. By entering T following any display command on the COMMAND line, the character equivalent is displayed below the hexadecimal data.

The T character is not allowed following an alter command on the COMMAND line. Direct entry of data below the data display is suppressed when the translate function is in effect.

The translate function is reset by entering a command on the COMMAND line without the T character.

Display/Alter Floating-Point Registers (QDF)

```
*DISPLAY/ALTER*
G GENERAL REGISTERS
C CONTROL REGISTERS                FLOATING POINT REGISTERS
F FLOATING POINT REGS
P PSW                                0
K STORAGE KEY                        0000  0000  0000  0000
V VIRTUAL STORE
M REAL STORAGE                       2
S I/O DEVICE STATUS                  0000  0000  0000  0000

                                     4
                                     0000  0000  0000  0000

                                     6
                                     0000  0000  0000  0000
= HEX CALCULATOR
Q GENERAL SELECTION
Z RETURN TO PROG SYS

COMMAND: QDF                              ==>
```

The floating-point registers (F) are displayed on the Display/Alter screen when a floating-point register display or alter function is executed from a manual control screen. All floating-point registers are displayed when any register or portion of a register is specified in any display or alter operation.

To change the floating-point registers from the COMMAND line, key the following before pressing ENTER.

- **QDF** (floating-point register)
- The register number **0**, **2**, **4**, or **6**
- The byte **0** to **7** within the register where the data string is to begin
- The operand
- The data to be inserted.

The operand can be an equal sign (=), which specifies a move of the data specified to the location specified, an ampersand (&), which specifies an *AND* function with the contents of the location specified, or a slash (/), which specifies an *OR* function with the contents of the location specified.

EXAMPLE

Assume the floating-point registers are all zeros, as shown in the Display/Alter floating-point register illustration.

```
COMMAND: QDF26=1a8c724a     (Press ENTER)
```

This changes floating-point register 2 to 0000 0000 0000 1A8C and register 4 to 724A 0000 0000 0000.

When altering data using the COMMAND line, a period can be used as a "don't care" character (data in that position is unchanged). This allows data to be changed in nonadjacent areas of a register in one step without affecting intermediate data. If a blank is inserted in the selection entry, it is deleted from the entry.

Data can be altered *directly* by positioning the cursor under the floating-point register data to be changed and by entering the new data from the keyboard. Blanks and periods are considered "don't care" characters. When the ENTER key is pressed, the data is entered in the floating-point registers.

Display/Alter Control Registers (QDC)

```
*DISPLAY/ALTER*
G GENERAL REGISTERS
C CONTROL REGISTERS                    CONTROL REGISTERS
F FLOATING POINT REGS
P PSW                          0           1           2           3
K STORAGE KEY                  0000 0000   0000 0000   0000 0000   0000 0000
V VIRTUAL STORE
M REAL STORAGE                 4           5           6           7
S I/O DEVICE STATUS            0000 0000   0000 0000   0000 0000   0000 0000

                               8           9           A           B
                               0000 0000   0000 0000   0000 0000   0000 0000

                               C           D           E           F
                               0000 0000   0000 0000   0000 0000   0000 0000
= HEX CALCULATOR
Q GENERAL SELECTION
Z RETURN TO PROG SYS

COMMAND: QDC                                  ==>
```

The control registers (C) are displayed on the Display/Alter screen when a control register display or alter function is executed from a manual control mode screen. All control registers are displayed when any register or a portion of a register is specified in any display or alter operation.

To alter the control registers from the COMMAND line, key the following before pressing ENTER:

- **QDC** (control register)
- The register number **0** to **F**
- The byte **0** to **7** within the register where the data string is to begin
- The operand
- The data to be inserted.

The operand can be an equal sign (=), which specifies a move of the data specified to the location specified, an ampersand (&), which specifies an *AND* function with the contents of the location specified, or a slash (/), which specifies an *OR* function with the contents of the location specified.

EXAMPLE

Assume control registers A and B are both 0000 0000, as shown in the Display/Alter control register screen illustration.

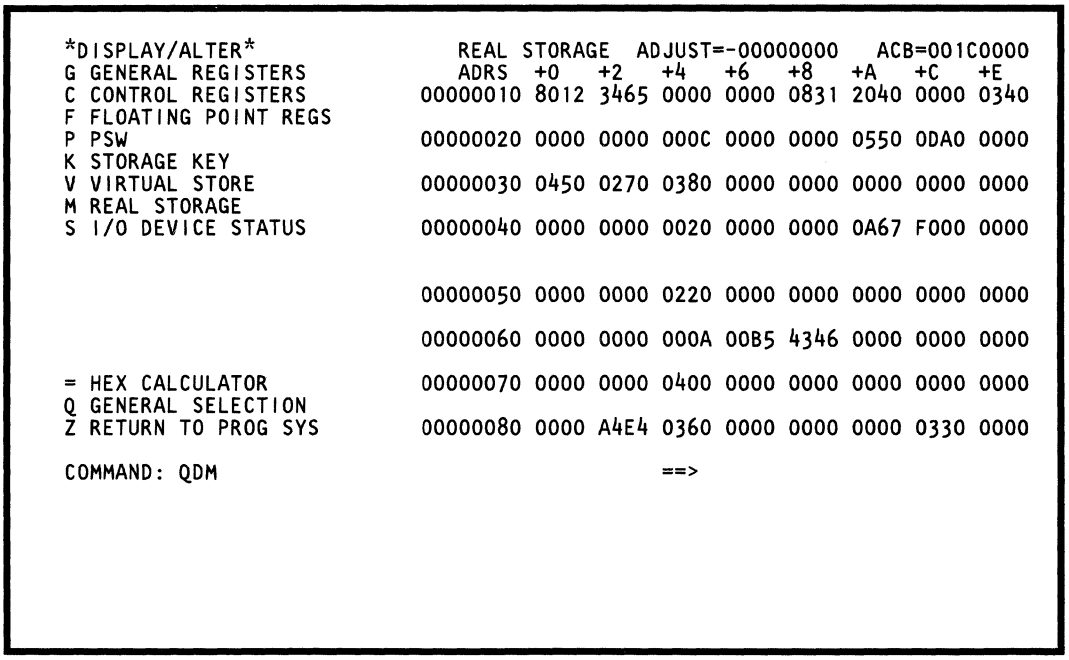
```
COMMAND: QDCA1=1c3a24f8     (Press ENTER)
```

This changes control register A to 001C 3A24 and register B to F800 0000.

When altering data using the COMMAND line, a period may be used as a "don't care" character (data in that position is unchanged). This allows data to be changed in nonadjacent areas of a register without affecting intermediate data. If a blank is inserted in the selection entry, it is compressed out (deleted from the entry).

Data can be entered *directly* by positioning the cursor under the control register data to be changed and entering the new data from the keyboard. Blanks and periods are considered "don't care" characters in this mode. When the ENTER key is pressed, the data is entered in the control registers.

Display/Alter Real Storage (QDM)



Displaying the Storage Screens

You can display or alter the real and virtual storage facilities using the QDM and QDV screens. The QDM screen is shown above; the QDV screen is shown on PRG 66.

When operating in S/370 mode, either virtual storage or real storage can be displayed on the right half of the Display/Alter screen by entering either **QDV** (virtual) or **QDM** (real) and a hexadecimal address (8 digits maximum) after the COMMAND line. The specified address displays a 128-byte block of storage, which contains the specified address. If no address is specified, an address of 00000000 is assumed. Three fields are displayed above the storage data.

Real Storage

The first field identifies the screen display as either a virtual storage or real storage display.

Adjust=-00000000

The second field displays any address adjust factor in effect. Here you can specify a hexadecimal constant to calculate an address value. This constant remains available to you until you change it, or until you leave the Display/Alter screen.

You specify an adjust value by keying either + (plus) or - (minus) and an adjust value after the QDM or QDV command. This adds or subtracts this value to the address on the command line. The calculated value then becomes the address of the data you want to display. Intensified dots appear under the data at the calculated address.

ACB=00000000 or REAL=00000000

The third field depends on whether real storage or virtual is displayed. For real storage displays, this field contains the address check boundary (ACB) address. The address specified for real storage alter/display can be from 0 to one less than the displayed ACB address. For virtual storage displays, this field contains the real address equivalent of the virtual address.

Display/Alter Virtual Storage (QDV)

```
*DISPLAY/ALTER*                VIRTUAL STORAGE ADJUST=+000003A0  REAL=00000000
G GENERAL REGISTERS              ADRS  +0   +2   +4   +6   +8   +A   +C   +E
C CONTROL REGISTERS          00FFFFE0 8012 3465 0000 0000 0831 2040 0000 0340
F FLOATING POINT REGS
P PSW                        00FFFFF0 0000 0000 000C 0000 0000 0550 0DA0 0000
K STORAGE KEY
V VIRTUAL STORE              00000000 0450 0270 0380 0000 0000 0000 0000 0000
M REAL STORAGE
S I/O DEVICE STATUS          00000010 0000 0000 0020 0000 0000 0A67 F000 0000


                             00000020 0000 0000 0220 0000 0000 0000 0000 0000

                             00000030 0000 0000 000A 00B5 4346 0000 0000 0000

= HEX CALCULATOR             00000040 0000 0000 0400 0000 0000 0000 0000 0000
Q GENERAL SELECTION
Z RETURN TO PROG SYS         00000050 0000 A4E4 0360 0000 0000 0000 0330 0000

COMMAND: QDV                                ==>
```

Altering the Storage Screens

Storage can be altered directly from the COMMAND line or by entering data below the displayed storage data. To alter storage from the COMMAND line, key the following before pressing ENTER.

- **QDV** or **QDM** (virtual or real),
- The hexadecimal storage address where the data string is to begin,
- The operand, followed by the data to be inserted.

The operand can be an equal sign (=), which specifies a move of the data specified to the location specified, an ampersand (&), which specifies an *AND* function with the contents of the location specified, or a slash (/), which specifies an *OR* function with the contents of the location specified.

EXAMPLE

```
COMMAND: QDM00000080=F1F2F3F4     (Press ENTER)
```

This changes the data (beginning at the real storage address 00000080) from 0000A4E4 to F1F2F3F4.

When altering data using the COMMAND line, a period may be used as a "don't care" character (data in that position is unchanged). This allows data to be changed in nonadjacent areas of storage without affecting intermediate data. Any blanks inserted in the selection entry are deleted from the entry.

Data is altered *directly* by positioning the cursor under the data to be changed and entering the new data. Blanks and periods are considered "don't care"

characters in this mode. When the ENTER key is pressed, the new data is entered in storage.

Address Adjust Operation

The address adjust is displayed above the storage data on the display screen. This function allows a base address to be manually set for use in later storage display screen operations. It is used when many addresses are to be manually accessed in a common area of storage (such as a table) with a known base (beginning) address. If the adjust factor is set to the base address, only the displacement value need be entered to display each address.

To use the address adjust function, enter the storage command on the COMMAND line with a hexadecimal address, followed by either + (plus) or - (minus) and the address adjust value.

Any adjust constant appended to the input field (with a + or -) is set into the adjust area displayed above the storage data; all later storage displays are adjusted by this value. All addresses that are displayed are relative to the adjust value. Address 00000000 in the data display area is address 3A0. The address of 70 specified in the example is interpreted as a value of 70 from the base address of 3A0. Therefore, the data at address 70 on the screen is 3A0 + 70, or 410. Addresses lower than 00000000 are displayed in complement form. Address FFFFF0 is equivalent to minus 10 (hexadecimal).

If, on a later operation, V1A0 is entered, the data display would show a 128-byte block of storage containing address 1A0. Again, this address is 1A0 from the base address of 3A0. Therefore, the data displayed at 1A0 on the screen is 3A0 + 1A0, or 540.

If no address is specified (such as QDV+2C0), the address adjust is set to 2C0, and address 00000000 is assumed and displayed (actual address = 2C0).

Any new address can be keyed, or paging can be executed and the adjust factor remains in effect. The address adjust factor remains in effect until you enter a new value or Display/Alter (QD) mode is exited.

Paging Operation

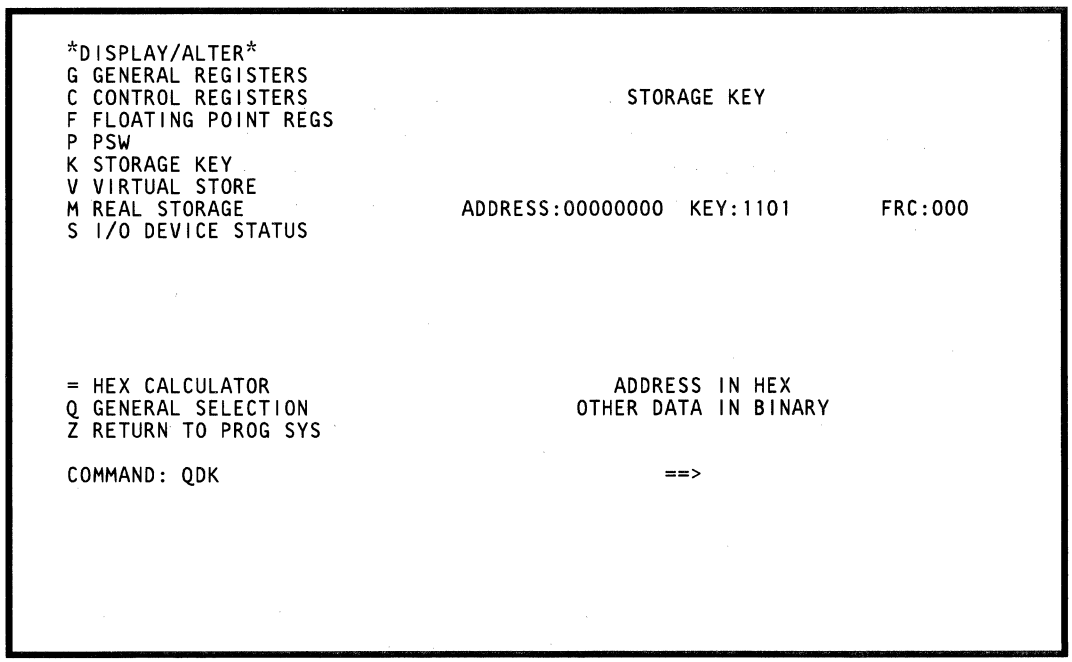
The paging keys cause the next higher 128 bytes of storage to be displayed (Page Up) or the preceding 128 bytes of storage to be displayed (Page Down).

The paging function is performed by holding the ALT key down and pressing the appropriate paging key. Paging through storage does not affect the address adjust value. If translate mode is active, it remains on while paging.

Dual Address Space Facility

The translation tables used to display a virtual address depend on the state of the PSW bit 16. To display a virtual address from a different address space, change this bit on the PSW display screen (QDP). However, to continue processing instructions, you must restore this bit to its original state.

Display/Alter Storage Key (QDK)



The QDK selection from the Display/Alter Selection screen causes the storage key to be displayed on the right half of the Display/Alter screen. When the screen is selected for display, a storage address of up to eight hexadecimal digits can be specified for display. If the address is left blank, address 00000000 is displayed.

Each display of the storage key shows the selected address in hexadecimal, the four-bit binary key for that address, and the status of the fetch-protection (F), reference (R), and change (C) bits.

Altering the Storage Key

The storage key can be directly altered from the COMMAND line or you can enter the data directly into the display area. To alter data from the COMMAND line, enter the following before pressing ENTER:

- **QDK**,
- A hexadecimal address (8 digits maximum),
- Operand,
- Key field (4 binary bits),
- FRC field (3 binary bits).

The operand can be an equal sign (=), which specifies a move of the data specified to the location specified, an ampersand (&), which specifies an *AND* function with the contents of the location specified, or a slash (/), which specifies an *OR* function with the contents of the location specified.

EXAMPLE

```
COMMAND: QDK47ac=0110100     (Press ENTER)
```

This selection places an address of 000047AC in the ADDRESS portion of the display, changes the KEY to 0110, and changes the FRC bits to 100.

A period entered on the COMMAND line is treated as a "don't care" character (data in that position is unchanged). Any blanks are compressed out of the selection entry (deleted from entry).

Data can be altered directly by positioning the cursor under the binary field data to be changed and entering the new data in binary from the keyboard. Blanks and periods are considered "don't care" characters in this mode. When the ENTER key is pressed, the data is inserted into the fields as entered.

Paging Operation

The paging keys cause a storage key display of the first (lowest) address in the next higher or lower storage block. The Page Up key displays the next higher storage block key. The Page Down key displays the next lower storage block key.

The paging function is executed by holding down the ALT key and pressing the appropriate paging key.

Display/Alter I/O Device Status (QDS)

```
*DISPLAY/ALTER*              *I/O DEVICE STATUS*                SAMPLES=03
G GENERAL REGISTERS          CUU STATUS  CUU STATUS  CUU STATUS  CUU STATUS
C CONTROL REGISTERS          033 CE/DE   150    DE   18E CE/DE   230 CE/DE
F FLOATING POINT REGS        33C    DE   344 CE/DE   4E1 CE/DE
P PSW
K STORAGE KEY
V VIRTUAL STORE
M REAL STORAGE
S I/O DEVICE STATUS




= HEX CALCULATOR
Q GENERAL SELECTION
Z RETURN TO PROG SYS         CE - DEVICE OWES CHANNEL END FOR FINAL OPERATION
.                            DE - DEVICE OWES DEVICE  END
COMMAND: QDS                              ==>
```

This screen displays in System/370 and 370-XA modes. The screens are the same for both modes except the top two lines. The top two lines for 370-XA mode are shown on the next page.

This QDS screen function is used to detect a device or devices that may be having device or system problems.

Each device with pending status is identified by its channel and unit (CUU) address, along with any pending channel end or device end status that is identified for that device; many samples are required to determine this. If further information about that device is required, a full I/O trace on that device can be initiated, using the QAP function as the condition is created again. Results of the trace can be viewed on the QAT screen.

The I/O Device Status screen contents are generated each time the operator presses ENTER. This causes an examination of all UCWs in the system. If a device has had pending status since the last sample count reset, that device is intensified on the screen.

However, there are some restrictions in determining the status of devices by this examining process:

- During command chain operations, channel end is pending until it is received for the last command in the chain.
- Device end status for devices with shared subchannels cannot be determined.
- During Halt I/O and Clear I/O instructions, the indication of channel end and device end is unpredictable.
- Any status accepted into the UCW, even though it has not yet been presented to the operating system, is indicated on the screen as though it has been completed.

The QDS screen applies equally to both System/370 and 370-XA, with the following exception. When you are operating in 370-XA mode, the *I/O Device Status* line describes the device numbers in the following manner:

```
DEVNUM  STATS  DEVNUM   STATS  DEVNUM   STATS   DEVNUM  STATS
01C0    CE/DE  001F     CE
```

Display/Alter Current PSW (QDP)

```
*DISPLAY/ALTER*                          CURRENT PSW
G GENERAL REGISTERS
C CONTROL REGISTERS                   D7C1 0000 2317 C123
F FLOATING POINT REGS
P PSW                        BC: CHNLMSK.E
K STORAGE KEY                EC:  R    TIE  PSW.KEY CMWP  ILC CC   PROG.MASK
V VIRTUAL STORE                   1101 0111   1100   0001  00  10    0011
M REAL STORAGE
S I/O DEVICE STATUS
                                  INSTRUCTION ADDRESS: 0017C123




= HEX CALCULATOR
Q GENERAL SELECTION               ADDRESS AND REGISTER IN HEXADECIMAL
Z RETURN TO PROG SYS              OTHER DATA IN BINARY

COMMAND: QDP                                    ==>
                     370
```

This screen displays information for both System/370 and 370-XA mode. 370-XA mode does not function in basic control mode; this line does not exist in the 370-XA screen. The PSW field line for 370-XA is shown in the last paragraph. Otherwise, the screen is the same for both modes.

The current PSW is displayed on the Display/Alter screen when a current PSW display or alter function is executed from a manual control screen. Either the basic control (BC) or extended control (EC) screen format is displayed, depending on bit 12 of the PSW. If bit 12 = 0, the BC mode screen format is displayed. If bit 12 = 1, the EC mode screen format is displayed.

To display the current PSW from the Display/Alter screen, enter **QDP** after the COMMAND line and press ENTER. The complete PSW is displayed in hexadecimal on the upper portion of the screen. Below is a display (by bit) of the PSW fields and the instruction address portion of the PSW in hexadecimal.

To alter the current PSW from the COMMAND line:

1. Enter:
   - **QDP** (PSW)
   - The byte (0 to 7) where the data string is to begin,
   - The operand, and
   - The data to be inserted in hexadecimal.
2. Press ENTER.

The operand can be an equal sign (=), which specifies a move of the data specified to the location specified, an ampersand (&), which specifies an *AND* function with the contents of the location specified, or a slash (/), which specifies an *OR* function with the contents of the location specified.

EXAMPLE

```
COMMAND: QDP5=046a2c     (Press ENTER)
```

This changes the last three bytes of the PSW on the upper portion of the display and the instruction address on the lower portion to 046A2C. If another portion of the PSW was altered, both the PSW on the upper portion of the screen and the appropriate bit display for the affected field(s).

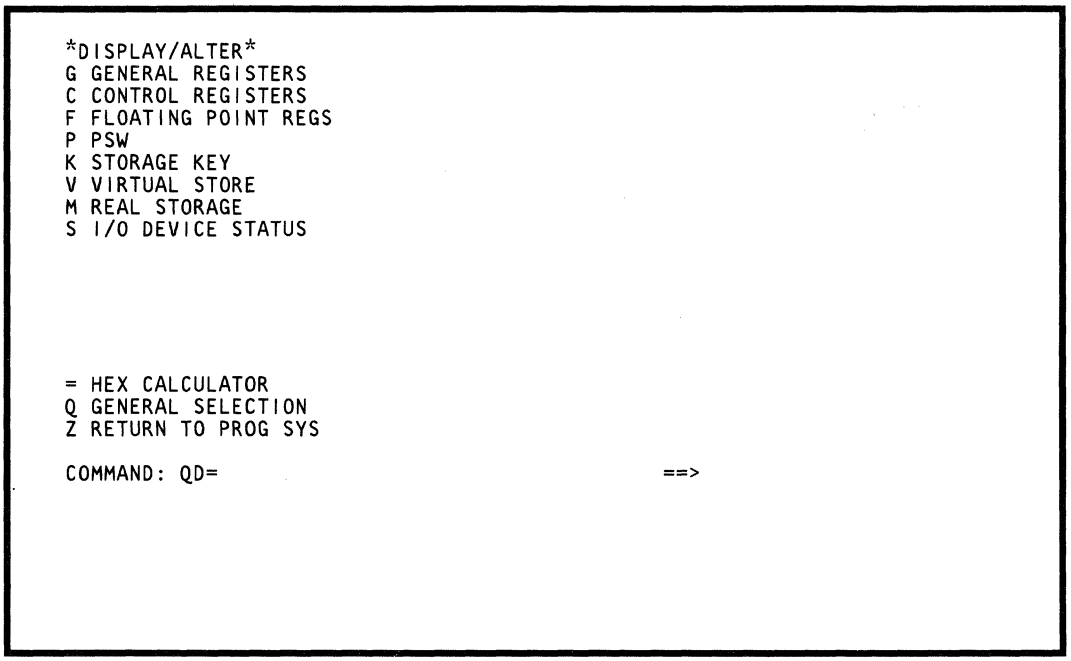
When altering data using the COMMAND line, a period may be used as a "don't care" character (data in that position is unchanged). This allows data to be changed in nonadjacent areas of the PSW without affecting intermediate data. If a blank is inserted in the selection line entry, it is compressed out (deleted from the entry).

Data can be *directly* altered by positioning the cursor under the individual PSW fields and entering data to be changed from the keyboard (Instruction Address in hexadecimal, remaining fields in binary). Blanks and periods are considered "don't care" characters in this mode. When the ENTER key is pressed, the data is entered in the PSW and is displayed in both the field area where entered and the PSW displayed in hexadecimal at the top of the screen.

The QDP screen applies equally to System/370 and 370-XA mode, with the following exception. The EC line and its associated bit presentation for 370-XA mode is shown in the following example:

```
EC:  R    TIE  PSW.KEY CMWP  S CC   PROG.MASK A
     1101 0111   1100    0001  0000   0011      0
```

Display/Alter Hex Calculator (QD=)



The hexadecimal calculator (QD=) function is available on all Display/Alter (QD) screens. This function lets you add or subtract hexadecimal numbers so that you can readily calculate storage addresses.

To use the hexadecimal calculator, enter **QD=** (to select the hexadecimal calculator function) and the problem after the COMMAND line in the following format:

COMMAND: QD=(operand 1)(op code)(operand 2)

- The = sign selects the hexadecimal calculator function.
- Operand 1 is any hexadecimal number (eight digits maximum).
- The operation code is a + (plus) or - (minus).
- Operand 2 is the hexadecimal number (eight digits maximum) to be added to or subtracted from operand 1.

When the problem is correctly entered after the COMMAND line, press ENTER on the keyboard. The original selection entry is erased and the result is displayed next to the message indicator (==>), to the right of the screen (along with the original problem) in the following format:

===> (Answer) = (operand 1) (op code) (operand 2)

Following are some examples of calculations.

EXAMPLE 1

Input:

```
COMMAND: QD=21a6+1a7     ==>
```

Result (Press ENTER*):*

```
COMMAND:                 ==> 0000234D = 000021A6 + 000001A7
```

Both operands are retained until replaced and can be used as a constant by not specifying them on later calculations. If the first operand is specified, the second operand is retained. Also, when only the first operand is specified, the operation code can be omitted if it remains the same (see Example 2).

EXAMPLE 2 (Assume this operation immediately follows Example 1)

Input:

```
COMMAND: QD=23           ==>
```

Result (Press ENTER*):*

```
COMMAND:                 ==> 000001CA = 00000023 + 000001A7
```

If only the second operand is specified, the first operand is retained. The operation code must be specified to identify the entry as the second operand (see Example 3).

EXAMPLE 3 (Assume this operation immediately follows Example 2)

Input:

```
COMMAND: QD=+a12         ==>
```

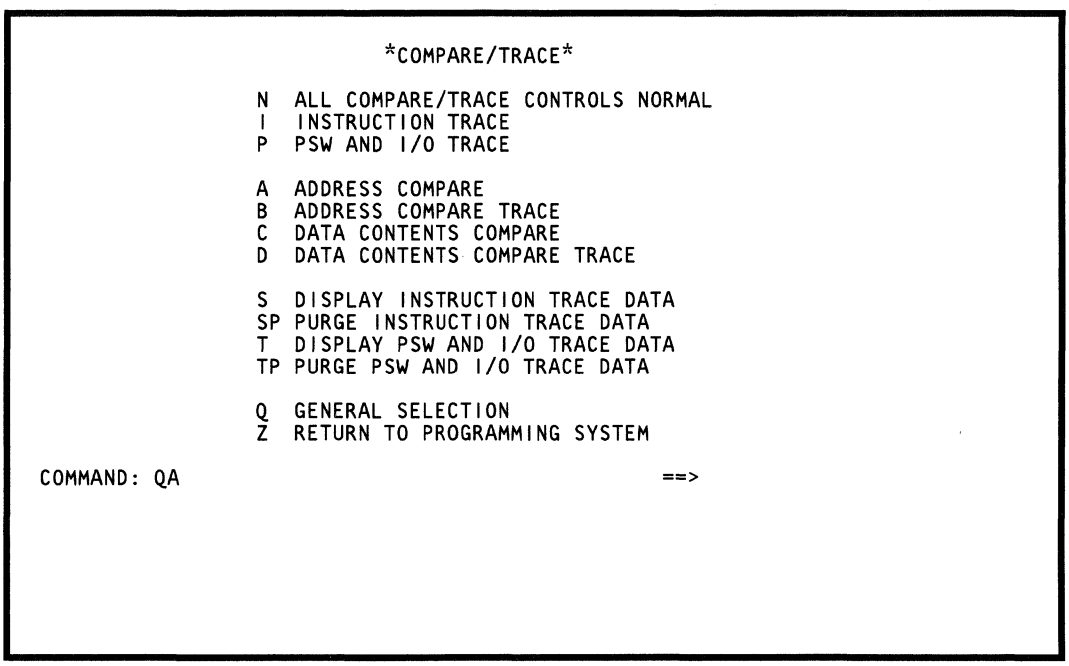
Result (Press ENTER*):*

```
COMMAND:                 ==> 00000A35 = 00000023 + 00000A12
```

If only the = sign is entered, the last hexadecimal calculation made is restored next to the message indicator.

Note: To restore the last calculation to the message display line, key **QD=**.

Compare/Trace (QA) Screen



Use the Compare/Trace screen when you want to:

- Stop the processing
- Trace and save selected address usage
- Trace and save selected I/O operations
- Display or clear trace data.

If you select an option on a compare/trace screen that conflicts with a previous selection, a message informing you of the conflict appears. An intensified compare/trace option means that it is active.

To select this screen, enter **QA** at the COMMAND line and press ENTER. The options contained in the Compare/Trace screen are described in the following text.

All Compare/Trace Controls Normal (QAN)

An intensified compare/trace option means that it is active. To reset previously selected compare/trace functions, enter **QAN** at the COMMAND line and press ENTER. This action is used alone to reset all previously selected compare/trace functions. By keying **N** on the Compare/Trace screen or **QAN** from any other manual control mode screen, any compare/trace function is ended and normal processing continues.

Using the QAN function resets any previously selected trace function, whether it was selected from the compare/trace (QA) screen or any other screen.

Instruction Trace (QAI)

This selection gives the instruction counter address save controls. The results of this trace are displayed on the QAS screen.

PSW And I/O Trace (QAP)

This selection sets the controls for the program status word (PSW) and input/output trace selections. The results of this trace are displayed on the QAT screen.

Address Compare (QAA)

This selection begins an address compare operation where the processor is set to stop on an address match.

Address Compare Trace (QAB)

This selection saves the instruction counter address(es) after a successful address compare. The results of this trace are displayed on the QAS screen.

Data Contents Compare (QAC)

This selection gives the control to stop the processor if a match on a specified address containing specified data occurs.

Warning: To avoid I/O errors while setting address matches, press the STOP **key. After about 30 seconds, begin the selections.**

Data Contents Compare Trace (QAD)

This selection saves the instruction counter address(es) on a successful data compare at a specified storage address. The results of this trace are displayed on the QAS screen.

Display Instruction Trace Data (QAS)

This selection displays the instruction counter addresses that were saved because of a trace stop, trace wrap, or an instruction-counter stop operation.

Purge Instruction Trace Data (QASP)

This selection clears all accumulated trace data from a trace stop, trace wrap or an instruction-trace operation.

Display PSW And I/O Trace Data (QAT)

This selection displays the results of traces selected from the PSW and I/O Trace (QAP) screen.

Purge PSW And I/O Trace Data (QATP)

This selection clears all accumulated trace data from the PSW and I/O trace data from the PSW and I/O trace operation (QAP).

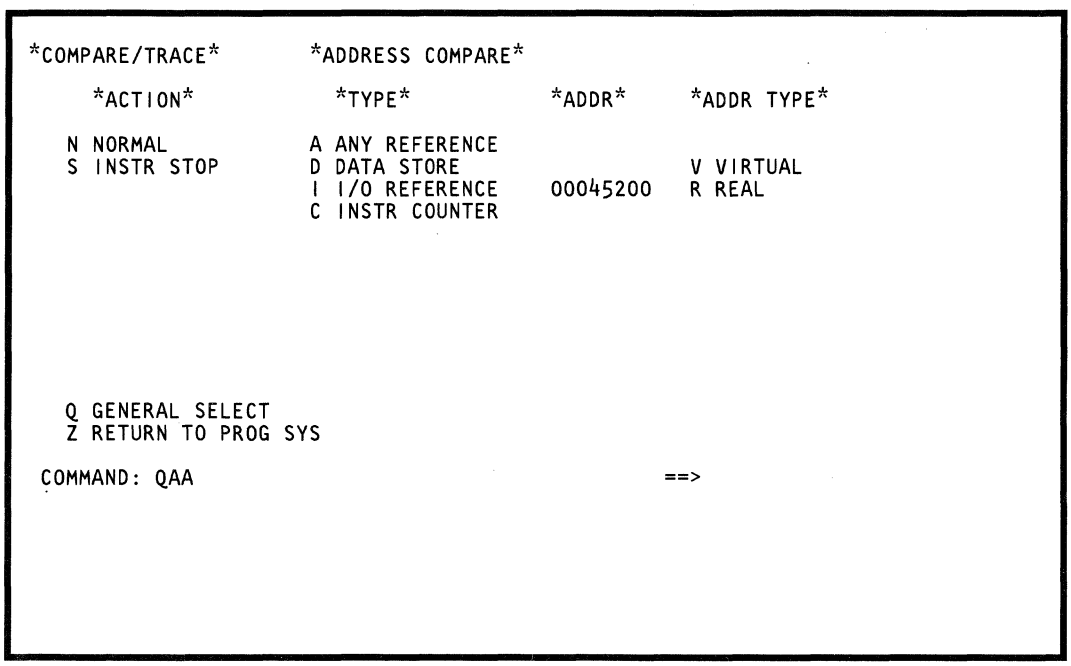
General Selection (Q)

Entering **Q** at the COMMAND line (or following the QA) and pressing ENTER changes the display to the General Selection manual control screen.

Return to Prog Sys (Z)

Entering **QZ** following COMMAND (or **Z** following the QA) and pressing ENTER returns the display to the Operating System (display or Prt/Kybd mode) screen.

Address Compare (QAA) Screen



Address Compare

To begin an address compare operation, enter **QAA** at the COMMAND line and press ENTER.

Action

Normal (QAAN) This action is used to reset any previously selected address compare functions on the QAA screen. By keying **N** on the Address Compare screen or **QAAN** from any other manual control screen, any address compare function is ended and normal processing continues.

INSTR Stop (QAAS) This action causes an instruction stop when the address compare conditions specified by the remaining parameter fields are satisfied. MATCH STOP is displayed in the system status field. The processor executes the current instruction, accepts all waiting interrupts, and stops.

Type

Any Reference (A) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when storage is accessed by the machine.

Data Store (D) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when a machine store (write) function occurs.

I/O Reference (I) This parameter causes the address specified by the remaining parameter field to be compared to the storage address when the transfer of data to and from I/O devices occurs.

INSTR Counter (C) This parameter causes the address of the instruction counter to be compared to the address entered in the address field when a new instruction is selected from storage.

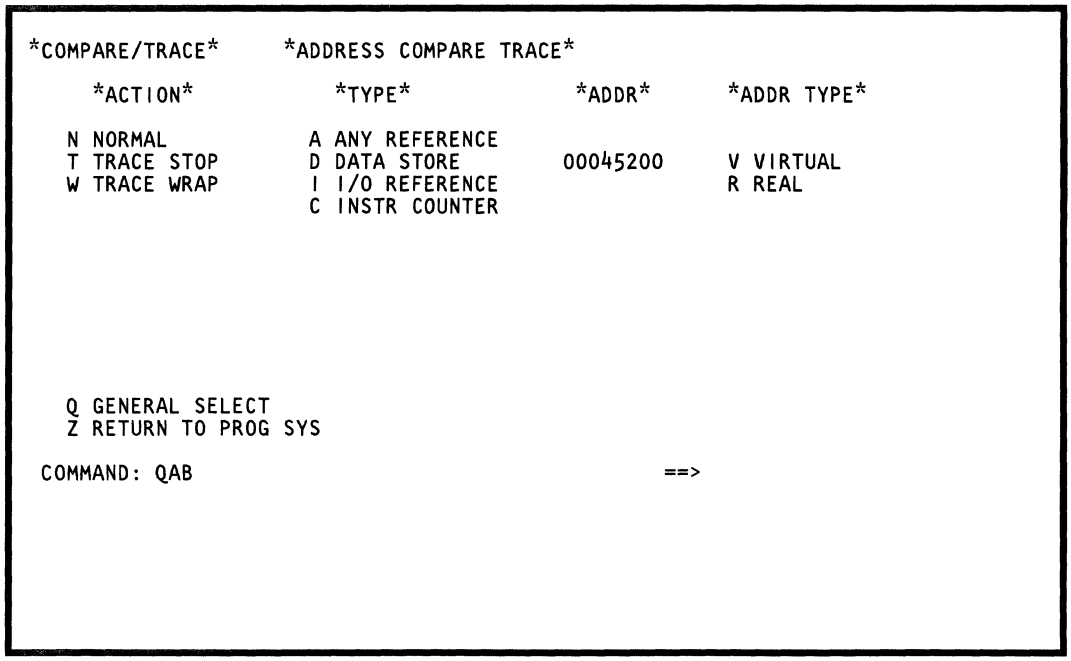
ADDR

This field is used to specify the compare address (1 to 8 hexadecimal digits) for type A, D, I, or C operations. The 4381 operates with 8 bytes at a time for storage accesses (Type A, D and I). Specified addresses may be adjusted to this address boundary. If the address used by the processor is anywhere within the 8-byte (doubleword) boundary specified, a compare occurs. For type C addresses, compares occur on halfword boundaries (2 bytes).

ADDR Type

This field is used to show whether the storage address is a virtual (V) or real (R) address. All I/O references are real addresses.

Address Compare Trace (QAB) Screen



The QAB function saves the instruction counter after a successful address compare. To specify the QAB command, press the STOP key, enter **QAB** at the COMMAND line, and press ENTER. The results of this trace are displayed on the QAS screen.

Action

Normal (QABN) This function resets all trace activity for the QAB command.

Trace Stop (QABT) This action causes the instruction counter addresses to be stored in a trace area until the trace area becomes full (470 entries). When the machine is stopped from a stop function on a type C instruction-counter operation, MATCH STOP is displayed in the status area. Pressing the START key resumes the process.

On type A, D, or I operations, the instruction-counter address is stored only when the compare conditions specified by the remaining parameter fields occur. Processing continues following each compare until the trace area is full.

The trace area can be viewed by selecting the *Display Instruction Trace Area* selection (QAS) option from the Compare/Trace screen.

Trace Wrap (QABW) On type A, D, or I operations, the instruction counter address is stored in the trace area only when the compare conditions (specified by the remaining parameter fields) occur.

On a type C (instruction counter) operation, this action stores the instruction-counter addresses in the trace area.

In each case, when the trace area becomes full, additional addresses are stored and the oldest addresses are dropped so that the trace area always contains the latest 470 addresses.

Note that it is possible to have an instruction-counter trace (for example, QABWC) *and* stop on any reference A, D, I (for example, QAASA) in effect at the same time.

Type

Any Reference (A) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when storage is accessed by the machine.

Data Store (D) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when a machine store (write) function occurs.

I/O Reference (I) This parameter causes the address specified by the remaining parameter field to be compared to the storage address when the transfer of data to and from I/O devices occurs.

INSTR Counter(C) This parameter causes the address of the instruction counter to be compared to the address entered in the address field when a new instruction is selected from storage.

ADDR

This field is used to specify the compare address (1 to 8 hexadecimal digits for type A, D, I or C operations).

The 4381 operates with 8 bytes at a time for storage accesses (Type A, D and I). Specified addresses may be adjusted to this address boundary. If the address used by the processor is anywhere within the 8-byte (doubleword) boundary specified, a compare occurs. For type C addresses, compares occur on halfword boundaries (2 bytes).

ADDR Type

This field is used to show if the specified storage address in the ADDR field is a virtual (V) or real (R) address. Specify V or R only if the current address type is wrong.

Data Contents Compare (QAC) Screen

```
*COMPARE/TRACE*     *DATA CONTENTS COMPARE*

   *ACTION*             *TYPE*          *ADDR*    *OP* *MASK*   *ADDR TYPE*

   N NORMAL           A ANY REFERENCE              =    FFFF
   S INSTR STOP       D DATA STORE                                V VIRTUAL
                      I I/O REFERENCE   00004300                 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 TO PROG SYS

 COMMAND: QAC                                      ==>
```

The QAC screen is used to determine if the data at a specific storage address matches the specified compare conditions. If a match does occur, an instruction stop occurs. To specify the QAC command, press the STOP key, key **QAC** and the desired parameters next to COMMAND, and press ENTER.

Action

Normal (QACN) This function resets all compare activity for the QAC command.

INSTR Stop (QACS) This function stops the processor if data at a specific storage location matches the specified compare conditions. Before the instruction stop occurs, the processor performs the current instruction and accepts all pending-allowed interrupts.

Type

Any Reference (A) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when storage is accessed by the machine.

Data Store (D) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when a machine store (write) function occurs.

I/O Reference (I) This parameter causes the address specified by the remaining parameter field to be compared to the storage address when the transfer of data to and from I/O devices occurs.

INSTR Counter (C) This parameter causes the address of the instruction counter to be compared to the address entered in the address field when a new instruction is selected from storage.

ADDR

This field specifies the compare address (1 to 8 hexadecimal digits) for type A, C, D, or I operations. Compares occur on halfword boundaries (2 bytes); specified addressing may be adjusted to this boundary. (Refer to the restrictions described below.)

OP* and *Mask

Use *OP* and *Mask* fields to set up the conditions that will cause a match at address *ADDR*. You can specify one of four operands together with two bytes of data in the *Mask* field. The options are to compare the data specified in the *Mask* field for an equal or not equal condition on any type A, D, or I operation.

The field equal (=) option is used to compare up to 4 hexadecimal digits (2 bytes) of data specified in the *Mask* field for an equal condition.

The field not equal (/) option is used to compare up to 4 hexadecimal digits (2 bytes) of data specified in the *Mask* field for a not equal condition. The bit equal (&) option is used to compare the bits making up the data specified in the *Mask* field for an equal (on) condition.

The bit not equal (%) option is used to compare the bits making up the data specified in the *Mask* field for a not equal (off) condition.

Periods (.) are permitted in the *Mask* field to show a "don't care" condition.

Restrictions on Compare Operations

- If a Clear Reset (see "General Selection Screen") is executed while a *trace* or *stop on main storage data compare* (nonzero) function is in effect, an incorrect MATCH STOP occurs.
- Data compare operations starting on the last byte of a page are not allowed.
- On type A, D, or I operations, it is possible to miss a data compare if sequential instructions change the same two bytes of storage.
- The *data contents compare* function is executed by microcode and allows compares down to the halfword or bit. However, since basic match hardware stops if a reference is made to a doubleword, the data in the target address may not have been referenced.

Warning: To avoid I/O errors while setting address matches, press the STOP key. After about 30 seconds, begin with selections.

ADDR Type

This field is used to show if the address is a virtual (V) or real (R) address. Specify V for virtual, or R for Real only if the present type is incorrect.

Data Contents Compare Trace (QAD) Screen

```
*COMPARE/TRACE*     *DATA CONTENTS COMPARE TRACE*

   *ACTION*            *TYPE*          *ADDR*    *OP* *MASK*   *ADDR TYPE*

   N NORMAL          A ANY REFERENCE   000043050  =    FFFF
   T TRACE STOP      D DATA STORE                             V VIRTUAL
   W TRACE WRAP      I I/O REFERENCE                          R REAL


                                    *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 TO PROG SYS

 COMMAND: QAD                                    ==>
```

The QAD command saves the instruction counter value after a successful data compare; up to 470 values can be saved. To specify the QAD command, press the STOP key, key **QAD** and the desired parameters next to COMMAND, and press the ENTER key.

Action

Normal (QADN) This action is used alone to reset any previously selected QAD command. By keying **N** on this screen or **QADN** from any other manual control screen, any QAD function is ended.

Trace Stop (QADT) This action saves the instruction counter value in a trace area if the data at a specific storage location matches the specified compare conditions. The processor stops after the trace area is full (470 entries); to resume processing, press the START key.

On type A, D, or I operations, the instruction counter address is stored only when the compare conditions specified by the remaining parameter fields occur. Processing continues after each compare until the trace area is full.

Trace Wrap (QADW) This function is the same as the QADT, except that when the trace area becomes full, additional addresses are stored and the oldest are dropped so that the trace area always contains the latest 470 addresses.

On type A, D, or I operations, the instruction counter address is stored in the trace area only when the compare conditions specified by the remaining parameter fields occur. Processing continues following each compare.

Type

Any Reference (A) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when storage is accessed by the machine.

Data Store (D) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when a machine store (write) function occurs.

I/O Reference (I) This parameter causes the address specified by the remaining parameter fields to be compared to the storage address when the transfer of data to and from I/O devices occurs.

ADDR

This field is used to specify the compare address (1 to 8 hexadecimal digits) for type A, D, or I operations. Compares occur on halfword boundaries (2 bytes) and specified addresses can be adjusted to this boundary. (Refer to the compare restrictions described at the QAC screen.)

OP* and *Mask

The *OP* and *Mask* fields are used if compare data is to be specified with an address. The options are to compare the data specified in the *Mask* field for an equal or not equal condition on any type A, D, or I operations.

The field equal (=) option is used to compare up to 4 hexadecimal digits (2 bytes) of data specified in the *Mask* field for an equal condition.

The field not equal (/) option is used to compare up to 4 hexadecimal digits (2 bytes) of data specified in the *Mask* field for a not equal condition.

The bit equal (&) option is used to compare the bits making up the data specified in the *Mask* field for an equal (on) condition.

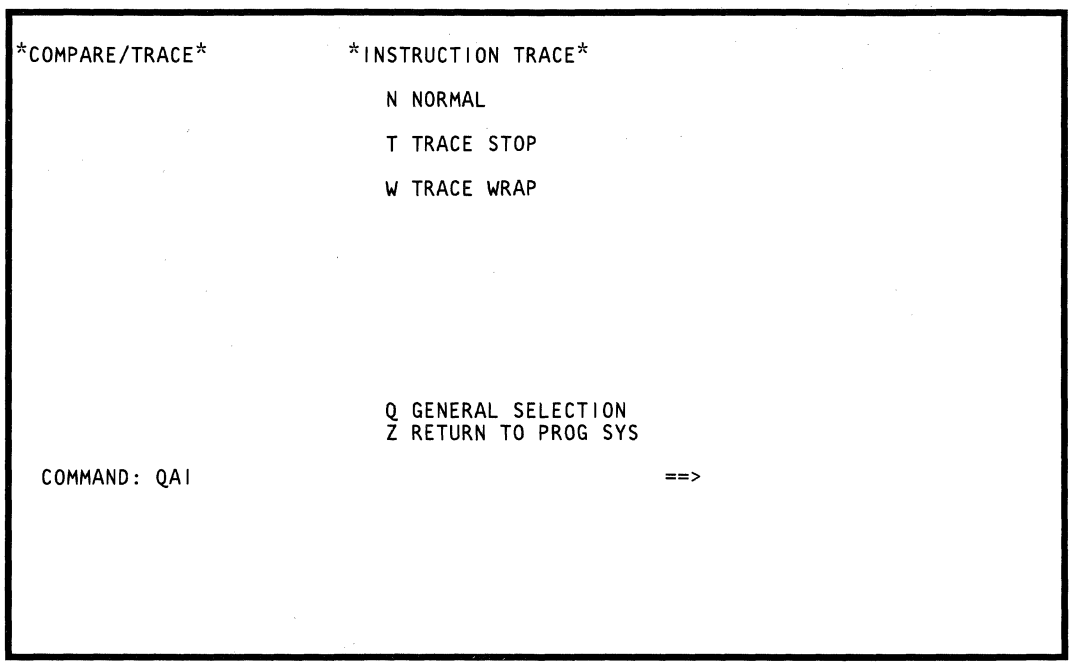
The bit not equal (%) option is used to compare the bits making up the data specified in the *Mask* field for a not equal (off) condition.

Periods (.) are permitted in the *Mask* field to show a "don't care" condition.

ADDR Type

This field is used to show if the address contained in the ADDR field is a virtual (V) or real (R) address. Specify V or R only if the current address type is incorrect.

Instruction Trace (QAI) Screen



The QAI screen is used to select the instruction-counter value save control. To specify the QAI command, press the STOP key, key **QAI** and the desired option next to COMMAND, and press the ENTER key. The following text describes the instruction-counter trace options that can be selected.

Normal (QAIN)

This command resets all instruction trace activity for the QAI command. This is the normal setting.

Trace Stop (QAIT)

This command saves all instruction counter (I-Counter) addresses in the instruction-counter trace area. The processor stops after 470 addresses are saved. Press the START key to save the next 470 addresses.

Trace Wrap (QAIW)

This command saves up to 470 instruction addresses in the I-Counter Trace area. After 470 addresses are saved, the newest address replaces the oldest address in the trace area.

Display Instruction Trace Data (QAS) Screen

```
*COMPARE/TRACE*          I-COUNTER TRACE DISPLAY              PAGE 0
   CURRENT INSTRUCTION HIGHLIGHTED
   00001000  00001004  00001008  0000100C  00001010  00001014  00001018
   0000101C  00001020  00001024  00001028  0000102C  00001030  00001034
   00001038  0000103C  00001040  00001044  00001048  0000104C  00001050
   00001054  00001058  0000105C  00001060  00001064  00001068  0000106C
   00001070  00001074  00001078  0000107C  00001080  00001084  00001088

   00001000  00001004  00001008  0000100C  00001010  00001014  00001018
   0000101C  00001020  00001024  00001028  0000102C  00001030  00001034
   00001038  0000103C  00001040  00001044  00001048  0000104C  00001050
   00001054  00001058  0000105C  00001060  00001064  00001068  0000106C
   00001070  00001074  00001078  0000107C  00001080  00001084  00001088

   00001000  00001004  00001008  0000100C  00001010  00001014  00001018
   0000101C  00001020  00001024  00001028  0000102C  00001030  00001034
   00001038  0000103C  00001040  00001044  00001048  0000104C  00001050
   00001054  00001058  0000105C  00001060  00001064  00001068  0000106C
   00001070  00001074  00001078  0000107C  00001080  00001084  00001088
   COMMAND: QAS                                 ==>
                                              INSTR STOP
```

The QAS screen displays the instruction-counter trace area, which contains instruction addresses saved because of a trace stop, a trace wrap, or an instruction-counter step operation. This screen can be a clear screen with no saved addresses, or can display up to 105 instruction addresses.

If an instruction-counter trace function is started without a clearing of the trace area, the new addresses are added to the address list currently in the trace area.

The page containing the first 105 addresses is always displayed first. Addresses over a count of 105 are displayed on additional pages of this screen. Addresses are arranged in a left-to-right, top-to-bottom sequence. The newest address is displayed at the top left of the page, with the oldest address at the bottom right of the address list.

When the list becomes full (470 addresses), each new address is inserted into the first position of Page 0. All addresses advance; the oldest address is dropped from the bottom of Page 4.

To advance from the first 105-address page (QAS0) to the second 105-address page (QAS1), enter **QAS1** at the COMMAND line and press ENTER. To advance to additional pages, enter **QAS** and the next page number. To return from any page to page 0, enter **QAS0** at the COMMAND line and press ENTER. (The Page Up and Page Down function keys can also be used.)

Purge Instruction Trace Area (QASP)

This command (issued at the COMMAND line) clears the instruction trace area of all addresses.

PSW and I/O Trace (QAP) Screen

```
*COMPARE/TRACE*            *PSW AND I/O TRACE*

                     *TRACE SET UP SPECIFICATIONS*
                        I PSW SWAP TYPE: LOAD
                        O OPERATION: SIO
                        R DEVICE RANGE: ALL - ALL
                        C DEVICE INITIATED CSW: Y    (S/370 only)

                     *TRACE CONTROL COMMANDS*
                        N STOP AND SET CONTROLS TO NORMAL
                        Y START TRACE ON ALL
                        S STOP TRACE
                        G START TRACE
                        H TRACE OPTIONS


                        Q GENERAL SELECTION
                        Z RETURN TO PROG SYSTEM
 COMMAND: QAP                                    ==>
```

This screen (QAP) sets the controls for the PSW and I/O trace selections in both System/370 and 370-XA mode. The results of these traces are displayed on the QAT screen. To display the QAP screen, press the STOP key, key **QAP** next to COMMAND and press ENTER. In 370-XA mode, the R (range) and C (CSW Device) specifications are different from System/370 mode. These differences are noted in the following text.

If you are not sure of the format to use in the screen, the H option under *Trace Control Commands* can be used to display the correct format to be used. To display a screen with the prescribed format, key in QAPH, followed by the trace setup specification I, O, R or D (for example, QAPHI to display PSW SWAP TYPE format) and press ENTER. (If you do not press the ENTER key, the old setup specifications remain in effect.)

Move the cursor to the *Trace Set Up* area (I, O, R, and C) and key in the desired specification where indicated. (These specifications may also be entered at the COMMAND line.)

Key the desired trace control command (N, Y, S, or G) next to QAP on the COMMAND line and press ENTER. The desired trace action is in effect.

Trace Setup Specifications

PSW Swap Type (I) Next to I PSW SWAP TYPE, you can specify:

ALL	Traces 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 (370-XA mode only).
SVC	Supervisor call interrupt
VM	VM-assisted.

Operation (O) Depending on the system mode, next to OPERATION, you can specify:

System/370 Mode

ALL	-	All I/O Operations
CLRCH	-	Clear Channel Operations
CLRIO	-	Clear I/O Operations
HDV	-	Halt Device Operations
HIO	-	Halt I/O Operations
SIO	-	(for both Start I/O and Start I/O Fast Operations
TCH	-	Test Channel Operations
TIO	-	Test I/O Operations

370-XA Mode

All	-	All I/O Operations
CSCH	-	Clear Subchannel
HSCH	-	Halt Subchannel
MSCH	-	Modify Subchannel
N	-	No Operation
RCHP	-	Reset Channel Path
RSCH	-	Reset 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

Device Range (R)

The range parameter is specified differently in System/370 mode and 370-XA mode as described below.

In System/370 mode, next to DEVICE RANGE, you can specify:

- ALL - ALL for all devices.
- CUU for a single device (System/370 mode)
- CUU - CUU for a range of three-digit device addresses (System/370 addresses must all be on the same channel)

Device-Initiated CSW (C) Next to DEVICE INITIATED CSW, you can specify Y (yes) or N (no). When you are in 370-XA mode, Device range is specified as follows:

Device Range: All On Device Or Subchan : D DEVICE INITIATED CSW line is replaced with an ON DEVICE OR SUBCHANNEL parameter. In 370-XA mode, you specify the DEVICE RANGE as follows:

- A range of four-digit device addresses and the letter D (for device; used in 370-XA mode only).
- A range of four-digit subchannel IDs and the letter S (for subchannel). Used in 370-XA mode only.

Trace Control Commands

Stop And Set Controls To Normal This function stops the current trace and sets the following:

- PSW SWAP TYPE to N
- TARGET OPERATION to N
- TARGET DEVICE RANGE to ALL
- DEVICE INITIATED CSW to N (System/370 mode only).

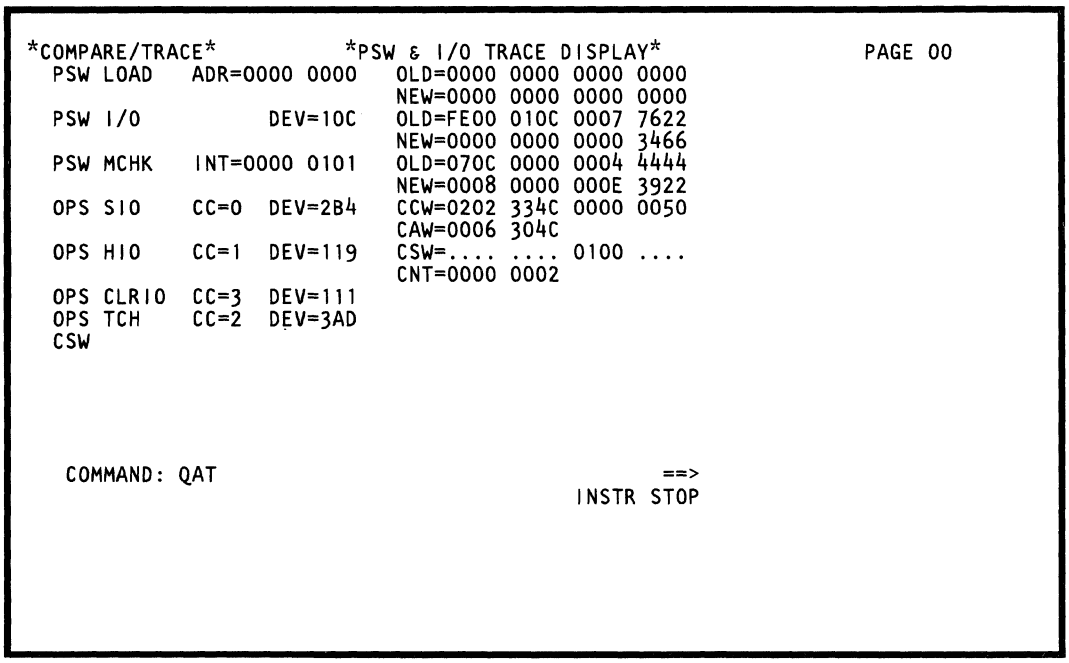
Start Trace On All (QAPY) This function gets the system running with no further specification (same as specifying ALL or Y in all the fields).

Stop Trace (QAPS) This function stops the trace operation.

Start Trace (QAPG) This function starts the trace operation.

Trace Options [QAPH(N)] This function lists the correct formats for each trace specification (for example, QAPH**O** lists all the correct operations you can specify and QAPH**R** lists the correct device ranges).

Display PSW and I/O Trace Display (QAT) Screen (System/370)



PSW & I/O Trace Display

This screen displays the results of the traces selected from the QAP screen. The PSW and I/O operations selected on the QAP screen are traced and saved in the various hardware areas. The contents are then displayed on the QAT screen.

The definitions of the fields that can be used in the trace screens are included in the following text (PRG 91 and 92).

PSW — Program status word; a word containing data required for proper execution of the currently active program.

ADR — The address of the Load PSW instruction. This is the address of the PSW in effect in the processor.

OLD — The state of the PSW before the swap operation. This is the PSW of the most recent operation.

NEW — The state of the PSW after the swap operation. This is the PSW of the current operation.

DEV — I/O device address; usually shown in channel (C) followed by the unit (UU).

MCHK or MCK — Machine Check; a group of interrupt codes that report system malfunctions and external problems.

INT — Interrupt code (EC mode only); a word that contains the coded machine check malfunction data.

CAW — Channel address word. This word contains the address of the first Channel Command Word.

CLRCH — Clear channel instruction.

CCW	Channel command word. Usually a string of commands to be executed to execute a channel operation.
CSW	Channel status word; this word contains the status of an I/O device. It can contain an indication of the reasons for which an I/O operation is ended.
EXT	External interrupt.
SIO	Start I/O; this instruction starts the execution of one or more I/O operations.
SIOF	Start I/O fast; this instruction starts the execution of one or more I/O operations.
HIO	Halt I/O; this instruction ends any operation on the addressed channel, subchannel, or device.
HDEV	Halt device; this instruction ends any operation on a specified device.
CLRIO	Clear I/O; this instruction causes the current operation being executed to be ended.
TIO	Test I/O; this instruction calls for data about the tested channel, subchannel, or I/O device.
TCH	Test channel; this instruction calls for data about the tested channel.
CC	I/O Instruction condition code; this code is set by the instruction execution result.
CNT	Count; the number of times this entry has been repeated without any intervening entry. The count starts at zero for the first entry, one for the second, two for the third, etc.
PCK	Program Check.
SVC	Supervisor Call.
EXT	External.
VM	Virtual Machine Assist.

Purge PSW and I/O Trace Data (QATP)

This selection (issued at the COMMAND line) clears all accumulated PSW and I/O trace data.

Display PSW and I/O Trace Data (QAT) Screen (370-XA)

```
*COMPARE/TRACE*            *PSW & I/O TRACE DISPLAY*              PAGE 00
OPS SSCH     CC=2  SCHID=0007      DEVN=0190      DEVA=90     CNT=0000 0001
OPS MSCH     CC=2  SCHID=0007      DEVN=0190      DEVA=90     CNT=0000 0001
OPS STSCH    CC=0  SCHID=0007      DEVN=0190      DEVA=90
                   ISC  =08        LPM =80        POM =FF     ELM=81
                   PNOM =00        LPUM=00        PIM =C0     PAM=C0
                   MBI  =0000      INT =FFFF FFFF
                   SCSW =0000 4400 0000 0138 0000 0000
OPS TP1      CC=0   CNT =0000 0001
OPS TSCH     CC=1  SCHID=0007      DEVN=0190      DEVA=90     CNT=0000 0001
                   ESW  =0080 0000          SCSW=0000 4400 0000 0138 0000 0000
OPS SSCH     CC=2  SCHID=0007      DEVN=0190      DEVA=90     CNT=0000 0001
OPS MSCH     CC=2  SCHID=0007      DEVN=0190      DEVA=90     CNT=0000 0001
OPS STSCH    CC=0  SCHID=0007      DEVN=0190      DEVA=90
                   ISC  =08        LPM =80        POM =FF     ELM=81
                   PNOM =00        LPUM=00        PIM =C0     PAM=C0
                   MBI  =0000      INT =FFFF FFFF
                   SCSW =0000 4400 0000 0138 0000 0000
OPS TP1      CC=0   CNT =0000 0001
   COMMAND: QAT00                                  ==>
```

This screen displays the results of the traces selected from the QAP screen when operating in 370-XA mode. The PSW and I/O operations selected on the QAP screen are traced and saved in the various hardware areas. The contents are then displayed on the QAT screen.

The definitions of the fields that can be used in the trace screens include the following terms (PRG 93 and 94).

ADR — The address of the load PSW instruction. This is the address of the PSW in effect in the processor.

CC — I/O instruction condition code.

CNT — The number of times this entry has been repeated without an intervening entry.

CSCH — Clear subchannel instruction.

DEVA — Device address.

DEVN — Device number.

ELM — An eight-bit field decoded as follows:

- E – Enable (bit 0)
- LM – Limited mode (bits 1, 2)
- MM – Measurement mode (bits 3, 4)
- D – Multi-path mode (bit 5)
- T – Timer installed (bit 6)
- V – Valid subchannel (bit 7).

ESW — Extended status word.

HSCH — Halt subchannel instruction.

INT — Interruption code.

ISC — Interruption subclass.

LPM	Logical path mask.
LPUM	Last path used mask.
MBI	Measurement block index.
MSCH	Modify subchannel instruction.
PAM	Path available mask.
PIM	Path installed mask.
PNOM	Path not operational mask.
POM	Path operational mask.
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.
TPI	Test pending interruption instruction.
TSCH	Test subchannel instruction.

Purge PSW and I/O Trace Data (QATP)

This selection (issued at the COMMAND line) clears all accumulated PSW and I/O trace data.

Problem Analysis (QP) Screens

The Problem Analysis program in the 4381 collects data from storage, error logs, program status words, channels, etc., and then attempts to determine the type of problem that may exist. For example, the problems may be I/O errors, IPU errors, incorrect loops, hangs, and wait states.

The Problem Analysis program, starting at Option 1, leads the user through the correct sequence of steps to determine the problem and resolve it. Detailed information relating to the Problem Analysis program and the steps taken in the process are contained in the *IBM 4381 Processor Problem Analysis Guide*, GA24-3955-0.

The *Problem Analysis Guide* leads the user through the procedures of problem determination. This interactive process instructs the operator to enter commands, and then displays the results of the commands. The screen instructions and content are contained in either the *PA Guide* or on the screens themselves. Option 3 may be used to test and analyze the processor.

Some of the screens in the PA program contain detailed system information that may need in-depth analysis or study, or may need some action taken by the user to help IBM in recording error data for future study. These screens are described in the following pages.

Problem Analysis Option 2, 4, 5 and 6 Screens

The Option 2 screen supplies a display of Problem Analysis message history. These messages and their log information were generated because of past Problem Analysis operations.

The Option 4 screens, which send service information (usually used with the direction of IBM service personnel), contain areas to be filled in with customer information. They contain selections from the processor hardware facilities to be transmitted to IBM that may contain data about the problem environment at the time of the problem. This information can help the IBM field support groups analyze the problem.

The Option 5 screens, which display details on PA, contain information that can be displayed about the processor hardware registers, program status words (PSW), interface control checks (IFCC), instruction and microprogram loops, microprogram load problems, etc.

The display information detail screens contain a header line that shows the area of a suspected problem. These header lines include: initial microprogram load (IML), initial program load (IPL), machine check (MCK), program: wait state (PGM:WAIT), interrupt (INT), etc.

The Option 6 screen contains options to let you protect your data and maintain security on your system.

Send Service Information (SSI) – QP4

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

                          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:  __________

ACTION: MESSAGES DESCRIBING ACTION

Q  GEN SELECTION
Z  RTN TO PROG SUS
                                                    ==>

COMMAND:  QP4
```

This screen is to be filled out by the customer so that the customer can send information about problems analyzed by the Problem Analysis program to IBM field support groups for further study. Once this information is sent, it resides in an IBM support system, which contains field problems and resolutions that can be distributed to all customers for their mutual benefit.

The information on the second line of this screen is supplied by IBM and contains the machine type, serial number, and the number to be called for IBM service. This information is supplied at installation time, and is displayed each time the screen is displayed. Areas of information that can be designated to be sent to the support system are:

- Machine configuration data
- Problem Analysis program-derived data
- Main storage contents (See Note.)
- Input/Output trace data (See Note.)
- Instruction trace data (See Note.)
- Processor unit analysis logs
- Reference code logs
- Power logs
- Support processor logs
- Processing unit logs.

  Note: The transmission of these facilities will cause the processor to stop execution for a period of time, depending on the facility selection.

Screen Information to be Supplied by the Customer

Name, Telephone, Program Type/Level
The name of the customer installation, telephone number and extension, and the program type and level that the system runs are entered at these lines.

System Status
This indicator defines to the support system the status of the system at the time the operation was performed; 1 (for not working) or 2 (for working) is entered at the space indicated at the line. This is the status of the processor unit, indicating whether it will run its prescribed programs.

IBM Support System (1 OR 2)
Number 1 (for primary) or 2 (for backup) is entered at the space indicated at the appropriate line, as directed by field support personnel.

Problem Description
This line describes the problem in a concise manner. The problem described on this line should be one that can be used by the support system program as a general topic field.

Send I/O Device Trace (1=Yes, 2=No)
This parameter is specified by the customer (1 or 2 at the space shown). This indicates to the send service information program that the customer I/O device information, which has been traced by the user's trace option, should be transmitted to the support system.

Send Instruction Trace (1=Yes, 2=No)
This parameter is specified by the customer (1 or 2 at the space shown). This indicates to the Send Service Program whether the customer instruction trace information, which has been traced by the user's trace option, should be transmitted to the support system.

Send Main Store Dump (01–64KB) and Starting Address
The customer can specify:

- The size of storage (in 1K segments) that he wishes to send to the support system for analyzation,
- The starting address of the storage block to be sent.

Password for Dump
This password must be the current password. The current password is the password that has been entered by the customer on the Customer Data and Security Control screen.

Action: Send Service Operation Messages

These instruction messages appear in the ACTION area and have the following meaning:

DIAL 1-XXX-YYY-ZZZZ ON RSF (CE) TELEPHONE
This number specifies the number of the RSF link to be used in the send service operation.

AT END OF ANSWER TONE, PUT DATA SET IN DATA MODE
This operation sets the data mode of the telephone to be used in the operation. When the user hears the answer tone, either the data button or the exclusion button must be operated; press the ENTER key to start the SSI operation. The data verification process, the initialization of the data link, and the transfer of specified data begins.

If the line plate adapter is used (WT only), the message AT END OF ANSWER TONE, PRESS ENTER KEY AGAIN displays; press the ENTER key to start the SSI operation.

AT -DATA SENT OKAY-, RETURN DATA SET TO TALK MODE
This message indicates successful completion and instructs you to return the telephone to normal talk mode.

Send Service Information Status Messages

WARNING: DO NOT SEND MAIN STORAGE DUMPS CONTAINING NON-IBM PROGRAMS OR CONFIDENTIAL DATA.
This caution message displays when a storage content transmission operation has been indicated.

MAIN STORAGE DUMP NOT ALLOWED, OR WRONG PASSWORD
This message displays when a storage content transmission has been indicated, and the ALLOW MAIN STORAGE DUMPS = NO has been specified by the customer on the Data and Security Control screen. If storage content transmission has been allowed, the entered PASSWORD was entered incorrectly.

Messages Appearing on Line 20 or 23

The following status messages display on line 20 or 23 of the display screen and contain a dynamic indication of the SSI operation status, as follows:

INVALID ENTRY, REENTER
This message displays when there has been an entry that did not contain the correct characters, or there were not enough characters entered for a specific field. This error occurs because of the entry of insufficient or alphabetic storage size entry characters, characters other than Y or N, 1 or 2 (where they are specified), or some other entry that is not accepted by the program because of some invalid condition. Reentering the correct information allows the program to continue.

INITIALIZING RSF-LINK
This message shows that the support processor is sending station-ID information and is waiting for a response from the support system, which indicates that the teleprocessing link is completed.

SENDING DATA GROUP (X)
This message shows that data is being sent to or received from the support system. The X is a continuous increasing of a consecutive number and shows data transfer status.

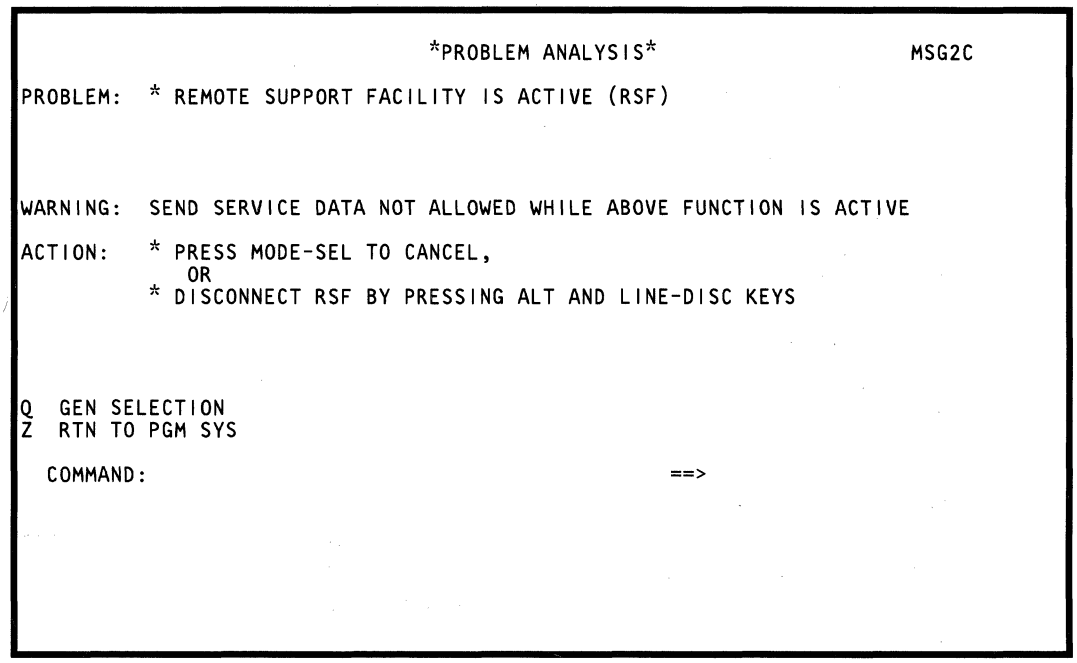
PATCH AREA FULL
The support system has attempted to send another patch, but the diskette patch record space is full.

DATA SENT OK, XXXXXXX
The data specified has been successfully sent to the support system. The XXXXXXX shows the incident number to be recorded at this time.

DATA LINE TIMEOUT
The telephone line between the support system and the support processor has been disconnected because of a timeout error. No data has been detected being transferred in the last 4 to 5 minutes.

CALL LOCAL SERVICE
This message shows that the data transfer was not successfully completed. Either the system is not registered with the support system, system space was not available to receive log data, or the data link was disconnected after successive teleprocessing attempts.

Send Service Information – Warning (QP4)



This screen is displayed by invoking the screen for sending service information (SSI). The SSI function can only be run when some functions of the support processor are not being used. If these functions are in use, this screen is displayed with one of the following messages.

- REMOTE SUPPORT FACILITY IS ACTIVE (RSF) (If RSF is being used by ROCF.)
- REMOTE OPERATOR CONSOLE FACILITY IS ACTIVE (ROCF) (If ROCF monitor is active, but ROCF/RSF is not being used.)

These two messages show that there is a conflict for support processor facilities.

Warning: When the processor is operating in a distributed data processing (DDP) mode, with RSF or ROCF active (as noted in the above messages), the send service function is not allowed.

Action

When the messages appear, several options are available to the user. *PRESS MODE-SEL TO CANCEL cancels the send service information request; the request can be attempted later.

DISCONNECT RSF BY PRESSING ALT AND LINE-DISC KEYS cancels the remote support connection and permits the send service connection to be established.

PRESS ENTER KEY TO TEMPORARILY DISCONNECT ROCF LATER permits the remote operator console facility (ROCF) monitor to be disabled until the remote support connection is finished. The support processor devices are then made available, and the send service information operation can be permitted. At the end of the transmission, the ROCF monitor is re-enabled.

Processor Option Select Screen

```
                        * PROBLEM ANALYSIS *

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

SELECT ONE OPTION, ONE VALID LOG NUMBER, THEN PRESS ENTER
FOR EXAMPLE QP5T3



 Q GENERAL SELECTION
 Z RETURN TO PROG SYS

 COMMAND: QP5                                    ==>
```

This screen contains a menu for selecting detailed information about the processor. The options, with their screen content and available logs, are:

I	Select this option when an IML error is suspected.
M	Select this option when a microcode loop is suspected.
L	Select this option when storage display is required.
T	Select this option when instruction trace is required.
C	Select this option when Channel and I/O information are required.

Command Selection

To request the detail screen desired, enter a letter from the option column (I, M, L, T or C), and a number for the log desired from the valid log chart (0, 1, 2, 3, 4 or 5) at the COMMAND line and press ENTER.

Valid Log Selection

A valid log selection is specified from the chart on the right side of the screen. Only one log may be selected at a time. The number of the log (0, 1, 2, 3, 4 or 5) is entered next to the option character at the COMMAND line (for example, QP5T3).

Instruction Loop Analysis Screen

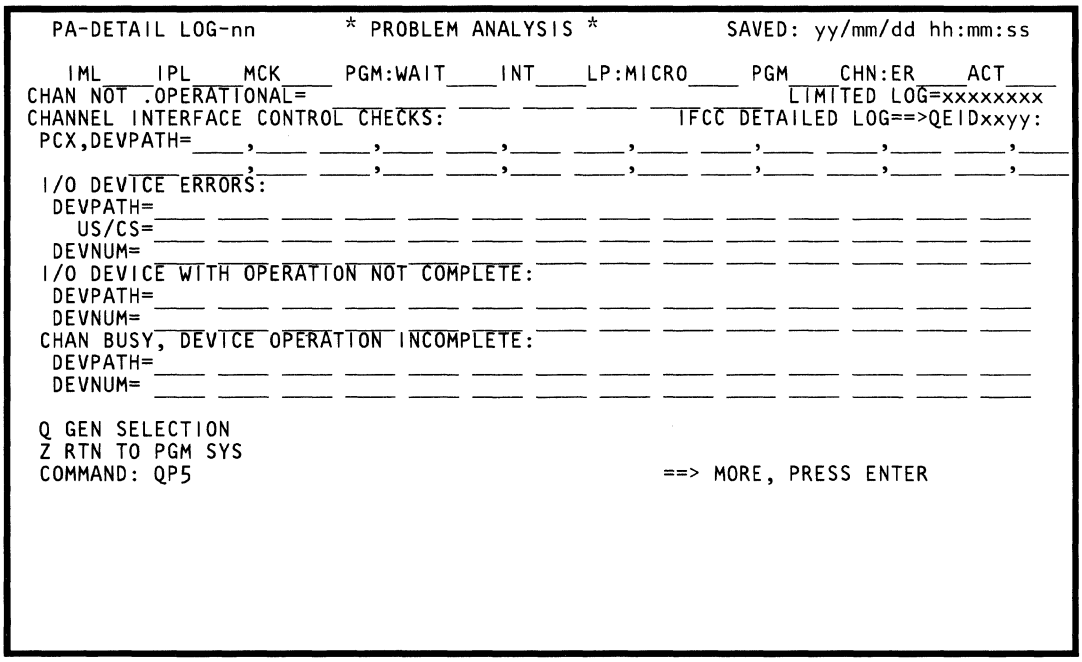
```
  PA-DETAIL LOG-nn        * PROBLEM ANALYSIS *          SAVED: 00/000/00  00:00:00
   IML____IPL____MCK____ PGM:WAIT____INT____LP:MICRO____ PGM____CHN:ER____ACT____

PROGRAM INSTRUCTION LOOP DETECTED          THE FIRST 90 ADDRESSES ARE:
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R
XXXXXXXX-V XXXXXXXX-V XXXXXXXX-R XXXXXXXX-R XXXXXXXX-V XXXXXXXX-V
 Q GEN SELECTION      NUMBER OF INSTRUCTIONS FOUND IN LOOP: xxxx
 Z RTN TO PGM SYS

 COMMAND: QP5                                      ==> MORE, PRESS ENTER
```

This screen shows that a possible program loop exists, if the program is looping on less than 470 instructions. After the 470 (or less) instructions loop, the PA program sets up an instruction-trace stop mode and starts the processor again. After the instructions execute, the processor stops and the addresses are taken from the trace array for analysis. The first 120 addresses are logged, and 90 addresses are displayed on this screen if a loop is found.

The address order is from left to right and top to bottom. If only seven addresses are displayed, a single line would be displayed along the top of the display screen. The total instructions detected in the loop is also shown. The instruction addresses are also shown with their virtual (V) or real (R) notation.

Note that if an instruction loop is occurring, it may be normal. However, most short (less than 470 instructions) loops indicate a problem can exist. The user can then: (1) instruction step the processor to see what type of loop is occurring, (2) note the operation codes, or (3) take other steps as required.

Logout of Channel and I/O Error Screen



This screen displays data to show that a possible channel or I/O device problem may have caused the machine to go into a wait state or program loop (more than one problem can occur). The channel log is displayed along with channel interface control checks, active I/O devices and I/O devices, with pending status in the channel and unit status fields of their UCWs.

The channel interface control checks are isolated so that the operator may be able to disconnect or disable devices causing system problems. The channel and unit addresses of devices with incomplete status are listed for the same purpose.

There are a maximum of 15 entries recorded under the channel interface control checks column on this screen. These entries are in two parts and may be used in further problem tracing on the Channel Interface Control Checks Logout screens (QEID).

Software Problem Isolation Screen

```
  PA-DETAIL LOG-nn        * PROBLEM ANALYSIS *          SAVED: 00/000/00  00:00:00
    IML____IPL____MCK____ PGM:WAIT____INT____LP:MICRO____ PGM____CHN:ER____ACT____


PROGRAM STATUS WORDS:       C M W P INV                                    C M W P INV
  CURRENT=XXXXXXXXXXXXXXXX  _ _ _ _  _          EXT OLD=XXXXXXXXXXXXXXXX  _ _ _ _  _
  PGM OLD=XXXXXXXXXXXXXXXX  _ _ _ _  _          EXT NEW=XXXXXXXXXXXXXXXX  _ _ _ _  _
  PGM NEW=XXXXXXXXXXXXXXXX  _ _ _ _  _          I/O OLD=XXXXXXXXXXXXXXXX  _ _ _ _  _
  MCK OLD=XXXXXXXXXXXXXXXX  _ _ _ _  _          I/O NEW=XXXXXXXXXXXXXXXX  _ _ _ _  _
  MCK NEW=XXXXXXXXXXXXXXXX  _ _ _ _  _         SUPV OLD=XXXXXXXXXXXXXXXX  _ _ _ _  _
  IPL-PSW=XXXXXXXXXXXXXXXX  _ _ _ _  _         SUPV NEW=XXXXXXXXXXXXXXXX  _ _ _ _  _
 GPR-0 XXXXXXXX  GPR-6 XXXXXXXX  GPR-C XXXXXXXX  CTL-2 XXXXXXXX   CTL-8 XXXXXXXX
 GPR-1 XXXXXXXX  GPR-7 XXXXXXXX  GPR-D XXXXXXXX  CTL-3 XXXXXXXX   CTL-9 XXXXXXXX
 GPR-2 XXXXXXXX  GPR-8 XXXXXXXX  GPR-E XXXXXXXX  CTL-4 XXXXXXXX   CTL-A XXXXXXXX
 GPR-3 XXXXXXXX  GPR-9 XXXXXXXX  GPR-F XXXXXXXX  CTL-5 XXXXXXXX   CTL-B XXXXXXXX
 GPR-4 XXXXXXXX  GPR-A XXXXXXXX  CTL-0 XXXXXXXX  CTL-6 XXXXXXXX   CTL-C XXXXXXXX
 GPR-5 XXXXXXXX  GPR-B XXXXXXXX  CTL-1 XXXXXXXX  CTL-7 XXXXXXXX   CTL-D XXXXXXXX
  Q GEN SELECTION   FPR-0 XXXXXXXXXXXXXXXX FPR-4 XXXXXXXXXXXXXXXX CTL-E XXXXXXXX
  Z RTN TO PGM SYS  FPR-2 XXXXXXXXXXXXXXXX FPR-6 XXXXXXXXXXXXXXXX CTL-F XXXXXXXX

  COMMAND: QP5                                    ==> MORE, PRESS ENTER
```

This screen is displayed by the operator when the Problem Analysis program has detected a probable software (or program) problem; it provides detailed data for the operator or system programmer with software experience. The displayed data is also saved for later analysis.

This screen displays the more common facilities needed by system programmers or system analysts to resolve program problems. It lists the following data:

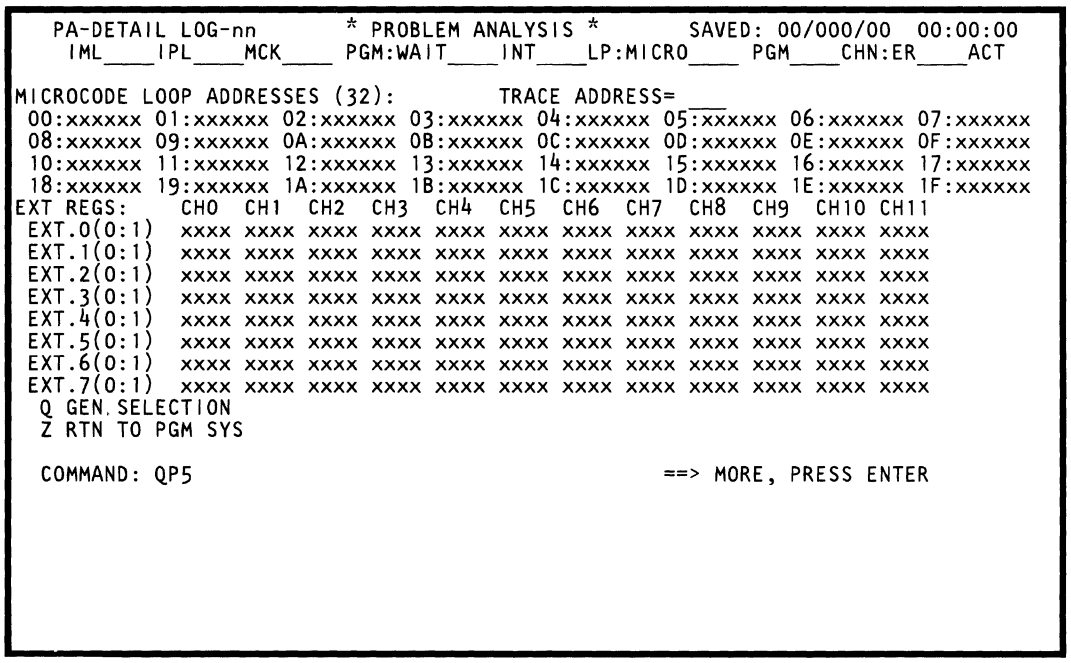
- Program status words (PSW) and data
- General purpose register (GPR) contents
- Control register (CTL) contents
- Floating-point register (FPR) contents.

CMWP and INV Bit

The program status words also have the control (C), machine check (M), wait state (W), and problem state (P) bits displayed individually for ease of use. The invalid flag bit (INV) is intensified if the PSW is in extended control (EC) mode and the PSW is invalid.

The IPL-PSW is location zero (0) of main storage. These eight bytes are used by the control program and contain error codes that may be needed by the system programmer to help in problem resolution.

Microcode Loop Analysis Screen



This screen displays the internal hardware facilities that may be helpful in analyzing microcode problems.

Microcode Loop Addresses (32):

These four lines display the contents of 32 microcode addresses, starting at the TRACE ADDRESS specified, for 32 addresses (00 to 1F) from the TRACE ADDRESS shown.

EXT REGS

This area displays the contents of the channel external registers. The top line specifies from six to twelve channels (CH0 to CH11). The channel heading is displayed only if the channel is installed on the processor.

Under each channel heading is the two-byte contents (0:1) of the eight channel external registers (EXT.0 to EXT.7) for that channel.

External Registers

```
   PA-DETAIL LOG-nn        * PROBLEM ANALYSIS *        SAVED: 00/00/00 00:00:00
    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: QP5                                  ==> MORE, PRESS ENTER
```

This screen displays a microcode address loop and the processor external registers when Problem Analysis has indications of a probable software failure. The processor cannot be soft stopped, and a possible microcode loop may have occurred because of a microcode problem or hardware failure. Data displayed on this screen is for the use of your service representative.

The data displayed on this screen contains the last 32 microwords executed, and a copy of the hardware external register contents at the time the program was initiated. This saved data is for possible later analysis. A second screen, if necessary, is displayed by using the Page Up function from the first page. The first screen contents will vary, depending on the number of channels available on the system.

IML Error Analysis Screen

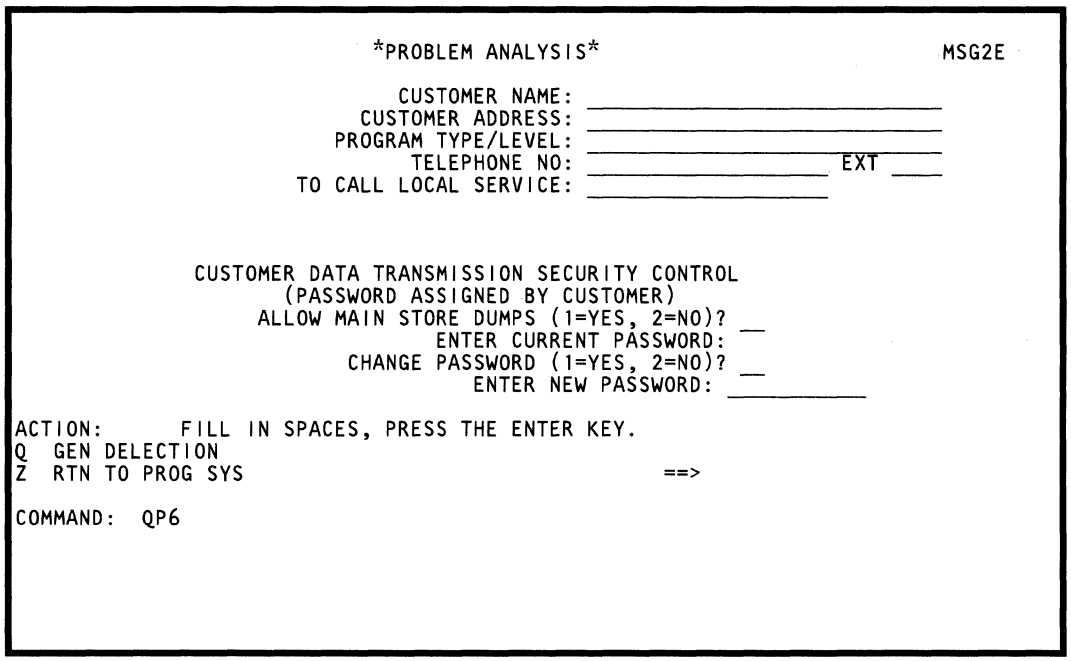
```
   PA-DETAIL LOG-01        * PROBLEM ANALYSIS *          SAVED: 00/000/00  00:00:00
    IML____IPL____MCK____ PGM:WAIT____INT____LP:MICRO____ PGM____CHN:ER____ACT____

MAIN STORE POINTERS:
ACB: xxxxxxxx          SP WORK AREA: xxxxxxxx             PER TABLE: xxxxxxxx
INTERNAL RECORD: xxxxxxxx          CHANNEL DIRECTORY: xxxxxxxx
         PU-IML ERROR OCCURRED IN PER TABLE
         AT MAIN STORE ADDRESS xxxxxxxx
         MAIN STORE DATA WAS                    MAIN STORE DATA 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
  Z RTN TO PGM SYS

  COMMAND: QP5                                  ==> MORE, PRESS ENTER
```

The information on initial microprogram load (IML) is collected when an IML error is detected, and the general IML error screen is displayed. The data is displayed using PA option 5 in the Problem Analysis program. The message on line seven (PU-IML ERROR OCCURRED IN PER TABLE on the example) will vary, depending on where the IML error occurred. Some examples of line seven messages are as follows:

- PU-IML ERROR OCCURRED IN AUX STORE
- PU-IML ERROR OCCURRED IN SP WORK AREA
- PU-IML ERROR OCCURRED IN INTERNAL RECORD
- PU-IML ERROR OCCURRED IN PER TABLE
- PU-IML ERROR OCCURRED IN CHANNEL DIRECTORY
- PU-IML ERROR OCCURRED IN DATA READ BACK (*)
- PU-IML ERROR OCCURRED IN DIRECTORY INITIALIZATION (*)
- PU-IML ERROR NOT ISOLATED (*)

(*) – no detailed data is displayed with this message.

Customer Data Security Control Screen



This screen contains a menu for selection of customer data protection and password initiation. The content of this screen would normally be filled in by a customer system programmer.

Customer Security Selections

The customer uses this screen to control the remote transmission of main storage data by assigning a system password, specifying whether storage transmission can occur, or changing the local service telephone number.

Password Protection Initiation

The first password installed with the machine is the literal word, PASSWORD (uppercase), and will be changed by the customer when the new security protection password is entered. The old password must be known to change to a new password. The old password, any time this screen is displayed, is not displayed on the screen. The new password is displayed until the MODE SEL key is pressed to exit this screen. The new password may be from one to eight characters. *The password will be in upper or lowercase, as entered.*

When you change your password on the primary FUNC2 diskette, you should also change this password on the backup FUNC2 diskette. This action allows you to recover from a problem with the primary FUNC2 diskette.

Data Security Initiation

An option to allow main storage data transmission is given, by entering a Y (yes) or N (no) where specified. Customers using non-IBM programs, or who process sensitive data, enter N at this selection to suppress storage transmission of this information.

The telephone numbers, program type and level are also changed on this screen.

Action

One of the following messages tells you what to do next.

FILL IN SPACES, THEN PRESS ENTER KEY This message at the ACTION line displays when the screen first displays. It is an instruction to begin the screen alteration.

INCORRECT PASSWORD, PLEASE RE-ENTER This message shows the entered password is incorrect; an incorrect key stroke or an unauthorized access attempt may have caused this to occur.

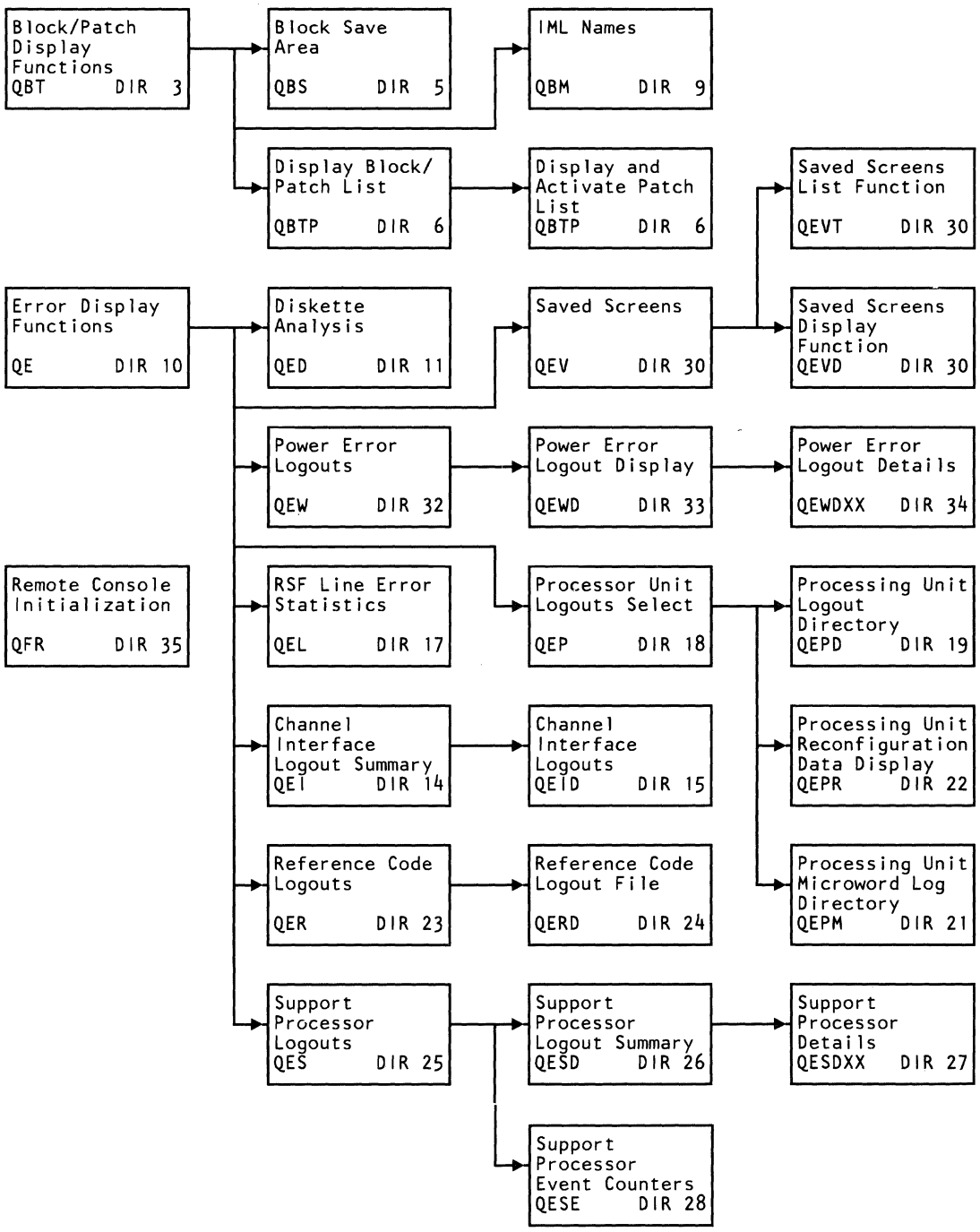
PASSWORD CHANGED; RECORD NEW PASSWORD This message appears when a password alteration is successful. The new password entry becomes the old password once the operation is completed, and the old password is not displayed in future operations.

DATA SAVED This message displays if no data is changed, but the password *is* changed.

INVALID ENTRY, REENTER This message displays on line 20 when the area to be filled in did not contain the correct amount or correct type of data.

Introduction to Directed-Use Functions

This chart shows the Directed-Use function screens; although these screens are available to you in customer mode, they should only be used under the direction of qualified service personnel. In customer mode, these screens are only a display function; you cannot change their content.



Directed-Use Functions

The Directed-Use functions, although they appear on the customer screens (in customer mode), fall solely within the responsibility of service personnel. The operations and functions in this section should not be used without the direction or attendance of qualified service personnel.

Block and Patch Operations

The customer block and patch facility on the 4381 (the QB screens) gives you ability to access and display the block or patch activity that has occurred on the system.

Blocks and patches are commands or strings of commands that can be used to solve problems, test small functions, and change existing functions. Blocks are user-program level functions for programming activity. Patches are microcode level activity and are written for the testing and changing of microcode functions.

Strings of program commands (blocks) and strings of microcode commands (patches) are saved by the processor. The block and patch facilities give you access to these saved areas, along with any lists of blocks and patches that have been previously saved by a service representative.

These block and patch facilities can only be displayed in customer mode. However, you cannot modify, construct, or execute these operations. These operations must be accomplished by a service representative on screens and options that are not available in customer mode.

Error Logouts

In normal mode, the system can have many conditions that it can automatically recover from. These conditions are recorded as they occur. The system can also be set to record other conditions as they occur. As these conditions occur, the system records information relating to the condition in areas specifically set aside for this purpose. These areas are called error logs; the error conditions are logged as they occur.

Power faults, channel interface control checks, reference codes, line faults in teleprocessing mode, support processor and main processor problems are contained in a log specifying the respective hardware area.

The recording of manual mode screens and their contents can also be saved at your option during manual operation mode.

The customer error log screens (QE) allow you to display these areas and to display lists that have been generated because of error condition logging.

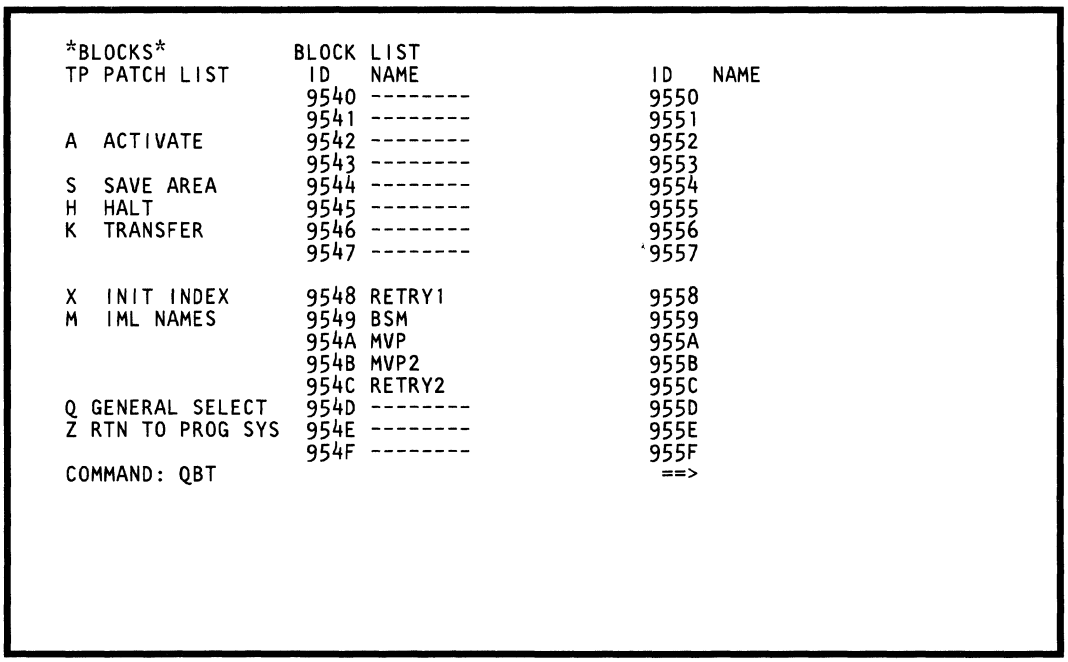
As with the block and patch facilities, you (the customer) cannot generate, modify, or clear the log areas. These operations are service representative functions and are accomplished on screens and options that are not available in customer mode.

Remote Operator Console Initialization

The remote console initialization (QFR) function establishes a link between a console at a remote location and the local console of the system. This function establishes a distributed data processing (DDP) environment between the two systems.

Directed-Use Screens

Block (QBT) Screen



This screen displays the list of the blocks, which are console commands or strings of console commands that have been stored in the system. These blocks can be strings of up to 19 commands, written to help solve problems, test program steps, or modify existing functions. (QB is the generic grouping of the Block and Patch screens; QBT deals specifically with blocks, QBTP deals specifically with patches.)

Displaying The Block List

To display the available current list of blocks, enter **QBT** next to COMMAND and press ENTER. Up to 32 blocks can be displayed on a screen. The module identifier, block name, and the status of the block is displayed in each entry.

Identifier (ID)

Each block is labeled with a block identifier **ID**. This identifier is assigned by the processor and contains the image of the block commands.

Patch Name (NAME)

Each block entry also contains a block name (**NAME**), up to eight characters, the first character of which cannot be the letter P (designating Patch). This NAME is specified by the block writer and identifies the area of the system where the block applies.

Patch Status

Each block also contains a block status identifier that can be blank for no status, or can be MATCH-WAIT status. MATCH-WAIT status shows that the block ended when an address compare occurred in the execution of the block.

Activate (QBA)

To start a block running when *Blocks* displays, enter **QBA** followed by the selected block name at the COMMAND line and press ENTER. The block will run until one of the following occurs:

- 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 start or continue. 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.
- The block halt command is used.

Save Area (QBS)

This command displays the block save area, which may contain data that was saved by a block.

Halt (QBH)

The Halt function (QBH) clears the block message and status areas and resets all information pertaining to running blocks. If a block is in MATCH-WAIT state, a message indicates that an address-compare match is still waiting to occur and has not been removed by the QBH command. The QBH function can only be used to stop a block in MATCH-WAIT status.

Transfer (QBK)

To specify a block transfer when *Blocks* displays, enter **QBK** followed by one or two block names at the COMMAND line and press ENTER. This function transfers (or copies) a block from one diskette to another.

The transfer block command:

1. Searches the block index for the specified block name. The block is then read into storage.
2. The command then prompts you to switch diskettes.
3. The command then searches the block index on the second diskette for the specified block name. If the block name is found, the command writes over the old block data with the new block data. If the block name is not found, the command enters the new block name into the block index and writes the block data in the first available area on the diskette.

If you inadvertently press the COPY key during block transfer, you must respecify the QBK command.

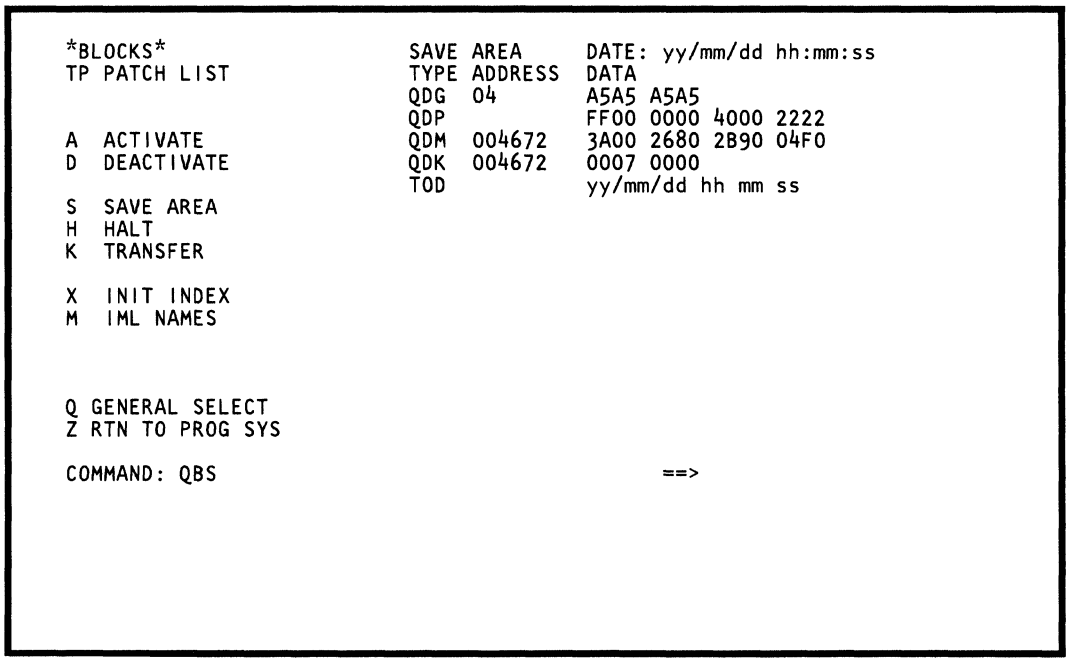
INIT Index (QBX)

If you feel that any block names are missing from the index, enter **QBX** at the COMMAND line and press ENTER. This function reviews the existing blocks and assures their names are in the block index.

IML Names (QBM)

This command displays the screen where you identify a block to be run when you IML the processor.

Block Save Area (QBS) Screen



Key **QBS** and a one-digit page number next to COMMAND, and press ENTER. If you do not specify a page number, the default is zero.

This command displays up to 16 items from the block save area. You can use the Page Up key to display the next higher or lower 16 entries. There are three identifying fields for each entry. These are the **TYPE**, the **ADDRESS**, and the **DATA** fields.

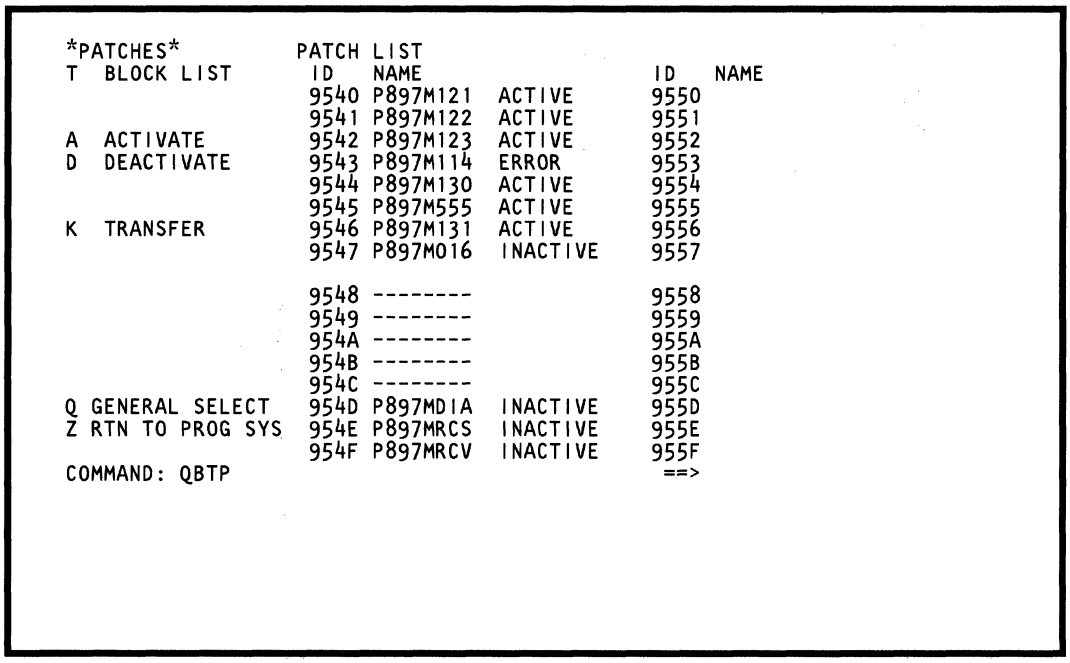
Label Identification

Type This field contains the screen designation that stored the data (for example, QDG specifies the General Purpose register screen).

Address Indicates the address associated with the data.

Data Contains the saved data.

Display Patch List (QBTP) Screen



Patches are microcode commands (stored on the functional diskette) that have been written to solve problems and modify existing microcode programs. A patch can be a microcode command or a string of up to 19 microcode commands that have been installed on the processor. A record of the patches for the processor is stored in an area called the patch index.

To display a list of the patch names written on the functional diskette (and reflected in the patch index), enter **QBTP** next to COMMAND and press ENTER. Displayed in each entry are the patch module ID, the patch name, and patch status.

Identifier (ID)

The patch identifier is a four-digit number assigned by the processor. This number is the module identification of the area that contains the image of the patch.

Patch Name (NAME)

The patch name has eight characters:

- The letter P
- Three characters of the last three digits of the microcode engineering change (EC) number
- Four characters designated by the patch writer.

Patch Status

The patch status displays as ACTIVE, INACTIVE, or ERROR.

Active Indicates that the patch is applied to the microcode and its name is in the patch index.

Inactive Indicates that the patch name is in the patch index, but the patch does not affect the microcode.

Error Indicates that an error occurred as a patch was being activated. The patch name remains in the patch index even though the patch is not activated. There is no effect on the existing microcode as any changes made prior to the error are restored to their original state.

Activate (QBA)

To apply a patch on the microcode when the screen displays *Patches*, enter **QBA** followed by a patch name at the COMMAND line. This activity should only be done at the direction of a service representative, with the system in the stopped state. Patches are activated by a power off and power on of the system.

Deactivate (QBD)

To remove a patch from the microcode, enter **QBD** followed by a patch name next to COMMAND and press ENTER. The patch name remains in the patch list, however the status becomes inactive.

Transfer (QBK)

To transfer (copy) a patch from one diskette to another when the screen displays *Patches*, enter **QBK** at the COMMAND line and press ENTER.

If a patch with the same name exists on the diskette you are "reading to," and it is active, the transfer is not made. If the same patch name is found and it is not active, the new patch data is written over the old patch data.

If the patch 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.

Microcode Patch Implementation Concepts

Patch Receipt

Patches are received in one of three methods.

- If a remote phone connection is made to the IBM support system during Problem Analysis through the Send Service Information function, any patches that exist for the 4381, but are not on the customer's installed diskette, are transmitted to the customer's 4381.
- An IBM service representative may be on-site and copy a required patch from a standard patch diskette.
- An IBM service representative may be on-site and type a required patch into the system in service mode.

Index Update

If the patches are received through an IBM support system transmission, the patch names are not displayed in the QBTP screen index until an index update (QBX) function is performed. There may be three pages of patch list information.

Patch Procedures

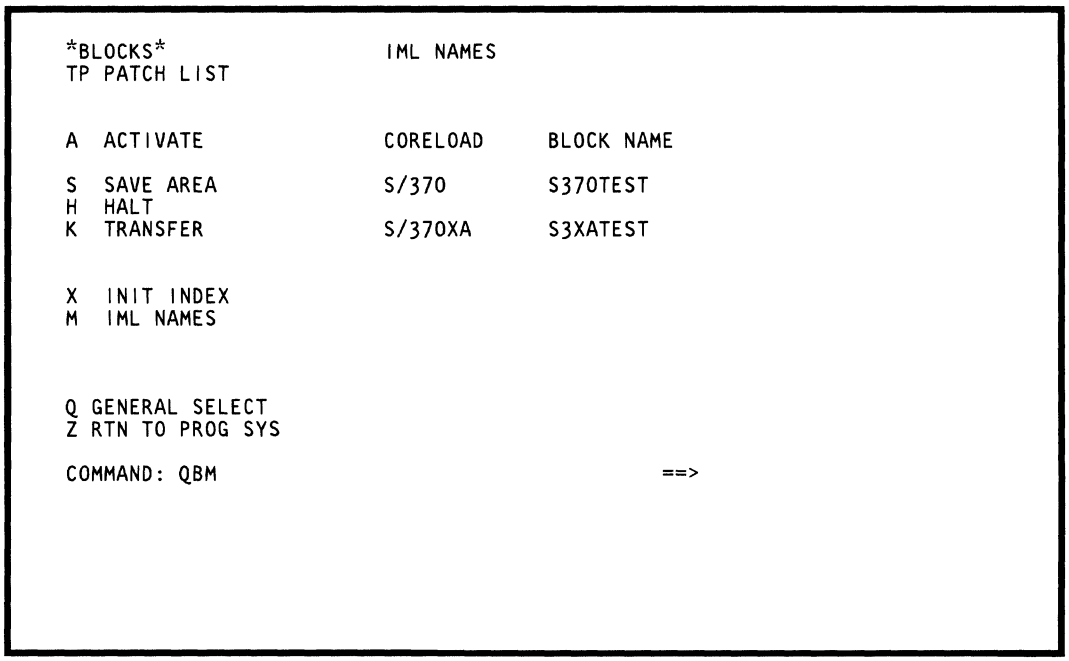
A patch can be received using one of the three methods described in "Patch Receipt" or by following the general steps below:

1. The IBM service representative discusses with the appropriate customer

representative (operator, operations manager, system programmer, etc.) when the system can be powered down to activate a patch.

2. If the patch application is to be performed by an IBM service representative giving direction to a customer by phone, that customer operator must be identified to the support system personnel.
3. At the agreed-upon time, the IBM representative, through a phone conversation with the customer (if applicable), directs the on-site operator to perform the following:
   - Stop the system,
   - Activate the appropriate patches using the activate command (QBA).
   - After all required patches have been made active on the QBTP screen, power off and then power on the 4381 system. [A copy of the patch index screen (QBTP), three pages if necessary, should be kept near the 4381 operator's console.]
4. The system in then IMLed and IPLed; normal operation continues.

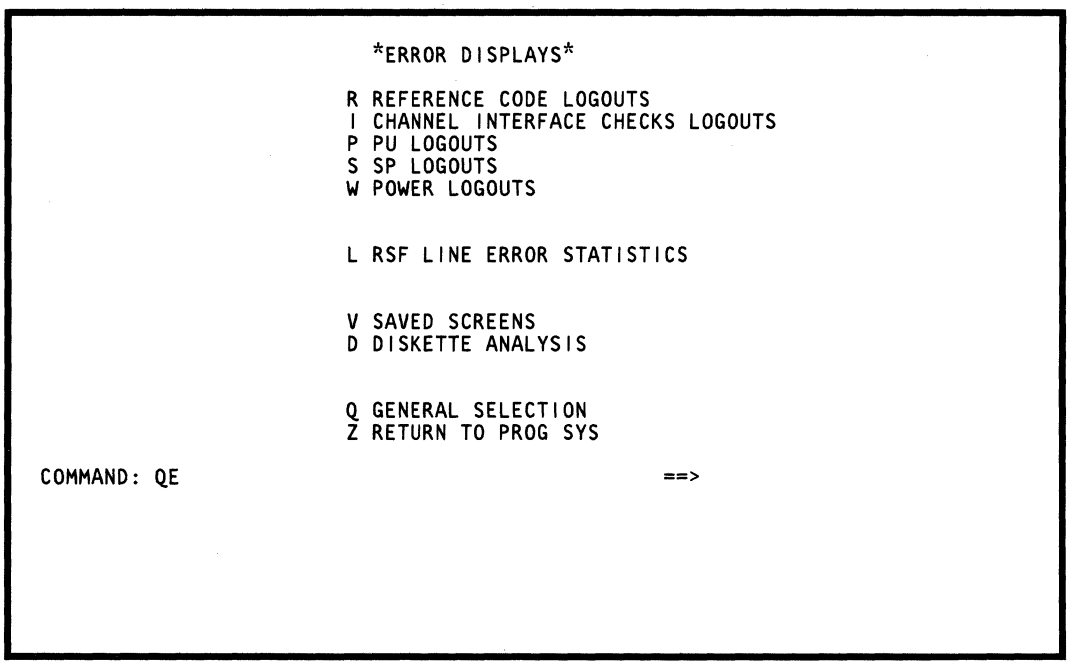
IML Names – Run Block at IML (QBM)



This screen allows you to designate a block to be automatically run after a successful IML of the processor. To name a block to run automatically, key **QBM** at the COMMAND line. The IML NAMES screen (QBM) displays. At the mode label (S/370 or 370-XA), enter the block name to be run when the respective mode is IMLed.

Only one block can be designated for each IML. To run the block, answer YES to the RUN PATCHES AT IML (Y OR N) question that appears after a successful IML. If IML COMPLETE appears, the block ran successfully. If ERROR appears, the block failed to run.

Error Display (QE) Screen



The Error Display screens display information that has been saved in a log area. This information can be remote support facility error statistics, results of diskette analysis, or screens that have been saved during manual function operations (using the save option).

Displaying the Error Display Options

To display the QE screen, which contains the options available in the Error Display function, key **QE** next to COMMAND and press the ENTER key.

Time-of-Day Clock (TODC) Equivalent

Knowing when failures have occurred can be very useful for analysis: when a failure is recorded in a log, the current time is also recorded. The recorded time is called the Time-Of-Day Clock Equivalent, or TODC equivalent. In order to have the TODC recorded, the function must be enabled. When you enable the TODC, the TODC equivalent and Greenwich Mean Time (GMT) become the same. Greenwich Mean Time is the actual time at Greenwich, England, which is at 0 degrees longitude. GMT is the same worldwide: consequently, its use eliminates any problems with time zone adjustments.

The format of the TODC equivalent is: yy/mm/dd. Two characters for the current year (yy), two characters for the current month (mm), and two characters for the current day (dd). Each value is separated by a slash (/). For example, the first day of December 1983 would then be 83/12/01.

Diskette Analysis (QED) Screen

```
*ERROR DISPLAYS*              *DISKETTE ANALYSIS*


         TO START: 1) SELECT STARTING CYLINDER AND RECORD NUMBER
                      (DEFAULT IS RECORD 1, CYLINDER 0)
                   2) SELECT DISK DRIVE FOR ANALYSIS (DEFAULT- 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                                      ==>
```

The QED screen makes selections for the analysis of a diskette. Results of the analysis are displayed on this screen (refer to the following page for a display of the results).

Using the QED screen:

1. Key **QED** next to COMMAND and press the ENTER key.

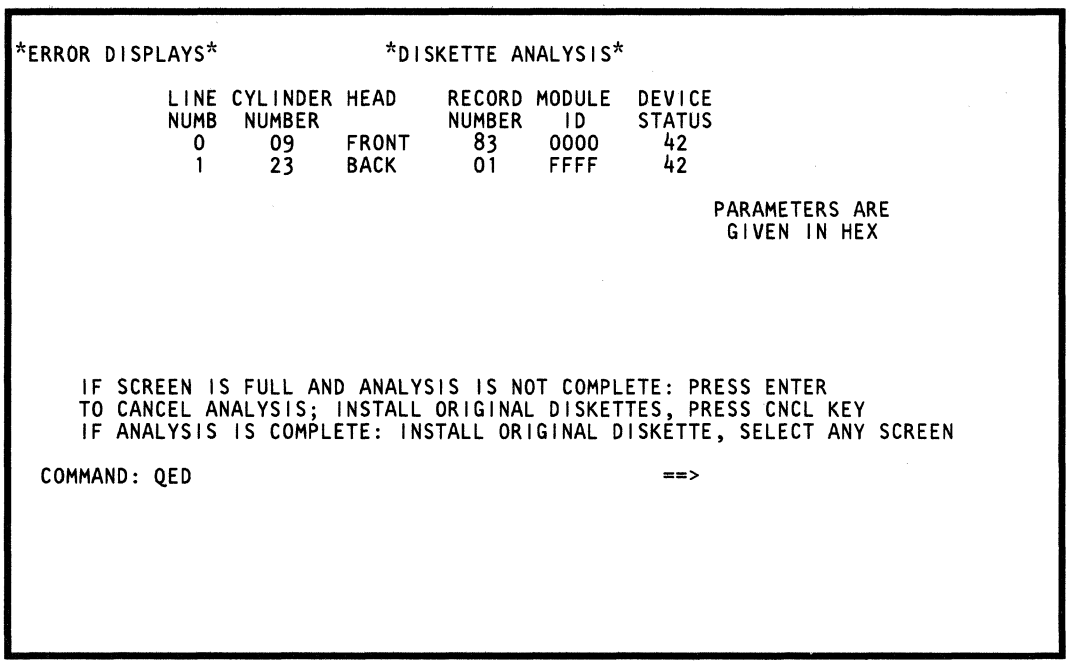
   This displays the QED screen. Note that when the QED analysis screen first displays, it contains a default value for cylinder number, record number, and a disk drive (see steps 1 and 2 in **To Start** in the above screen).

2. If you choose not to use the default values, enter your values in place of the default values in the correct fields at lines **00**, **01** and **2**.

3. Insert the diskette to be analyzed. This diskette may be inserted in either of the drive positions as specified on the QED screen.

4. Press the ENTER key. Analysis begins; the QED display screen presents a running status of the analysis as it progresses through the diskette.

Diskette Analysis Display Screen



1. Any error that occurs during analysis displays on this screen.

   Note: If the screen becomes full, press ENTER to continue the analysis. The analysis can be cancelled at any time by pressing the CNCL key.

2. To leave the analysis routine after the diskette has been analyzed, replace the original diskette and enter any Q command.

   Note: If **FFFF** appears in the **MODULE ID** column, one of the following conditions has occurred:

   - The module ID is beyond the end of the written data,
   - Cylinder 0 was read, or
   - A cylinder index or master index was read.

Device Status Meanings

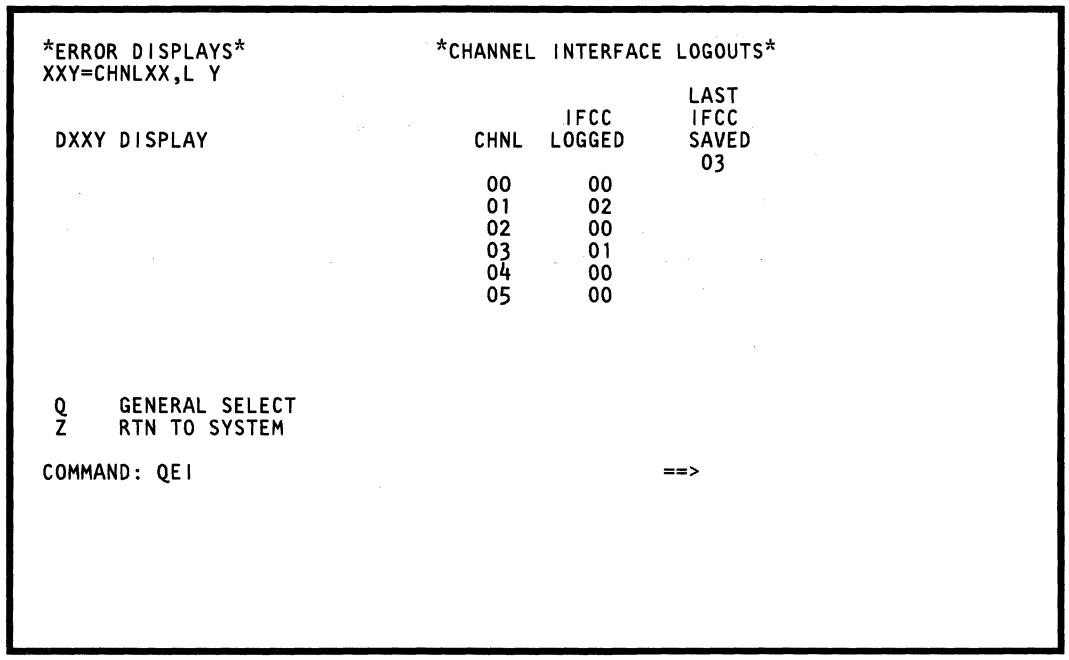
The following device status codes indicate processor status.

Code	Device Status
18	Busy
28	Timeout
38	Diskette Not Ready

The following codes are sometimes combined to to supply multiple meanings; for example, status code 42 indicates that a CRC error occurred and interrupt was enabled. However, *18 always* indicates *Busy*, *28 always* indicates *Timeout*, and *38 always* indicates *Diskette Not Ready*.

Field 10	Error Status
80	Command Error
40	CRC Error
C0	Hardware Error
Field 2	**Operational Status**
08	Control Operation Complete
20	Overrun or Underrun
30	Record Not Found
Field 3	**Interrupt Status**
01	Interrupt Request
02	Enable Interrupt
04	Machine Check

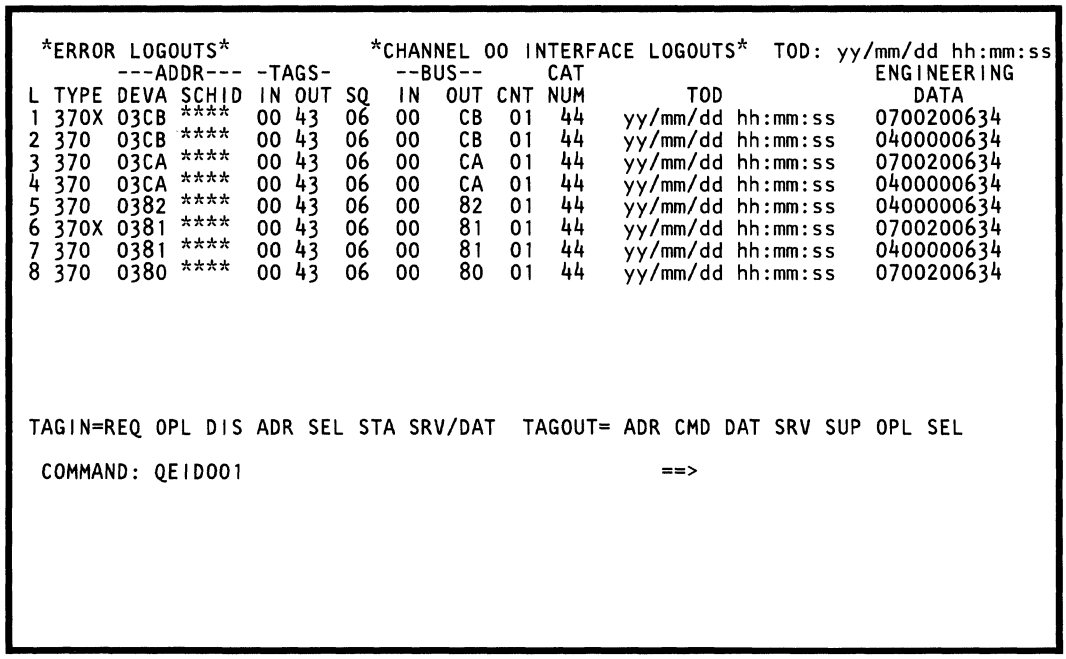
Channel Interface Logout Summary (QEI) Screen



The Channel Logouts screen displays the number of different nonsequential interface control check logs taken for each channel. The channel number of the most recent failure is displayed under the label LAST IFCC SAVED.

To display the Channel Logouts screen, key **QEI** next to COMMAND and press the ENTER key.

Channel Interface Logouts (QEID) Screen



```
 *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 03CB ****  00 43  06   00   CB  01  44   yy/mm/dd hh:mm:ss   0700200634
2 370  03CB ****  00 43  06   00   CB  01  44   yy/mm/dd hh:mm:ss   0400000634
3 370  03CA ****  00 43  06   00   CA  01  44   yy/mm/dd hh:mm:ss   0700200634
4 370  03CA ****  00 43  06   00   CA  01  44   yy/mm/dd hh:mm:ss   0400000634
5 370  0382 ****  00 43  06   00   82  01  44   yy/mm/dd hh:mm:ss   0400000634
6 370X 0381 ****  00 43  06   00   81  01  44   yy/mm/dd hh:mm:ss   0700200634
7 370  0381 ****  00 43  06   00   81  01  44   yy/mm/dd hh:mm:ss   0400000634
8 370  0380 ****  00 43  06   00   80  01  44   yy/mm/dd hh:mm:ss   0700200634




TAGIN=REQ OPL DIS ADR SEL STA SRV/DAT  TAGOUT= ADR CMD DAT SRV SUP OPL SEL

 COMMAND: QEIDOO1                                  ==>
```

The QEID screen displays detailed interface control check (IFCC) information for a particular channel. Up to eight IFCC logs can be displayed.

Displaying the QEID Screen

Key **QEID** or **QEIDXXY** (XX is a channel-ID, Y is the log number) next to COMMAND and press ENTER. Also, the *TAGS IN* and *OUT* fields can be interpreted by entering the two-digit channel and one-digit log number. The screen description is as follows:

- If less than eight IFCC errors were logged on the channel, log number 1 identifies the most recent failure and log number 8 identifies the oldest failure.
- When the eighth IFCC error occurs, the log information in log numbers 1 to 4 continues to change as new IFCC errors occur. Log number 1 still identifies the most recent failure.
- Also, when the eighth IFCC check occurs, the log information in log numbers 5 to 8 no longer changes. If the QEIP command is used to clear the log, the system must be *soft stopped* if it has been IMLed.

Label Identification

L Log number of the IFCC as detailed above.

Type This is the mode of the processor at the time the IFCC occurred. 370 indicates System/370 mode; 370X indicates 370-XA mode.

DEVA This is the channel address of the failing device.

SCHID This is the operating system's logical device address and is used in 370-XA only.

Tags In This is the state of the TAGS IN bus at the time of the IFCC. The specific tag line names are at the bottom of the display screen.

SQ This field contains information intended for the service representative.

Tags Out This is the state of the TAGS OUT bus at the time of the IFCC. The specific TAG OUT names are at the bottom of the display screen.

Bus In: This is the data recorded on the input bus at the time of the IFCC.

Bus Out This is the data recorded on the output bus at the time of the IFCC.

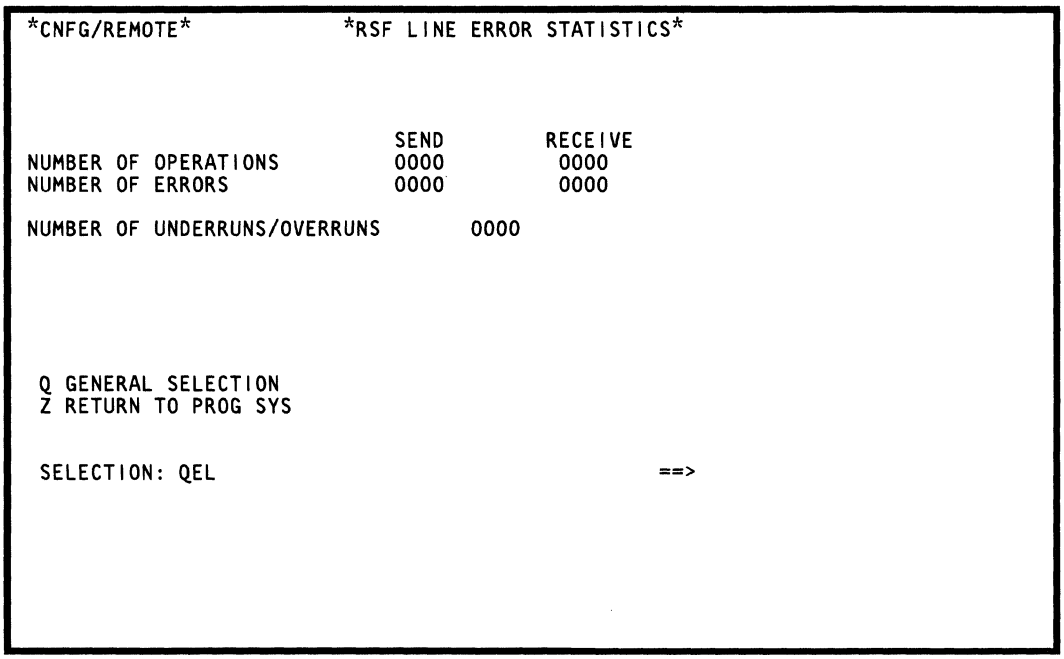
CNT This is the count field. This field is incremented when sequential logs for a particular channel contain data.

CAT NUM The catalog number is used to catalog channel errors and is used with the sequence count number to investigate ten categories of errors detected during channel operations. The information in this field is intended for the service representative.

TOD This is the time that the IFCC occurred. Refer to the explanation of the Time of Day at the QE screen description.

Engineering Data The engineering data field contains useful information for the service representative.

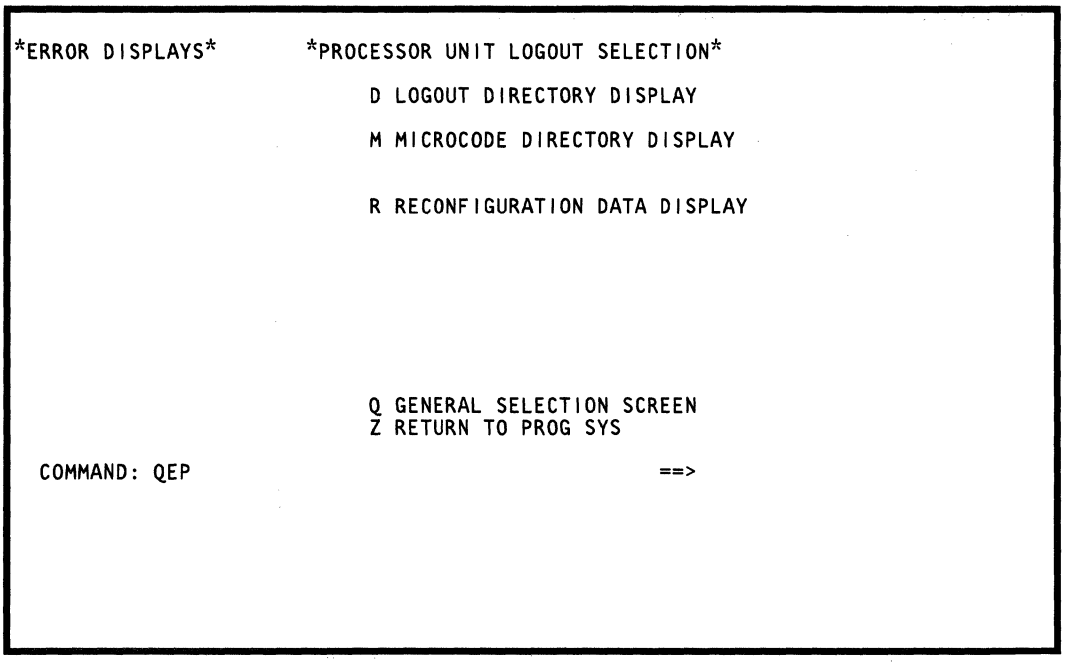
RSF Line Error Statistics (QEL) Screen



This screen contains a record of errors that occurred during a remote support facility transmission operation. Error may occur both during a send and a receive operation. The records are listed in both sending and receiving modes, with the number of errors recorded.

These error statistics are reset at the start of each RSF transmission session. To select this screen, enter **QEL** at the COMMAND line and press ENTER.

Processing Unit Logout Selection (QEP) Screen



This screen contains error log display selections that are applicable to the processor unit.

Logout Directory Display (QEPD) Screen

To display information about the most recent processor logs that were caused by unrecoverable failures, key in **QEPD** at the COMMAND label and press ENTER.

Microcode Directory Display (QEPM) Screen

To display information about the most recent processor logs that were caused by microcode failures that are not recoverable, key in **QEPM** at the COMMAND label and press ENTER.

Reconfiguration Data (QEPR)

The reconfiguration data screen records any reconfiguration that takes place because of a processing unit error. To display this screen key in **QEPR** next to the COMMAND label and press ENTER.

Processing Unit Logout Directory (QEPD) Screen

```
   PROCESSING UNIT LOGOUT DIRECTORY   MODEL: 0000   SERIAL NUMBER:  000000

 ID    TODC              REF CODE ERR  STG ADRS MACH STATUS           CHANNEL RST

0001  yy/mm/dd hh:mm:ss XXXXXXXX               SUCCESSFUL RECOVERY  ------------
0002  yy/mm/dd hh:mm:ss XXXXXXXX               CHECK STOP (RESET)   ------------
0003  yy/mm/dd hh:mm:ss XXXXXXXX ESK XXXXXXXX  CHECK STOP (RESET)   ------------
0004  yy/mm/dd hh:mm:ss XXXXXXXX ESK XXXXXXXX  CHECK STOP (RESET)   ------------
0005  yy/mm/dd hh:mm:ss XXXXXXXX               CHECK STOP (RESET)   ------------
0006  yy/mm/dd hh:mm:ss XXXXXXXX                                    ------------
0007  yy/mm/dd hh:mm:ss XXXXXXXX                                    ------------
0008  yy/mm/dd hh:mm:ss XXXXXXXX                                    ------------
0009  yy/mm/dd hh:mm:ss XXXXXXXX                                    ------------




 COMMAND:   QEPD                                ==>
```

The QEPD command displays information about the last nine PU logs, if at least one was caused by an unrecoverable failure. If none of these last nine logs were caused by an unrecoverable failure, the QEPD command displays information about the last eight PU logs and the last log that was caused by an unrecoverable failure.

To display The PU Logout Directory, press the MODE SEL key. Key **QEPD** next to COMMAND and press ENTER.

PU Logout Directory Fields

ID Log identification number (assigned sequentially from 0001 to FFFF).

TODC Equivalent Time of failure according to the time-of-day clock (TODC) value. The format of the TODC equivalent is yy/mm/dd. Two characters for the current year (yy), two characters for the current month (mm), and two characters for the current day (dd). Each value is separated by a /. For example, the first day of December 1983 would be 83/12/01.

REF Code Reference code. (If a reference code is not available, RC N/A is displayed.)

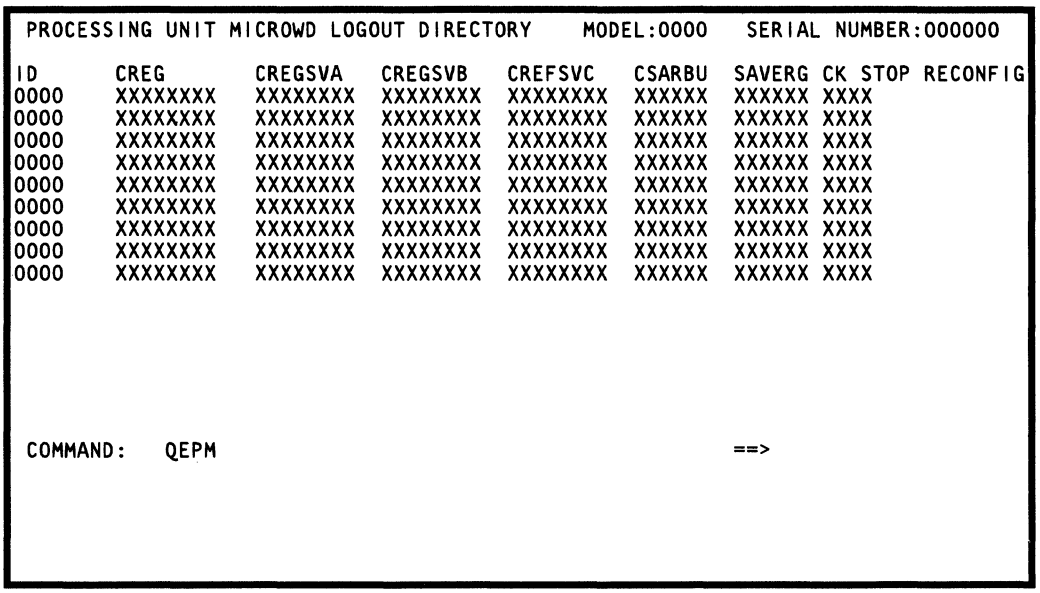
ERR STG ADDR Indicates that a storage error occurred at the address shown. (If the failing storage address is not available, ADR N/A is displayed.) The ERR field can be one of the following:

D	Double-bit error
Key	Key error
DK	Double-bit error with key
ES	Enabled single-bit error
ESK	Enabled single-bit error with key

MACH Status The machine status after the failure was logged and analyzed.

Channel RST An X indicates that the channel was reset because of the failure. The data in this column identifies a channel that has a permanent machine check and has been deconfigured.

Processing Unit Microword Logout Directory (QEPM) Screen



```
 PROCESSING UNIT MICROWD LOGOUT DIRECTORY    MODEL:0000   SERIAL NUMBER:000000

ID      CREG       CREGSVA    CREGSVB    CREFSVC    CSARBU  SAVERG CK STOP RECONFIG
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX
0000    XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXXXX   XXXXXX  XXXXXX XXXX


 COMMAND:   QEPM                                          ==>
```

The QEPM command displays information about the last nine PU logs if at least one was caused by an unrecoverable failure. If none of these last nine logs was caused by an unrecoverable failure, the QEPM command displays information about the last eight PU logs and the last log that was caused by an unrecoverable failure.

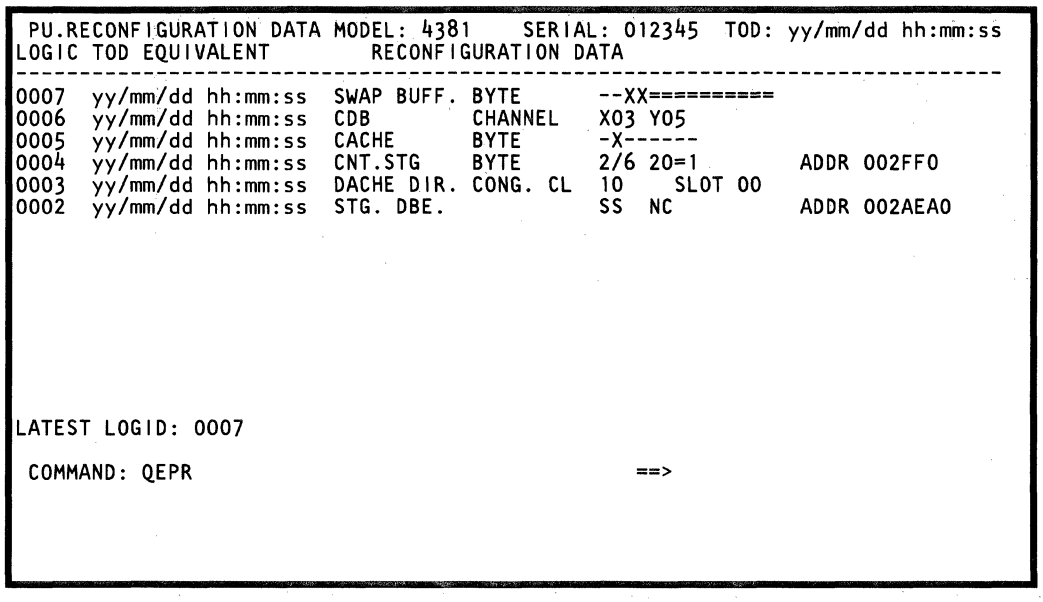
To Display The PU microword logout directory, first press the MODE SEL key. Then key **QEPM** next to COMMAND and press ENTER.

PU Microword Logout Directory Fields

The fields of this screen contain information intended for the service representative; the fields include:

- ID
- CREG
- CREGSAVEA
- CREGSAVEB
- CREGSAVEC
- CSARBU
- SAVEREG
- CK STOP
- RECONFIG

Reconfiguration Data (QEPR) Screen



The QEPR screen displays the reconfiguration records as a result of a processing unit error. Up to thirty reconfiguration logs can be stored.

To display the QEPR screen, press the MODE SEL key, then key in **QEPR** at the COMMAND line and press ENTER.

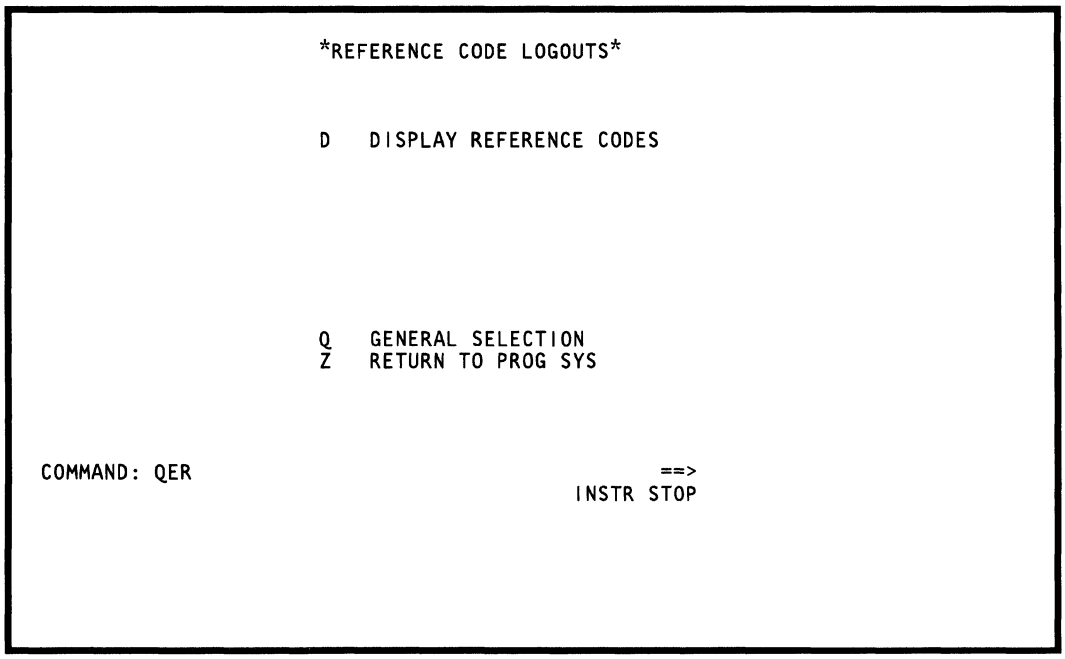
LOGID TOD Equivalent

These fields contain the time of the failure.

Reconfiguration Data

These columns contain information regarding the hardware facility that has been reconfigured.

Reference Code Logouts (QER) Screen



This screen contains the selection to display the reference codes that have occurred in the processor.

Reference Code Logout File (QERD)

```
 **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 yy/mm/dd hh:mm  F9010B20 00000000  16 01 yy/mm/dd hh:mm  F9010B20 00000000
1  01 yy/mm/dd hh:mm  F9010B20 30000000  17 01 yy/mm/dd hh:mm  F9010B20 30000000
2  01 yy/mm/dd hh:mm  F9010B20 00000000  18 01 yy/mm/dd hh:mm  F9010B20 00000000
3  01 yy/mm/dd hh:mm  F9010B20 01F00000  19 01 yy/mm/dd hh:mm  F9010B20 01F00000
4  01 yy/mm/dd hh:mm  5D212CAA 30000000  20 01 yy/mm/dd hh:mm  5D212CAA 30000000
5  01 yy/mm/dd hh:mm  5D212CAA 01F00000  21 01 yy/mm/dd hh:mm  5D212CAA 01F00000
6  01 yy/mm/dd hh:mm  5D212CAA 00000000  22 01 yy/mm/dd hh:mm  5D212CAA 00000000
7  01 yy/mm/dd hh:mm  F9010B20 30000000  23 01 yy/mm/dd hh:mm  F9010B20 30000000
8  01 yy/mm/dd hh:mm  5D212CAA 01F00000  24 01 yy/mm/dd hh:mm  5D212CAA 01F00000
9  01 yy/mm/dd hh:mm  F9010B20 00000000  25 01 yy/mm/dd hh:mm  F9010B20 00000000
10 01 yy/mm/dd hh:mm  5D212CAA 01F00000  26 01 yy/mm/dd hh:mm  5D212CAA 01F00000
11 01 yy/mm/dd hh:mm  5D212CAA 30000000  27 01 yy/mm/dd hh:mm  5D212CAA 30000000
12 01 yy/mm/dd hh:mm  F9010B20 00000000  28 01 yy/mm/dd hh:mm  F9010B20 00000000
13 01 yy/mm/dd hh:mm  5D212CAA 01F00000  29 01 yy/mm/dd hh:mm  5D212CAA 01F00000
14 01 yy/mm/dd hh:mm  5D212CAA 30000000  30 01 yy/mm/dd hh:mm  5D212CAA 30000000
15 01 yy/mm/dd hh:mm  F9010B20 00000000  TIME OF LAST PURGE: yy/mm/dd hh:mm:ss

 COMMAND: QERD                                        ==>
```

The QERD screen displays the last 31 processor unit, support processor, and power reference codes. To display the Reference Code Logout File screen, press the MODE SEL key; then key **QERD** next to the COMMAND line and press ENTER.

Reference Code Logout Fields

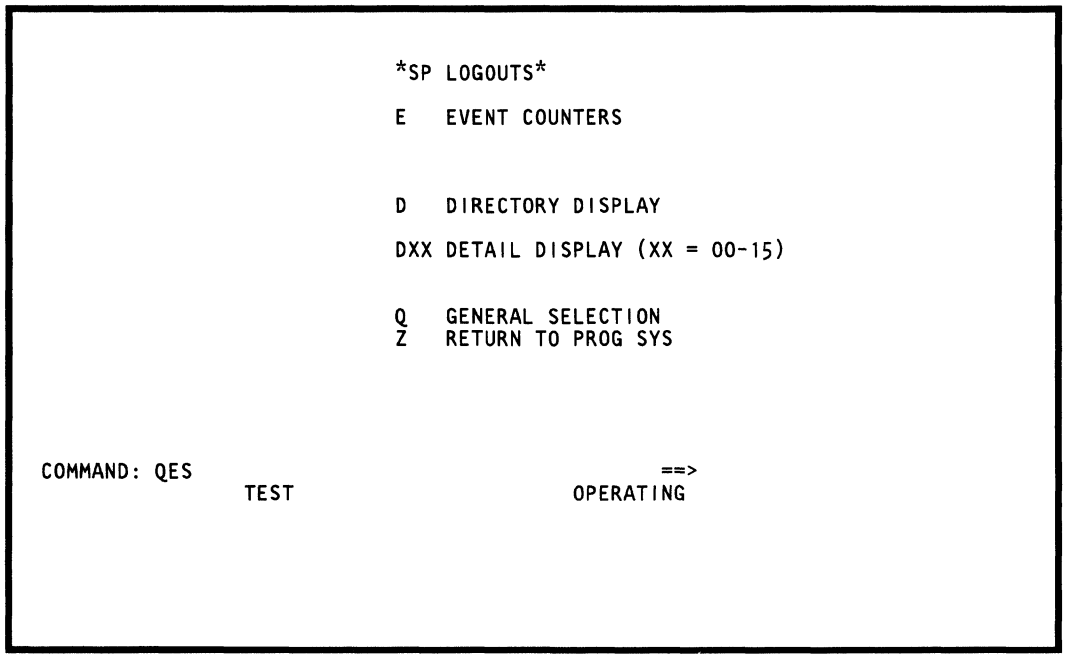
RN Record number. RN 0 is the most recent entry.

CT Count. Indicates the number of consecutive times the particular reference code was logged. If CT is more than one, the TODC EQUIV (time-of-day clock equivalent) field is the time of the first failure.

REF Code Reference code.

RC EXTNT Reference code extension.

Support Processor Logout (QES) Screen



The support processor (SP) logout screens display the support processor summaries, details, and event counters. To display the support processor logout options, key **QES** next to COMMAND and press ENTER.

Support Processor Logout Summary (QESD) Screen

```
     *** 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 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
01 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
02 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
03 0001 02 yy/mm/dd hh:mm:ss 05 00 12 21142B2A 2114 EE05 0000 0000 20A0 EC240724
04 0002 01 yy/mm/dd hh:mm:ss 07 00 12 21142B2A 2114 EE05 0000 12C4 8000 ECA0FF34
05 0001 01 yy/mm/dd hh:mm:ss 06 00 12 DB1C2F2E DB1C EE85 0000 0000 8000 ECA0FF34
06 0001 01 yy/mm/dd hh:mm:ss 05 01 12 21142B2A 2114 EE05 0000 0000 20A0 EC240724
07 0001 02 yy/mm/dd hh:mm:ss 05 01 12 DB1C2F2E DB1C EE05 0000 12C4 20A0 EC240724
08 0001 01 yy/mm/dd hh:mm:ss 06 00 12 21142B2A 2114 EE85 0000 12C4 8000 ECA0FF34
09 0001 01 yy/mm/dd hh:mm:ss 07 00 12 DB1C2F2E DB1C EE05 0000 40AA 50A6 EC220024
10 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
11 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 12C4 8000 ECA0FF34
12 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
13 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
14 0001 01 yy/mm/dd hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024
15 0003 01 yy/mm    hh:mm:ss 07 00 12 5E9E3B3A 5E9E EE85 0000 40AA 50A6 EC220024

  COMMAND: QESD                                    ==>
```

The QESD screen displays a summary of the last sixteen support processor logs.

To display the support processor logout summary, press the MODE SEL key; then key **QESD** next to COMMAND and press ENTER.

Up to sixteen (00-15) log entries are displayed; the most recent entry is LN (log number) 00.

SP Logout Summary Field Definition

LN Log number. LN 0 is the most recent SP log entry.

CT Count. Indicates the number of consecutive times the same failure occurred.

TODC Equivalent Time of the failure. If CT is more than one, the TODC EQUIVALENT (time-of-day clock equivalent) is the time of the first failure.

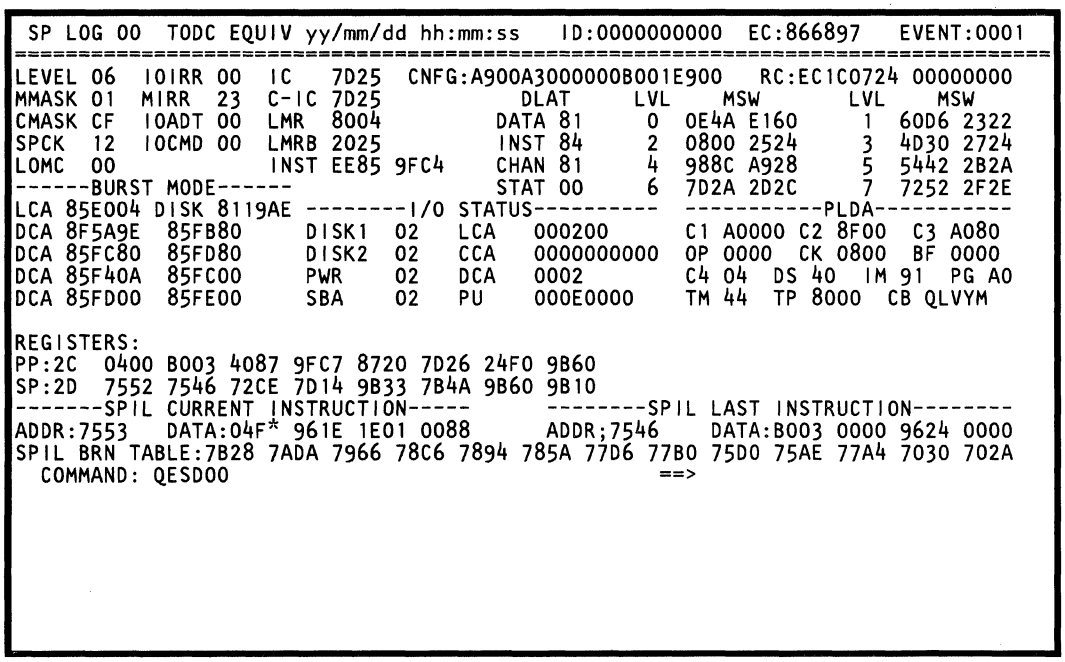
SIC The last instruction address of the support processor.

LMR The last module that was read from the diskette.

REF Code Reference code.

The remaining fields are intended for IBM service use only.

Support Processor Detail Log (QESDXX) Screen



The QESDXX command, where XX is a specific log number, displays detailed error information about a log chosen from the QESD screen. To display a support processor detail log, press the MODE SEL key; then key **QESD** and a log number (XX) next to COMMAND and press ENTER.

Support Processor Detail Log Fields

The fields of this screen are intended for IBM use only.

The Screens for the SP EVENT Counters (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:
 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                                  ==>
```

The QESE command displays detailed error information about various events that have occurred in the support processor. To display an Event Counters screen, press the MODE SEL key; then key **QESE** next to COMMAND and press ENTER.

More than one screen is needed to display the SP event counters. Pressing the ALT key with the Page Up or Page Down key displays the TOTAL and DELTA counts for the specific events on the two screens (refer to the following page for the second screen).

Total and Delta Columns

The TOTAL columns record the number of times the event occurred since the machine was installed. These columns are not reset when you clear the counters.

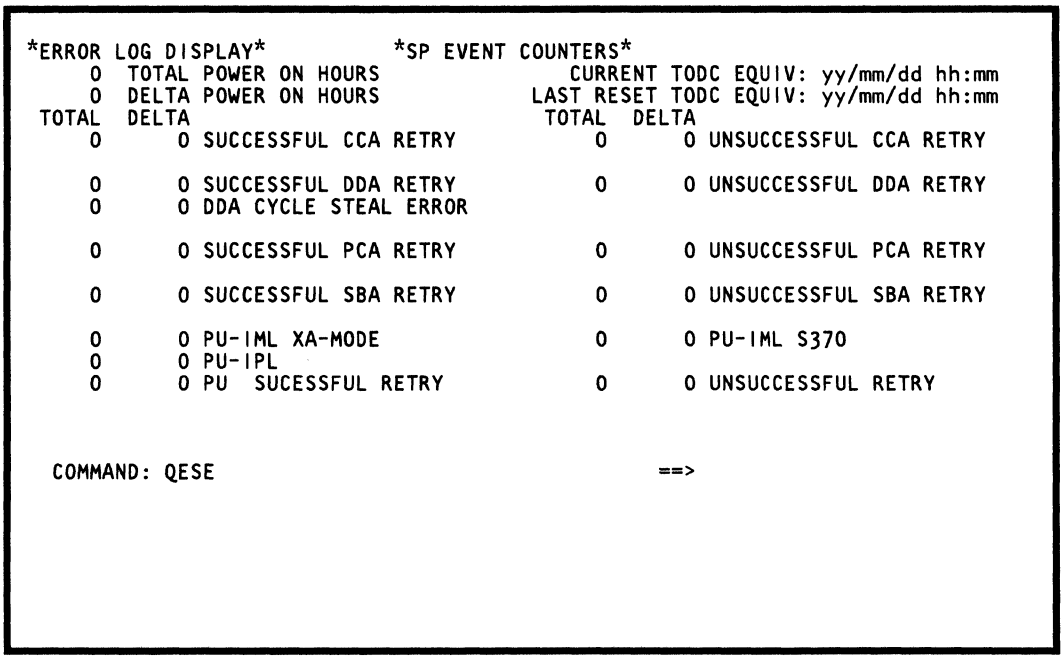
The DELTA columns record the number of times the event occurred since the last time the SP Event Counters were cleared.

If the TOTAL or DELTA columns reach maximum value, they are reset and begin counting from zero. This condition can result with the DELTA column having a higher value than the TOTAL column.

To clear the DELTA columns, key **QESER** next to COMMAND and press ENTER. When prompted, key in **R** and press ENTER again.

Support Processor Events Counted

The events counted field definitions for this screen are intended for IBM use only.


ERROR LOG DISPLAY
SP EVENT COUNTERS
0 TOTAL POWER ON HOURS
CURRENT TODC EQUIV: yy/mm/dd hh:mm
0 DELTA POWER ON HOURS
LAST RESET TODC EQUIV: yy/mm/dd hh:mm
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 SUCESSFUL RETRY
0 0 UNSUCCESSFUL RETRY
COMMAND: QESE
==>

Displaying the Saved Screens (QEV)

```
*SAVED SCREENS*        ADDR RANGE (00/04)              DATE: yy/mm/dd hh:mm

 T LIST
                       ***** COPY KEY SCREEN TITLE ********** SAVED DATE *
 D DISPLAY              00   QF0                              yy/mm/dd hh:mm
                        01   QVAL00                           yy/mm/dd hh:mm




 F SEND TO CONS PRT
 C SEND TO CHNL PRT

 Q GENERAL SELECT
 Z RTN TO PROG SYS

COMMAND: QEVT00                                 ==>
```

The QEV screen displays the list of screens that have been saved using the COPY key.
To display the QEV Screen, key **QEV** next to COMMAND and press ENTER.

This displays a list of the previously saved screens. If the message MORE PRESS PAGE KEY appears, this indicates that the list as it is displayed is incomplete. Press the Page Forward key to display the rest of the list.

QEV Screen Description

The QEV screen contains three general areas:

- The left side of the screen lists the commands that can be used.
- Below the COPY KEY SCREEN TITLE line is the area that displays a two-digit identifying number and a title. the saved date of any screen that has been saved with the COPY key.
- The SAVED DATE area shows the saved of any screen that has been saved with the COPY key.

QEV Commands

The following describes the available commands as they appear in the left column of the screen (under *Saved Screens*).

LIST (QEVT) To display a list of the saved screens, enter **QEVT** next to COMMAND.

DISPLAY (QEVD) To display a saved screen, enter **QEVDXX** next to COMMAND; **XX** is the identifying number (00-04) of the screen. The message SAVED-YYY appears on line 20 to indicate that the displayed screen is a copy of a previously saved screen.

Note that lines 20 to 24 of the current (QEV) screen are displayed with lines 1 to 19 of saved screen **XX**. To display lines 20 to 24 of the saved screen, press the Page Up key

You can also use the Page Up key to page forward through all the saved screens, beginning with the specified screen.

Send TO CONS PRT (QEVF) This function prints a saved screen on the console printer:

1. Enter **QFO** next to COMMAND and press the ENTER key. This displays the System Configuration (QFO) screen.
2. On the QFO screen, ensure that **Y** is entered next to CONSOLE PRT (if not, enter it).
3. Then specify a port: **P1**, **P2** or **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 of the screen; to indicate the screens you want printed, use one number (for example, 0B) or a range of numbers (00-05), or the word ALL (QEVFALL).

Send TO CHNL PRT (QEVC) This function prints a saved screen on the channel printer:

1. Ensure that an IML has been performed, but that an IPL has not been performed. *This is important because customer data can be lost when the QEVC function is used.*
2. Enter **QFO** next to COMMAND and press the ENTER key. This displays the system configuration (QFO) screen.
3. Enter **QEVCXXYYYY** next to COMMAND.

XX is the identifying number(s) of the saved screen; to indicate the screens you want printed, use one number (for example, 0B) or a range of numbers (00-05), or the word ALL (QEVCALL). **YYYY** is the channel unit address of the printer (if you omit this address, the default is the channel printer assigned on the System Configuration screen). When the system is in System/370 mode, **YYYY** contains a zero in the left position, with the channel (C) and unit address (UU) in the other three positions. When the system is in 370-XA mode, **YYYY** contains the device number.

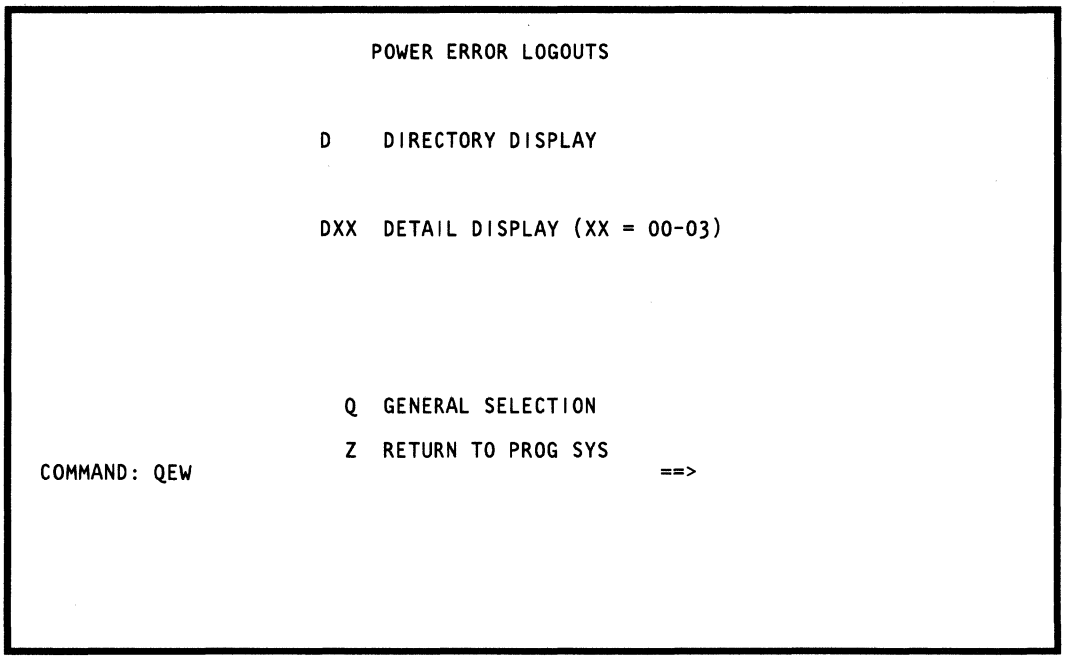
Return to General Selection (Q)

To return the display to the General Selection screen, enter **Q** next to COMMAND.

Return to Prog Sys (QZ)

To return the display to the Operating System (Display or Prt/Kybd mode) screen, enter **QZ** next to COMMAND.

Power Error Logouts (QEW)



Two selections display Power Error information. These selections display a directory of accumulated power faults and details of conditions in the power areas at the time of the faults.

Directory Display (QEWD)

This selection contains a directory of accumulated power faults, the time that the fault occurred and the generated reference code. To select the directory screen, enter **QEWD** at the COMMAND line and press ENTER (see DIR 33).

Detail Display (QEWDXX)

This selection displays the state of the power area hardware at the time of a detected power fault (see DIR 34).

Power Error Logout Directory (QEWD) Screen

```
POWER LOGOUT DIRECTORY              CURRENT TODC EQUIVALENT: yy/mm/dd hh:mm:ss

LINE  TODC EQUIVALENT   REFERENCE CODE

 00   00/00/00 00:00:00 11A0920E
 01   00/00/00 00:00:00 11D1600E
 02   00/00/00 00:00:00 1141300E
 03   00/00/00 00:00:00 11D1920E
 04   00/00/00 00:00:00 00000000
 05   00/00/00 00:00:00 00000000
 06   00/00/00 00:00:00 00000000
 07   00/00/00 00:00:00 00000000
 08   00/00/00 00:00:00 00000000
 09   00/00/00 00:00:00 00000000
 10   00/00/00 00:00:00 00000000
 11   00/00/00 00:00:00 00000000
 12   00/00/00 00:00:00 00000000
 13   00/00/00 00:00:00 00000000
 14   00/00/00 00:00:00 00000000
 15   00/00/00 00:00:00 00000000          TIME OF LAST PURGE: 00/00/00 00:00
 COMMAND:  QEWD                                    ==>
```

This screen displays a list of detected power errors. This screen has three fields.

Line

This column specifies a two-digit number that identifies a specific power fault that can be selected as the **XX** term in the QEWDXX command.

TODC Equivalent

This column specifies the date and time of the fault. The format of the TODC equivalent is yy/mm/dd. There are two characters for the current year (yy), two characters for the current month (mm), and two characters for the current day (dd). Each value is separated by /. For example, the fifteenth day of June 1982 would then be 82/06/15.

Reference Code

This column specifies the associated power reference code (if any) that was generated because of the fault.

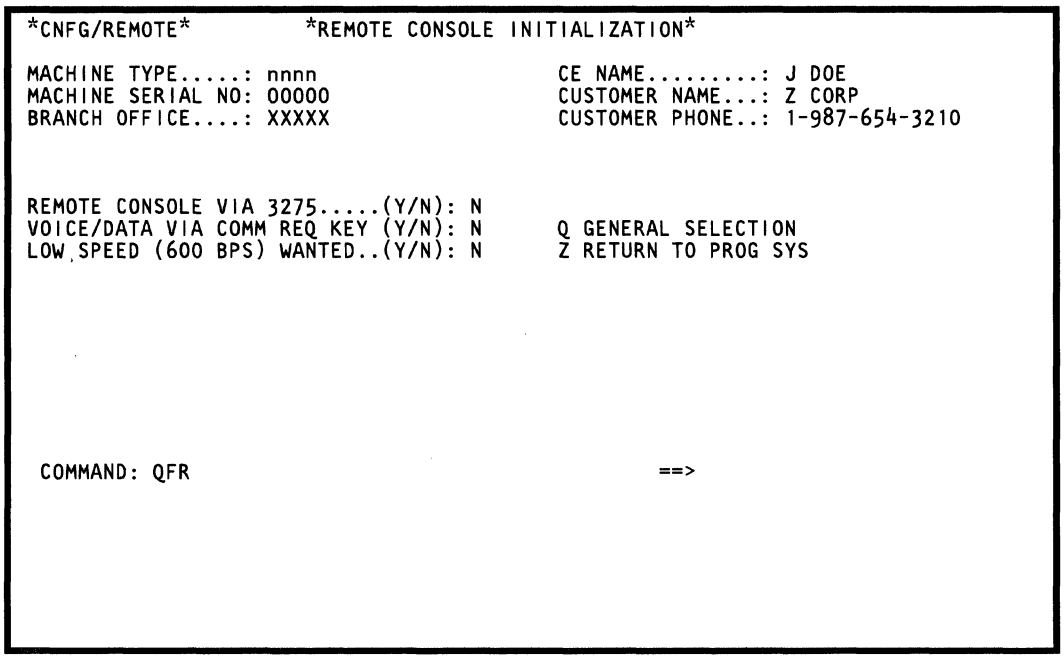
Power Error Logout (QEWDXX) Screen

```
 POWER LOGOUT: 00          REFERENCE CODE = 11D1350E   TOD = yy/mm/dd hh:mm

                        CONTROL LATCHES ON AT TIME OF ERROR:

01) PICK K3               06) +5V PS109 START
02) PICK K4               07) +5V PS108 START
03) -2.2V PS103 START     08) +6V PS107 START
04) -1.5V PS103 START
05) -4.3V PS106 START

                                    POWER ERRORS:

+6V PS107 CURRENT LIMIT




COMMAND: QEWDXX                                    ==>
```

This screen gives details of power failures of a specific power fault (XX) listed in the LINE column on the Power Error Directory (QEWD) screen. To select a specific power fault for detail display, key **QEWDXX** at the COMMAND line and press ENTER.

When a specific power error is specified, the title of the fault is shown on the top line, along with its associated reference code, and the equivalent time of the fault. The details of the power hardware are then shown in the order that the power controls were sensed and recorded.

Remote Console Initialization (QFR) Screen



This screen establishes a link between the remote service console and the local console. You will be instructed by service personnel on the use of this screen.

Enter **QFR** on the COMMAND line to establish the communication link. The support structure of the system accomplishes this link. Upon completion of the communication, disconnect the link using the DISC key.

Press the POWER ON/IML switch to perform a support processor IML before continuing with normal operation.

Remote Operator Console Program Function Keys

The program function (PF1-12) keys of the host system ROCF console can function as standard PF keys or can emulate the system functions of the ROCF console on the remote system.

The current PF mode function setting is displayed on the host ROCF console in the lower-right corner of the screen as either <P> (standard PF mode) or <S> (system PF mode).

Pressing the TEST REQUEST key of the host system ROCF console alternately changes the PF key function mode from <P> <S> and back to <P>.

In system function mode, the host PF keys emulate the system function keys of the remote system console. The system functions of the PF keys are shown in the chart below.

Host System PF Keys in <S> Mode	**Remote System Function Keys**
PF1	Start
PF2	Stop
PF3	Interrupt
PF4	Change Status Display Mode
PF5	Reserved
PF6	Change Display
PF7	Page Up
PF8	Page Down
PF9	Communication Request
PF10	Copy (3275 only)
PF11	Reserved
PF12	Mode Select

Attention Keys on the 3275 Keyboard	**Key Functions**
PA1	Request
PA2	Cancel
Clear	Restore Display
Enter	Enter
Test Request	PF Mode Change (from P mode to S mode and vice-versa)

If the host system ROCF console has 24 PF keys, the host operator does not have to switch PF key function mode. PF keys 13-24 also perform the system functions as shown below.

Host System PF Keys in <S> Mode	Remote System Function Keys
PF13	Start
PF14	Stop
PF15	Interrupt
PF16	Change Status Display Mode
PF17	Reserved
PF18	Change Display
PF19	Page Up
PF20	Page Down
PF21	Communication Request
PF22	Copy (3275 only)
PF23	Reserved
PF24	Mode Select

Change Status Display Mode

The Change Status Display key setting determines whether only the console lines 1 through 20 are transmitted to the host system (as in a normal run mode) or lines 1 through 24 are transmitted, which adds the system status area to the host console display for use in problem determination. (To improve performance, the system status area should be displayed only when necessary.) Pressing the Change Status Display Mode key alternately changes this transmission setting.

Messages for Manual Control Mode

The messages in this section apply to any manual control screen.

Messages usually display on either line 20 (for a system error) or line 23 (for a support processor error), but may also appear in an alternate message area for a specific screen function. The messages in this section are organized alphabetically and each is followed by a **Meaning** that explains the cause of the message. **Recovery** information is also provided. This information briefly describes how to correct an error condition (if applicable), or gives you information that may help you understand the message.

ACB VALUE CHANGED BY *xx* K

Meaning: Assigned UCWs take a reserved storage area of 128 UCWs. After this boundary is passed, each block of 32 UCWs takes an additional 2K of user storage. This change is reflected in the address check boundary (ACB) generated at the next IML.

Recovery: This is an information message, no recovery action is necessary.

ADDR *xxx* ALREADY ASSIGNED

Meaning: An attempt was made to assign a device (UCW) to an address that has already been assigned.

Recovery: Assign the device to an unused address or unassign the device that is at the desired address. Start the UCW device assignment procedure again.

ADDRESS ALREADY USED

Meaning: The address that you are trying to assign was assigned earlier.

Recovery: Assign the device to an unused address.

ADDRESS OUT OF RANGE

Meaning: The specified address is too large, too small, or is larger than the physical storage size.

Recovery: Correct the ADDR term and enter the function again.

ADDRESS RESERVED

Meaning: An attempt was made to assign an address that is reserved for an internal function.

Recovery: Correct the ADDR term and enter the function again.

ADDRESS TOO LARGE

Meaning: The address specified in the ADDR field is beyond the limit.

Recovery: Correct the ADDR term and enter the function again.

ALARM

Meaning: An alarm notice was received; the audible alarm sounded.

Recovery: If PROCEED is not displayed, press the ENTER or CNCL key. If PROCEED is displayed, press the system, selective reset, or a Program Function (PF) key.

ALPHA

Meaning: This is a prompting message to put the terminal in alphabet operation by pressing the ALPHA key. (This message applies to Katakana keyboard only.)

Recovery: This is an information message; no recovery action is necessary.

ALPHA↑

Meaning: This tells you to press the ALPA↑ key to put the terminal into alphabet operation. (This message applies to the Katakana keyboard only.) This is identical to pressing the Shift key on an English keyboard.

Recovery: This is an information message; no recovery action is necessary.

ALTER IGNORED

Meaning: An attempt was made to alter data without the machine being soft-stopped.

Recovery: Press the STOP key to soft-stop the machine and perform the desired alter function.

ALTER WILL BE IGNORED

Meaning: This message displays following a selection operation to another screen while the present screen remains displayed. Any data altered on this screen is lost when the ENTER key is pressed.

Recovery: Press the ENTER key to restore normal screen operation.

ANALYSIS CANCELLED

Meaning: The user has cancelled the problem analysis program.

Recovery: This is an information message; no recovery action is necessary.

ANALYSIS COMPLETE

Meaning: The Problem Analysis program has completed. Any errors are displayed on the screen.

Recovery: This is an information message; no recovery action is necessary. Switch to a functional diskette on the QFO screen and select any screen.

ANALYSIS HALTED

Meaning: The Problem Analysis program has encountered an error from which it cannot recover.

Recovery: Assure that the diskette is selected and functional. Check any reference code and try the operation again.

ANALYSIS IN PROGRESS

Meaning: The Problem Analysis program is in progress.

Recovery: This is an information message; no recovery action is necessary.

BLOCK

Meaning: A block is being processed or is waiting for an address match to occur.

Recovery: This is an information message; no recovery action is necessary.

BLOCK AT MATCH-WAIT

Meaning: 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 a halt block command, QBH.

CALL LOCAL SERVICE

Meaning: The data transfer to the support system was not successful: The machine is not registered in the support system, system space is not available to receive log data, or the data link was disconnected following successive attempts to send the information.

Recovery: Call your local service representative.

CHANGES REQUIRE IML

Meaning: This message appears on the Program Load screen when the mode has been changed. The message reminds you that an IML must be performed or the mode changes will be lost. This message may also indicate that a change to the CONSOLE MODE or CONSOLE ADDRESS could not be communicated to the processing unit.

Recovery: Perform an IML.

CHANNEL 0 UNAVAILABLE

Meaning: This message appears when a function requires the use of the local channel path (channel 0) between the support processor and the processing unit, but the path is busy with a processing unit operation.

Recovery: Try the function again. If the message continues to display, press STOP. A support processor re-IML may be needed to clear a channel program loop to the display console, or a program reset may be required to clear a channel program loop to channel 0. A program reset takes longer than normal to complete under these circumstances.

CHECK STOP

Meaning: The processor is in the check-stop state.

Recovery: This is an information message; recovery action may be necessary.

CHNL *xx* HAS NO IFCCS

Meaning: There are no channel interface checks on the channel specified at *xx*.

Recovery: This is an information message; no recovery action is necessary.

CLEAR COMPLETE

Meaning: A successful system reset clear (QCLEAR) has been performed.

Recovery: This is an information message; no recovery action is necessary.

CLEAR RESET REQUIRED

Meaning: You have pressed the COPY key after the system has been IPLed.

Recovery: Enter **QCLEAR** at the COMMAND line and press ENTER. Now press the COPY key.

WARNING: Performing a QCLEAR alters storage and requires an IML and IPL of the system. A loss of customer data results from a QCLEAR.

COMMANDS START WITH Q

Meaning: All commands entered at the COMMAND line start with the letter **Q**.

Recovery: Reenter the command beginning with the letter Q.

COMM REQ

Meaning: The COMM REQ (Communication Request) key on the console has been pressed.

Recovery: This is an information message, no recovery action is necessary.

CONFLICTING C/T ACTIVE

Meaning: An active compare/trace selection conflicts with the selection that you are attempting to perform.

Recovery: Determine from the information displayed on the screen the active storage Compare/Trace that is conflicting with your selection.

CONS PRT NOT CONFIGURED

Meaning: The console printer is not configured for processor operation.

Recovery: Assign the COPY key on the Configuration screen (QFO) to a valid console printer and repeat the command.

CONSOLE DISK FAILURE

Meaning: Ten errors occurred on the same record during initial microprogram load (IML).

Recovery: Re-IML the system. If the error continues, run the Problem Analysis program.

CONSOLE I/O WAITING

Meaning: An input/output operation has been requested by the system with the console in manual mode.

Recovery: Enter **Z** next to the COMMAND line and press ENTER, or press the CHG DPLY key to return to the program system.

CONV CHECK

Meaning: 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 the device's problem determination procedures in the keyboard unit.

COPY TO CHNL PRT DONE

Meaning: A copy of the saved screen, or the displayed screen has completed printing on the channel printer.

Recovery: This is an information message; no recovery action is necessary.

CSAR: *xxxxx*

Meaning: The clock is stopped. The address displayed at *xxxxx* is the current control storage address.

Recovery: This is an information message; no recovery is necessary.

DATA CROSSES DWORD BNDRY

Meaning: The specified address in the data or compare selection causes the doubleword to cross its boundary.

Recovery: Change the address specified in your selection, or use "don't care" characters in the specified address.

DATA: *hhhh* ADDR: *xxxxxxxx*

Meaning: This message displays data *hhhh* at address *xxxxxxxx* when in instruction-stop or match-stop state. The address displayed for a stop condition is the address of the next instruction.

Recovery: This is an information message; no recovery action is necessary.

DATA: *hhhh* R-ADDR: *xxxxxxxx*

Meaning: This message displays 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. R-ADDR indicates the processor is operating with real (R) addresses.

Recovery: This is an information message; no recovery action is necessary.

DATA: *hhhh* **V-ADDR:** *xxxxxxxx*

Meaning: This message displays 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. V-ADDR indicates the processor is operating with virtual (V) addresses.

Recovery: This is an information message; no recovery action is necessary.

DATA LINE TIMEOUT

Meaning: The telephone connection between the support structure and the support processor has been disconnected. If no data transfer takes place in approximately five minutes, a timeout error occurs.

Recovery: This is an information message. No recovery action is necessary. The connection can be attempted at a later time.

DATA LINK DISCONNECTED

Meaning: The data link was disconnected because of one of the following:

- The DISC key was pressed and ended remote service, or
- A support processor program requested RSF access to disconnect the data link, or
- A data link disconnect signal was received from the remote location.

Recovery: This is an information message; no recovery action is necessary.

DATA LINK TIME-OUT ERROR

Meaning: A data transmission has not occurred in the last five minutes. The program assumes a line error and displays this message.

Recovery: The program is terminated; the operation must be reinitiated.

DATA LINK UNRECOV. ERROR

Meaning: An error has occurred during the transmission of data that could not be recovered.

Recovery: The program is terminated; the operation must be reinitiated.

DATA NOT ACCESSIBLE

Meaning: The processor could not be stopped to perform the desired function.

Recovery: Retry the function.

DATA NOT AVAILABLE

Meaning: 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: Change the virtual storage address and retry the operation, or stop trying to display or alter. If the UCW data cannot be accessed now, retry later.

DATA SENT OK, INC *nnnn*

Meaning: This is a status message to indicate that the information was transmitted to the support system and was assigned an incident number. The *nnnn* specifies the incident number assigned to this transmission.

Recovery: This is an information message; no recovery action is necessary.

DEG

Meaning: This message displays when the processor is running in degraded mode due to an automatic reconfiguration caused by a hardware failure in the processor.

Recovery: This is an information message and requires no recovery procedures. If more information is desired regarding the reconfiguration, call your service representative.

DEVICE BUSY

Meaning: The function specified cannot be performed by the device because the device is busy at this time.

Recovery: Retry the function.

DEVICE NOT ASSIGNED

Meaning: The requested unit control word (UCW) is not assigned.

Recovery: Refer to the UCW directory display (QFOIC) screen for the current valid UCW assignment procedures. Use the the screen to determine the specifications of the function requested. Rekey the selection.

DEVICE *xxx* **IS BUSY**

Meaning: The addressed device is busy with an I/O operation.

Recovery: Press ENTER on the display of the coupled pair that has the PROCEED light on. Rekey the changes.

DISCONNECT ON CNFG SCREEN

Meaning: An attempt was made to save a screen using the Save Screen to Console Printer (QEVF) function with the console printer configured to the COPY key.

Recovery: Disconnect the COPY key assignment on the Configuration (QFO) Screen and retry the function.

DISCONNECTED

Meaning: The display console specified is not available since it is not logically assigned to the processor.

Recovery: This condition exists if a unit address is not logically assigned using the Program Load (QL) screen. Ensure that the device is configured with the Program Load screen.

DISKETTE DRIVE ONE IS NOT OPERATIONAL

Meaning: A request to diskette drive one was specified, but the drive is not functional.

Recovery: Ensure that there is a diskette in drive one and that the latch is securely turned.

DISKETTE DRIVE *xxx* NOT READY

Meaning: The diskette drive specified by *xxx* has been accessed, but is not ready.

Recovery: Ensure that there is a diskette in drive *xxx* and that the latch is securely turned.

DISKETTE *xxx* CHECK

Meaning: The diskette or diskette drive specified by *xxx* (ONE or TWO) has had a failure.

Recovery: Ensure that the diskette is undamaged and that the drive is operational. Retry the operation. If retry is unsuccessful, call the service representative.

DISKETTE *xxx* NOT READY

Meaning: The diskette or diskette drive specified by *xxx* (ONE or TWO) is not ready because the diskette is not installed properly, or the drive latch is not secure.

Recovery: Ensure that the diskette is properly installed, and the latch is secure. If the error continues, run the Problem Analysis program.

DISPLAY CONSOLE FAILURE

Meaning: A display to the screen failed during IML. An error was detected from the console display.

Recovery: Retry the IML procedure. If the error persists or a reference code is displayed, call the service representative.

DISPLAY MODE

Meaning: The display console is in display mode.

Recovery: This is an information message; no recovery action is necessary.

DONE, NO READ ERRORS

Meaning: The Problem Analysis program has completed and has not found any errors.

Recovery: Install original diskettes and continue operation.

DONE, PRESS ENTER

Meaning: This tells you to continue by pressing ENTER.

Recovery: This is an information message; no recovery procedures required.

DUPLICATE CONS DEV ADDRESS

Meaning: A duplicate address exists. Duplicate addresses are only permitted in Prt/Kybd mode (see "Console Mode" under "Program Load Screen"). The cursor is positioned to the end of the selection line entry.

Recovery: Rekey the correct command after the last command entered on the COMMAND line.

DUPLICATE PORT ADDRESS

Meaning: The port specified has already been assigned.

Recovery: Assign a port that has not yet been assigned, or unassign the port desired.

ENTER DATE MM/DD/YY

Meaning: This prompts you to enter the date.

Recovery: Enter the date requested with a two-digit month (MM), a two-digit day (DD), and the last two digits of the year (YY).

ENTER NEW PASSWORD

Meaning: This is a prompting message for you to enter a new password. This function is used with the remote operator console facility (ROCF) and Problem Analysis. The entry of the new password sets the password for future operation.

Recovery: Enter the password requested at the appropriate position on the screen.

ENTER NODE IDENTIFICATION

Meaning: This message prompts you to enter the required system node identification characters.

Recovery: This is an information message; no recovery action is necessary.

ENTER OLD PASSWORD

Meaning: This message prompts you to enter the old password. This function is used in remote operator console facility (ROCF) mode and Problem Analysis. To enter a new password the old password must be known. This requirement is a security protection feature.

Recovery: This is an information message; no recovery procedures are required.

ENTER PASSWORD

Meaning: This message prompts you to enter the current password to continue processing.

Recovery: This is an information message; no recovery action is necessary.

ENTER P0 P1 P2 P3

Meaning: This message tells you to assign a display console port device number.

Recovery: This is an information message specifying an entry on the QFO screen of the processor port assignments.

ERROR OR SLOW PRINTER

Meaning: A printing error has occurred, or the support processor is waiting for a complete signal.

Recovery: Retry the operation, and check the printer operation.

FAILURE INITIALIZING RCS

Meaning: The initialization of the remote console support (RCS) facility failed.

Recovery: To successfully initialize the remote console support facility, all options on the QFB screen must be correctly selected. Refer to the ROCF screen (QFB) for correct option selections.

FAILURE INITIALIZING RDB

Meaning: The initialization of the remote data bank failed.

Recovery: To successfully initialize the remote data bank facility, the processor must have a CDT 1000A (or equivalent) and dataphone installed and readied.

FULL COMMAND REQUIRED

Meaning: The complete command was not entered. Some commands may use an abbreviated form; however the command that you selected requires the complete format. Refer to the specific screen for the required form.

Recovery: Re-enter the command correctly and press the ENTER key. If you do not want to perform the function, press ENTER to bypass the request.

FUNCTION KEY IGNORED

Meaning: A function key other than a paging key has been pressed or the paging key is not applicable to the function in use.

Recovery: No recovery action necessary.

FUNCTION NOT AVAILABLE

Meaning: The requested function is not available on the installed and accessed diskette.

Recovery: Install the correct diskette and retry the function.

FUNCTIONAL ONE DISKETTE NOT IN DISKETTE DRIVE ONE

Meaning: A request was made to the diskette (in functional drive ONE) that was not available.

Recovery: Install the functional ONE diskette in functional drive ONE and retry the operation.

IF ERROR: PRESS ALT AND LINE-DISC KEYS

Meaning: If there is an error in the remote support facility (RSF) function, this message specifies the disconnect procedure.

Recovery: Press the Alternate key (ALT) and the Line Disconnect (LINE-DISC) keys to stop the operation.

IML COMPLETE

Meaning: The initial microcode load (IML) has completed.

Recovery: This is an information message; no recovery action is necessary.

IML ERROR

Meaning: An error was detected during the initial microprogram load (IML) operation.

Recovery: Retry the IML operation.

IML IN PROG

Meaning: This message is displayed during the execution operation of the initial microprogram load (IML) function.

Recovery: This is an information message; no recovery action is necessary.

IML REQD (SP & PU)

Meaning: This message indicates that an initial microprogram load for the support processor (SP) and main processor (PU) is required.

Recovery: IML the support processor from the service panel and the processor from the program load screen and retry the function.

IML REQUIRED

Meaning: A function has been requested or changes have been made that require an IML of the processor to accomplish the operation.

Recovery: Perform the IML and retry the function.

IML S/370 CORELOAD

Meaning: An initial microprogram load of System/370 mode is required.

Recovery: Ensure that the correct option is selected on the IML parameters selection screen (QLI) and retry the function.

IML STEP *xxxx*

Meaning: This message displays during the initial microprogram load of the processor. The *xxxx* field continually updates with a sequential number to indicate the progress of the loading procedure.

Recovery: This is an information message; no recovery procedures are required.

INCOMPLETE COMMAND

Meaning: The complete command required for this function was not specified.

Recovery: The cursor is positioned at the missing input area. Specify the required data and press ENTER.

INCOMPLETE INPUT

Meaning: The required fields for a selected function have not been completely specified. The cursor is positioned at the missing input character position.

Recovery: Enter the missing fields or parameter(s).

INCORRECT CURRENT PASSWORD, PLEASE REENTER

Meaning: The password does not match the current valid password.

Recovery: Enter the current password to continue. Entering three invalid passwords terminates the connection.

INHIBITED

Meaning: All keys except RESET, START, STOP and INTR are now inactive. This message appears if you try to:

- Change a protected data field
- Press two keys at one time
- Press keys faster than they can be processed
- Insert a character into a full field
- Press one of the program function (PF) keys.

Recovery: Press the RESET key, and continue.

INITIALIZATION COMPLETE

Meaning: The teleprocessing link to the support system has been completed.

Recovery: This is an information message; no recovery action is necessary.

INITIALIZING RSF-LINK

Meaning: The support processor is waiting for a response from the support system to indicate that the teleprocessing link is complete.

Recovery: This is an information message; no recovery action is necessary.

INPUT *xxxxxx*--**OUTPUT** *xxxxxx*

Meaning: This is a status message displaying the input and output addresses.

Recovery: This is an information message and requires no recovery procedures.

INSERT FROM DISKETTE ON DRIVE 1
TO DISKETTE ON DRIVE 2 AND PRESS ENTER

Meaning: This message tells you to assign your diskettes in the following manner when you are copying information from one diskette to another.

- The *read from* diskette goes in drive 1.
- The *read to* diskette goes in drive 2.

Recovery: Install the correct diskettes on the specified drives.

INSERT MODE

Meaning: The Insert key on the display console has been pressed.

Recovery: If this mode is not desired, press the RESET key to exit.

INSTR STEP

Meaning: The processor is in instruction-step mode.

Recovery: This is an information message; no recovery action is necessary.

INSTR STOP

Meaning: An instruction stop has occurred.

Recovery: This is an information message; no recovery action is necessary. An instruction stop can also be caused by pressing the STOP key.

INSTR STOP REQUIRED

Meaning: The requested function requires that the processor be in instruction-stop state.

Recovery: Press the STOP key and retry the function.

INTERRUPT KEY PROCESSED

Meaning: This message indicates that the processor has acknowledged that the INTERRUPT key on the display console has been pressed, and that the interrupt has been passed to the processor for processing.

Recovery: This is an information message and requires no recovery procedure.

INTV-REQD

Meaning: The printer assigned as a hard-copy device has become not ready due to an end-of-form, power-off, or some other check condition.

Recovery: Clear the check condition and ready the printer.

INTV-TIMER

Meaning: This message indicates that the interval timer is on.

Recovery: This is an information message and requires no recovery procedures.

INVALID ADDRESS

Meaning: The address field contains an invalid character or the address specified is beyond the valid screen range.

Recovery: The cursor is positioned at the address to be corrected. Enter the correct address and retry the command.

INVALID BLOCK NAME

Meaning: The block name specified does not begin with the letter P, or the block name contains more than eight characters.

Recovery: Respecify the block correctly.

INVALID CHANNEL ADDRESS

Meaning: The channel address of the input/output devices is not a valid number.

Recovery: Enter a valid channel and device address and retry the function.

INVALID CHAR. CODES

Meaning: An invalid character or an invalid combination of characters was used in the characteristics field.

Recovery: Enter the correct character or characteristic.

INVALID DATE

Meaning: The date parameters that you entered are not valid for the fields entered.

Recovery: Ensure that the entered characters match the field requirements for month, day and year.

INVALID DEVICE NUMBER

Meaning: The device number of the input/output address is already assigned.

Recovery: Enter a correct device address and retry the function.

INVALID ENTRY, REENTER

Meaning: This message indicates that:

- An incorrect character was entered
- An incomplete field specified
- An entry not made where an entry is necessary.

The cursor is positioned at the error position.

Recovery: Refer to the specific screen field requirements, and reenter the selection.

INVALID - FULL RANGE REQUIRED

Meaning: An invalid range of device addresses for a control unit was entered.

Recovery: All devices on a shared control unit must be assigned at the same time. Assign the complete range of device addresses for the control unit and reenter the command.

INVALID INPUT

Meaning: An incorrect selection has been keyed. The cursor is positioned below the first invalid character encountered.

Recovery: Enter the correct parameters for the appropriate function and press ENTER.

INVALID INPUT, CE ONLY

Meaning: The selection that was specified is a service-only selection and requires that the processor be in service mode.

Recovery: Reenter the correct function, or set the CE mode switch to CE mode and reselect the entry.

INVALID INPUT - S/370 ONLY

Meaning: A function was requested that requires that the processor be in System/370 mode.

Recovery: Reload the system with System/370 mode from the mode selection screen (QLI).

INVALID NAME

Meaning: The entered name is invalid because:

- Invalid characters (alphanumeric or special) have been entered.
- Too many characters have been entered.
- An invalid combination of characters (alphanumeric or special) has been detected in the field.

Recovery: Check the requirements of the name field, and reenter.

INVALID OPERATION

Meaning: The operation specified is not valid for the screen.

Recovery: The cursor is positioned at the required operation field. Enter a valid operation code and retry the command.

INVALID OR INCOMPLETE INPUT, PLEASE RE-ENTER

Meaning: The selection was either invalid or incomplete.

Recovery: Reenter the valid selections for the command and press ENTER.

INVALID OR INCOMPLETE INPUT, PLEASE REENTER

Meaning: This message indicates that the input data either contained invalid syntax for the field's character requirement, or was incomplete for the field's length requirement.

Recovery: Check the requirements for the specific field entry, and reenter.

INVALID PASSWORD

Meaning: The entered password does not match the password character requirements.

Recovery: Check the requirements for the password entry in the text describing the screen and reenter.

INVALID PRINTER TRAIN

Meaning: The printer train specified for the IOCP operation is invalid.

Recovery: Ensure that the printer train specified is a valid one. The available train options are described in the IOCP screen (QFOID).

INVALID PRINTER TYPE

Meaning: The printer type specified for the IOCP operation is invalid.

Recovery: Ensure that the printer type specified is a valid one. The type options available are described in the IOCP screen (QFOID).

INVALID PROCESSOR ID

Meaning: The machine serial number on the diskette does not match the internally fixed machine serial number.

Recovery: Load the correct diskette and re-IML. If the error persists, call the service representative.

INVALID RANGE SPECIFIED

Meaning: An invalid range of device addresses for a control unit was entered to be unassigned in the command.

Recovery: All devices on a shared control unit, or a Start I/O Fast type device must be unassigned at the same time. Unassign the complete control unit's range of devices.

INVALID VIA RSF LINK

Meaning: An attempt was made to select a remote operator console facility (ROCF) mode switch function (M) on the ROCF (QFB) screen from a remote console.

Recovery: This selection is only permitted on the local console.

Note: This selection can be forced to take effect from either the local or remote console by keying in **MODE** at the selection line (instead of M). However, be sure that the facility can be safely invoked in this manner.

IOS

Meaning: This indicator displays when the Stop key was pressed while the processor was in the running state. This condition indicates I/O suppression is active.

Recovery: Press the Restart key. I/O processing will restart.

IPL COMPLETE

Meaning: The initial program load (IPL) has been executed.

Recovery: This is an information message; no recovery action is necessary.

IPL DEVICE NOT RESPONDING

Meaning: This message indicates that the IPL device is not attached, or that the METER switch is off. This message also displays when a Machine Reset (QCM) is selected, but the processor is not in clock-stopped mode.

Recovery: Check that the IPL UNIT ADDR is correct on the Program Load screen. Check any switching devices to ensure that the device is attached to the system. Check that the device control unit is powered-on and the meter switch is turned on.

IPL EC-PSW FORMAT ERROR

Meaning: The program status word (PSW) that was loaded during the initial program load (IPL) is invalid.

Recovery: Determine from the Program Load screen (QL) the correct IPL unit address. Ensure that the correct IPL device contains the correct disk or tape. Ensure that the correct microcode mode is loaded. Retry the IPL operation.

IPL ERROR

Meaning: An error occurred during initial program load.

Recovery: IPL the processor again. If the error persists, run the Program Analysis program.

IPL IN PROG

Meaning: The initial program load is in progress.

Recovery: This is an information message; no recovery action is necessary.

IPL I/O ERROR

Meaning: There is no UCW for the I/O device, or the first IPL record is invalid.

Recovery: Check that the IPL UNIT ADDR is correct on the Program Load screen. Check that the IPL device contains the correct disk or tape. If the IPL media is tape, ensure that the tape is at load point and that the tape drive is ready.

IPL I/O ERROR. INTF CTL CK

Meaning: The initial program load was not successful because of a channel interface control check (IFCC).

Recovery: Retry the IPL function. If the error condition persists, retry the function on another I/O device.

IPL I/O ERROR. US/CS=xxxx

Meaning: An I/O error has occurred. The unit status and channel status are displayed.

Recovery: If *US/CS=x2xx, xAxx* or *xExx*, check that the IPL device is physically attached, powered-on, and ready. Retry the IPL. If the failure repeats, refer to the Problem Analysis program in the *IBM 4381 Processor Problem Analysis Guide*, GA24-3955.

IPL UNIT OR CTL UNIT BUSY

Meaning: The initial program load is not possible because of a busy condition in the path or paths to the assigned device.

Recovery: Retry the operation. If the error persists, stop other activity to the IPL unit and retry the operation.

IPL UNIT NOT DEFINED

Meaning: The IPL unit specified for the initial program load (IPL) is not defined.

Recovery: Ensure that the correct IPL unit requirements are followed for the Program Load (QL) screen. Ensure that the selected unit is in the present UCW directory. If you are operating in 370-XA mode, be sure that the unit has been added to the IOCDS package. Also ensure that the selected unit is the correct one.

KATAKANA NORMAL

Meaning: (Katakana keyboard only). This message prompts you to press the Katakana Normal key. Pressing this key puts the keyboard into Katakana mode.

Recovery: This is an information message and requires no recovery procedures.

KATAKANA UPSHIFT

Meaning: (Katakana keyboard only). This is a prompting message to press the Katakana Upshift key. Pressing this key puts the terminal in Katakana Symbol mode.

Recovery: This is an information message and requires no recovery procedures.

KEY IGNORED

Meaning: The support processor is busy processing a previous function.

Recovery: Retry the function.

LINE DISCONNECTED: NO PASSWORDS ENTERED IN 1 MINUTE

Meaning: In ROCF mode, the 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.

Recovery: The ROCF session has been terminated. Restart the ROCF LOGON procedure, if desired.

LINE DISCONNECTED: TOO MANY INCORRECT PASSWORDS

Meaning: In ROCF mode, three incorrect passwords were entered.

Recovery: The ROCF session has been terminated. Restart the ROCF procedure, if desired.

LINES OR SIZE OVER MAX

Meaning: The number of characters entered exceeds the available space, or more than the allowed number of editing lines are requested.

Recovery: Refer to the screen description for field specifications of characters or lines. Delete the excessive characters or lines and reenter.

LOAD

Meaning: This message is displayed during a program load operation.

Recovery: This is an information message; no recovery action is necessary.

LONG IPL PROCEEDING

Meaning: This message displays if the initial program load takes longer than 12 seconds.

Recovery: The IPL is still in process. No action necessary. If you suspect that the IPL is taking an abnormal amount of time and will not complete successfully, press the MODE SEL key to stop the IPL.

MACH CHECK

Meaning:
The processor is in machine-check state and is inoperative, or is in an error-retry process.

Recovery: Machine checks are caused by processor malfunctions. The processor handles the machine check, depending on the type of machine check that has occurred.

The Directed Use section of this manual contains processor unit log out screens which, under direction of service personnel, can display hardware facilities at the time of machine check occurrences.

MAIN CONSOLE NOT READY DURING POWER UP SEQUENCE

Meaning: The main or primary display console failed to operate at power on.

Recovery: Press the CHG DPLY key on the console that is displaying this message. This action will assign an alternate console as the primary operator console.

MAIN STORAGE DUMP NOT ALLOWED OR WRONG PASSWORD

Meaning: In Problem Analysis Option 4, this message indicates that either the customer has protected his main storage data by disallowing the transmission option, or the entered password was incorrect.

Recovery: Enter the correct password (if this is the problem). If the password is correct, the customer has disallowed any main storage transmission.

MAN

Meaning: This message, Manual (MAN), indicates that the system is in a stopped state.

Recovery: This is an information message; no recovery action is necessary.

MANUAL CONTROL

Meaning: This message indicates that the system is under control of the support processor microcode. In this mode, a Start I/O to the display console is accepted but held pending until the display console is available. On a Start I/O to the display, the alarm sounds and the message SYSTEM MESSAGE WAITING is displayed on line 23.

Recovery: Press the CHG DPLY to return to the operating system.

MATCH STOP

Meaning: The processor has stopped on a specified match condition. If the CSAR is displayed, a clock stop has occurred. If DATA and ADDR are displayed, the MATCH was on an instruction.

Recovery: This is an information message; no recovery action is necessary.

MAX (2048) UCWs EXCEEDED

Meaning: More than 2048 allowable UCWs were assigned. (The maximum number is 2048.)

Recovery: This is an information message; no recovery action is necessary.

MAXIMUM NO. OF CHARS IS 8

Meaning: More than eight characters were specified in a field where the maximum number is eight.

Recovery: Refer to the descriptive text for the specific screen, and specify the valid field length and characters.

MINIMUM NO. OF CHARS IS 4

Meaning: Less than four characters were specified in a field where the minimum number is four.

Recovery: Refer to the descriptive text for the specific screen, and specify the valid field length and characters.

MODE NOT SELECTED

Meaning: An operating mode has not been selected.

Recovery: The mode selected can be either System/370 or 370-XA. Select the proper IML mode on the IML parameter screen (QLI).

MORE

Meaning: The contents of this screen are contained on more than one 20-line screen.

Recovery: To display the continuation of the screen, use the Page Up or the Page Down keys as desired.

MORE ERRORS USE PAGE KEY

Meaning: There are more errors than this screen can display in the ERROR field.

Recovery: Use the Page Up key to display the additional screen contents.

MORE, PRESS ENTER

Meaning: The data to be presented does not fit on a screen.

Recovery: Press the ENTER key again to continue the display of the page on an additional screen.

NAME2 LONGER THAN NAME1

Meaning: The second name specified on the screen is longer than the first name specified.

Recovery: Refer to the screen description of valid fields for the screen, then reenter a NAME2 of valid length.

NATIVE DEVICE ADDR USED

Meaning: The wrong screen was used to assign or remove a locally attached device.

Recovery: Use the Configuration (QFO) screen to change any native device address.

NEW PASSWORD=OLD PASSWORD

Meaning: The new password entered is the same as the old password. The new password defined for future use must be different from the old password.

Recovery: Enter a correct password entry and press ENTER. Remember to manually record the new password since it is not retrievable after ENTER is pressed.

NO AUTO-ANS DCE INSTALLED

Meaning: This message indicates that the remote operator console facility (ROCF) AUTO MODEM selection on the System Configuration screen (QFS) was not selected.

Recovery: Ensure that the AUTO MODEM is installed on the processor and that the Y option is entered on the QFS screen at the selection label.

NO CONVERGENCE FEATURE

Meaning: A color display function was requested from a display unit that does not have color ability, or does not require convergence adjustment.

Recovery: Refer to the description of the screen you are using to determine the limitations of the requested function. Rekey your statement.

NO IML

Meaning: An initial microprogram load (IML) was not executed.

Recovery: Press POWER/IML.

NO PATH FOR IPL UNIT

Meaning: An initial program load has been specified from a device to the processor, but a path to the unit has not been specified.

Recovery: The IOCP must be rerun to define the correct IOCDS to assign a valid data path to the device.

NO SAVED SCREENS

Meaning: The CE log or saved screens area is empty.

Recovery: This is an information message; no recovery action is necessary.

NOT AVAILABLE

Meaning: A function was requested that cannot be performed because it is not available, or there is no room on the mounted diskette.

Recovery: The function cannot be performed; No recovery action necessary.

NOT AVAILABLE, RCS MODE

Meaning: An attempt was made to perform a color convergence operation on the TP console while it is in remote console support mode.

Recovery: Color convergence may not be performed on a console in ROCF mode. The teleprocessing link must be disconnected to do color convergence.

NOT IMLED

Meaning: An IPL was attempted without a prior IML. The cursor is positioned at the end of the entry on the COMMAND line.

Recovery: IML the support processor, and rekey the correct command and parameter.

NOT INSTALLED AS HARDCOPY

Meaning: An attempt was made to assign the COPY KEY to a port that does not have a hard-copy device assigned to it.

Recovery: Rekey the statement.

NOT RSF CONSOLE

Meaning: The specified display console is not a remote support facility (RSF) console.

Recovery: Rekey your statement.

ONE INPUT DEVICE REQUIRED

Meaning: An input device must be assigned for the operation specified.

Recovery: This is an information message; no recovery action is necessary.

OPERATING

Meaning: The processor is operating.

Recovery: This is an information message; no recovery action is necessary.

PAGING KEY IGNORED

Meaning: This message is generated under three conditions:

1. The Page Up or Page Down is not applicable to the function on the screen.
2. The address generated by paging is too high or too low for the selected function.
3. The previous command had a nonpaging error.

Recovery: No recovery action is necessary.

PASSWORD CHANGED PASSWORD DATED - MM/DD/YY

Meaning: The password has been changed, the date indicates the current date.

Recovery: This is an information message, no recovery action is necessary.

PASSWORD CHANGED, RECORD NEW PASSWORD

Meaning: The password has been changed as requested. The message emphasizes the recording of the password since the password is not accessible if it is unknown.

Recovery: This is an information message, no recovery action is necessary.

PASSWORD INCORRECT, RETRY PASSWORD DATED - MM/DD/YY

Meaning: In ROCF, the entered password did not match the current password in the remote system. The date set by the user when the password was last changed is displayed.

Recovery: Enter the correct password for the system being dialed.

PATCH

Meaning: This message is displayed when a patch is being processed.

Recovery: This is an information message; no recovery action is necessary.

PATCH AREA FULL

Meaning: The support system procedure attempted to send a patch to the diskette, but the patch area on the diskette is full.

Recovery: The block and patch function cannot be performed by the customer. The block and patch lists may be displayed, but not modified. Call the service representative.

PORT *x* CONFIG ERROR

Meaning: A device is not specified or is not correctly configured.

Recovery: Refer to the description of the QFO Configuration Screen to determine the requirements of the function requested. Rekey your statement.

POWER INCOMPLETE

Meaning: A function was selected before the power-on sequence of the processor was completed.

Recovery: Press the POWER OFF key and then press the POWER-ON key. Wait for POWER COMPLETE to display, and retry the command.

PRESS CANCEL TO INPUT CMD

Meaning: The processor is in a loop condition.

Recovery: Press the CANCEL key. Rekey the selection at the COMMAND line.

PRESS ENTER TO LOCK

Meaning: This message indicates that pressing ENTER will lock the serial number that has been entered on the QFS screen.

Recovery: This is an information message; no recovery action is necessary.

PRESS ENTER TO SAVE

Meaning: This message indicates that pressing ENTER saves the screen that is displayed. This message step is included to assure that the save command is intentionally entered.

Recovery: If the machine has been IPLed, this function alters storage and then requires a new IPL and IML. A loss of customer data results with execution of this command. If you do not want to execute the command, enter a different command or press the MODE SEL key.

PRINTER HALTED

Meaning: This message indicates that the printer has stopped printing.

Recovery: This message is a printer device status message. To continue operations, ensure that the printer is operational.

PROBLEM ANALYSIS ERROR

Meaning: This message indicates that the Problem Analysis program has encountered a hardware error during the analysis operation.

Recovery: Refer to the *IBM 4381 Processor Problem Analysis Guide*, GA24-3955, for further procedures. If more information is wanted, refer to the 'Problem Analysis (QP) Screens" in the **Programmer/Analyst** section.

PROBLEM ANALYSIS RUNNING

Meaning: This message indicates that the machine is in Problem Analysis mode.

Recovery: This is an information message; no recovery action is necessary.

PROCEED

Meaning: A READ command is in progress. Only at this time can data be entered in the input area. PROCEED is cleared when the READ command is ended by pressing ENTER or CNCL. PROCEED is also ended by a system or selective reset, or by a HALT I/O or HALT DEVICE instruction.

Recovery: This is an information message; no recovery action is necessary.

PRT-BUSY

Meaning: The printer is in manual mode and is busy from a previous COPY KEY request, or from a START I/O from the system. A COPY KEY request is ignored.

Recovery: Press the ENTER key and retry the COPY KEY request again. Press the RESET key, the STOP and START key, and retry the COPY key request. Turn off the printer, then turn it back on, and then retry the COPY key request. If the condition cannot be cleared, call the service representative.

PRT CHECK

Meaning: The printer in manual mode has an unrecoverable error.

Recovery: Press the RESET key.

PRT INTV REQUIRED

Meaning: In manual mode, intervention is required to restore the printer to a ready condition.

Recovery: The printer may be at end-of-forms, or not powered-on, or in Test mode. Also, a COPY key request was made and no device is assigned. Press the RESET key after ensuring that the printer is operational.

PRT/KBD MODE

Meaning: The display console was assigned a common address with a hard-copy printer.

Recovery: Refer to the Program Load screen (QL). This is an information message; no recovery action is necessary.

PRT/KYBD CONS ADDR ERROR

Meaning: The address restrictions associated with printer/keyboard mode have not been met. (See "Console Mode" under "Program Load Screen.") The cursor is positioned to the end of the selection line entry.

Recovery: Rekey the correct command after the last command entered on the COMMAND line. When there are duplicate commands, only the latter is recognized.

PSW UNPREDICTABLE

Meaning: A program reset has made the PSW unpredictable, and has been set to zeros.

Recovery: Display the current PSW to determine whether program execution may continue. If necessary, re-IPL.

PU ALREADY INITIALIZED

Meaning: An attempt was made to use the copy to a channel printer function while the system was in an active IPL. The copy function overlays the existing program in the system. To correctly perform the copy function, the QCLEAR system reset command must be issued. (The system reset commands QNORM and QCLEAR are described in the **Operator** section of this manual in the General Selection screen.)

Recovery: If a copy is desired, enter **QCLEAR** on the COMMAND line and then retry the function.

WARNING: If the machine has been IPLed, a QCLEAR is required; however, customer data can be lost with this selection.

PU IS NOT SOFTSTOPPED

Meaning: The processor must be soft-stopped before the desired function can be performed. If the function is invoked while the machine is running, an attempt is made to *soft stop* the processor. This message appears if the attempt to soft stop was unsuccessful.

Recovery: Press the STOP key to soft stop the processor. Perform the desired function.

PU NOT INITIALIZED

Meaning: The processor is not IMLed. No processor functions can be executed.

Recovery: IML the processor and retry the function.

QCLEAR RESET REQUIRED

Meaning: This message indicates that a requested function requires that the processor not be IPLed, or that the channel printer or a Power Logout (QEW) option was selected when the machine was IPLed.

Recovery: To protect the operator from accidentally overlaying storage, the *copy to line printer* function requires a Clear Reset. If a customer program is running, a Clear Reset ends the program. An IPL is required after a Clear Reset if more programs are to be run.

Warning: Performing a QCLEAR alters storage and requires a subsequent IML and IPL; however, customer data will be lost.

QNORM OR QAN REQUIRED

Meaning: Storage must be accessed to preserve a Compare/Trace setting when a QCLEAR is issued. This is usually done when the machine is in a check-stop state.

Recovery: Perform the QNORM command; the error state is now cleared. Storage can now be accessed.

> **Note:** If the error state has not been cleared, perform the QAN command. All compare/trace settings are cleared. Perform the QCLEAR command to clear the error state. Reenter any required compare/traces that were cleared.

Warning: Performing a QCLEAR alters storage and requires a subsequent IML and IPL; however, customer data is lost.

RC=xxxxxxxx

Meaning: This is an eight-digit reference code (RC) that identifies an error. This reference code is highlighted until the ENTER key is pressed. An additional eight-digit extension code may also be displayed.

Recovery: The reference code is keyed to a specific error condition, and is used in Problem Analysis. This is an information message; no recovery action is necessary.

RCS ALREADY INITIALIZED

Meaning: The remote console support facility has already been initialized.

Recovery: This is an information message, no recovery action is necessary.

REJECTED - BLOCK INVOKED

Meaning: A compare/trace reset was attempted while a compare/trace selection set by a block is active, and in a MATCH-WAIT state.

Recovery: Issue a halt command to the block using the QBH function before you issue an address compare command.

READY PRINTER

Meaning: A print operation was attempted to a channel printer, but the printer or channel was not ready.

Recovery: Make the printer ready and retry the operation.

REENTER SELECTION

Meaning: The selection as entered was not accepted by the processor.

Recovery: Refer to the description of the screen you are using to determine the limitations of the function requested. Rekey your statement.

REMOTE CONSOLE NOT INIT

Meaning: This message indicates that the communication request made on the Communication Request screen (QFC) is not available because the remote console is not initialized.

Recovery: To have the remote console initialized, contact must be made with the other processor.

REMOTE LOGON IN PROGRESS

Meaning: This message indicates that the remote operator console facility (ROCF) is enabled and is processing the LOGON procedures with another processor.

Recovery: When the LOGON procedures complete, the remote processor teleprocessing link is established, and the system is made available. Retry the selection.

REMOTE OPERATOR SUPPORT HAS BEEN INITIALIZED ON CONSOLE Ty, CONSOLE Tx WAS NOT OPERATIONAL

Meaning: In ROCF mode, the remote system console (Tx) (selected from the QFB screen for use during ROCF sessions) was not operational. The remote system has selected an alternate console (Ty) for this ROCF session.

Recovery: This is an informational message. The dialed system recovers by selecting an available console.

REPEATED NEW PASSWORD

Meaning: This message indicates the the new password as entered was incorrect, and that it should be reentered.

Recovery: Rekey the password where indicated.

REPEATED PASSWORD WRONG

Meaning: This message indicates that the password as reentered was incorrect. One attempt at password entry is permitted, then the operation is terminated.

Recovery: Ensure that the password is correct, then reenter.

REQUEST

Meaning: A Request Key (REQ) attention status has been queued because the device was busy.

Recovery: When the current operation completes, the attention status is presented to the channel, and the REQUEST indicator is cleared. A system or selective reset also clears the REQUEST indicator.

ROCF ACTIVE

Meaning: This message indicates that the host system has an active ROCF session in progress through the remote support facility link.

Recovery: This is an information message; no recovery action is necessary.

ROCF LINK DISCONNECTED

Meaning: This message indicates that the current teleprocessing link has been disconnected.

Recovery: This message may be the result of an intentional disconnect, a period of no transmission of data, or the normal completion of the ROCF session.

ROCF MONITOR ACTIVE

Meaning: This message indicates that the ROCF facility is enabled and is waiting for incoming calls from the host system.

Recovery: This is an information message; no recovery action is necessary.

SAVED

Meaning: This display indicates that the information was successfully saved.

Recovery: This is an information message; no recovery action is necessary.

SAVED SCREEN AREA FULL

Meaning: The saved screen area was full when the COPY key was configured to the diskette.

Recovery: If you need to save a screen, erase an existing screen from the saved area or purge the saved area. If the existing saved area cannot be modified, exit from this procedure by entering another command, or pressing the MODE SEL key.

SEC KEY OFF

Meaning: The keyboard is locked; the security key is either removed or is in the locked position. The screen is cleared, except for the operator information area.

Recovery: Turn the security key to the ON position.

SEE ERROR MESSAGE

Meaning: Refer to the ERROR message displayed on this screen.

Recovery: This is an information message; no recovery action is necessary.

SELECTION COMPLETE

Meaning: This message indicates that the selected function was processed successfully.

Recovery: This is an information message; no recovery action is necessary.

SENDING DATA GROUP *xx*

Meaning: This status message indicates that data is being transmitted either to or from the support system. The *xx* field is continually updated with a sequential number to indicate data transfer status.

Recovery: This is an information message; no recovery action is necessary.

SERIAL NOS. DO NOT MATCH

Meaning: The diskette image machine serial number does not match the internal processor serial number.

Recovery: Ensure that the diskette is correct for the processor. If the diskette is correct, run Problem Analysis.

SOFTSTOP REQUIRED

Meaning: An attempt was made to change a device address while the processing unit is in the running state. The cursor is positioned to the end of the selection line entry.

Recovery: Stop the system with the STOP key. With the correct command still entered on the COMMAND line, press the ENTER key.

STAT CHECK

Meaning: The processor state is unreliable.

Recovery: Perform a QCLEAR, QNORMAL or QLM reset function. If this action does not clear the STAT CHECK, a Power-Off and Power-On should be performed. If this does not clear the CHECK, initiate the Problem Analysis program.

STORAGE C/T ACTIVE ON QA_

Meaning: This message indicates that there is an active storage compare/trace.

Recovery: This is an information message; no recovery action is necessary.

SP/PU COMMUNICATIONS FAILURE

Meaning: During IML, the final stages require data to be successfully passed between the support processor and the processing unit. Among other things, this requires channel 0 to be operational. This message means that the IML failed due to an error during this transfer.

Recovery: Re-IML the processor. If the error persists, run the Problem Analysis program.

SUPPORT BUS FAILURE

Meaning: During IML, the processing unit logic reset failed.

Recovery: Retry IML. If the error persists, run the Problem Analysis program.

SYNTAX ERROR

Meaning: An error occurred in the editing fields.

Recovery: The cursor is positioned at the data in error. Key in the correct data and press ENTER.

SYSTEM ERROR

Meaning: An internal error has occurred in the system and a reference code is displayed.

Recovery: Refer to the Problem Analysis procedures.

SYSTEM IS IMLED

Meaning: IN ROCF mode, the system that has been dialed by the operator has been IMLed. A re-IML of this system will alter the present IML status.

Recovery: This is an informational message, no recovery is required.

SYSTEM IS IPLED CURRENT PSW IS *xxxxxxxx xxxxxxxx*

Meaning: The system dialed by the operator has been IPLed. The current program status word (PSW) is *xxxxxxxx xxxxxxxx*. A re-IPL alters this current status.

Recovery: This is an information message; no recovery action is necessary.

SYSTEM IS IPLED MACHINE IS IN A CLOCK STOPPED STATE

Meaning: In ROCF mode, the system that has been dialed by the operator has been IPLed and is in a clock-stopped state at the present time. An IPL of the system will alter this state.

Recovery: This is an information message; no recovery is necessary.

SYSTEM IS IPLED MACHINE IS IN AN ERROR STOPPED STATE

Meaning: In ROCF mode, the system that has been dialed by the operator has been IPLed and is now in an error-stopped state. An IPL of this system will alter this state.

Recovery: This is an information message; no recovery is necessary.

SYSTEM RESET REQD

Meaning: This message appears when you attempt to use the MODE SEL or CHG DPLY key while the system is in a check-stopped state and the console is busy with a system program operation.

Recovery: Perform a Program Reset (PROGR), Clear Reset (CLEAR), or an IPL.

S/370 IML REQUIRED

Meaning: An IML has not been performed in System/370 mode.

Recovery: Using the QLI screen, IML the system in System/370 mode and retry the desired function.

TAPE NOT OPERATIONAL

Meaning: The specified tape drive is not operational.

Recovery: Verify that the correct tape drive is being used and that the control unit and tape drive are operational and ready.

TEST

Meaning: This message indicates that one of the following is active:

- CE Mode Switch set to CE Mode
- Diagnostic Mode
- Compare/Trace
- Check Control
- Operation Rate.

Recovery: This is an information message; no recovery action is necessary.

THE INVALID PASSWORD SECURITY COUNT IS (*xxx*), UNAUTHORIZED ACCESS TO THE REMOTE FACILITY MAY HAVE BEEN ATTEMPTED

Meaning: In ROCF mode, more than ten incorrect passwords were entered from this and previous sessions. The actual number of incorrect passwords replaces the (*xxx*) in the message above. An unauthorized user may have attempted to gain access to the remote system through ROCF. Note that any incorrect password is counted, even if a valid password is entered later.

Recovery: This is an informational message; no recovery is required.

TRACE CONTROLS RESET

Meaning: The system was in a state where storage was not accessible when the clear system reset command was issued. A compare/trace setting was active and could not be preserved by the system reset.

Recovery: Reselect the compare/traces that were active at the time of the system reset.

TRACE/DATA COMP NOT RESET

Meaning: The entered command requires a trace or data compare to be reset, but the processor unit is in clock-stop or machine-check state. The command has turned off the trace or data compare in the hardware, but has not reset the microcode.

Recovery: Perform a system reset, or put the processor in instruction-step stop. Reenter the normal Address Compare function.

USAGE CONFLICT

Meaning: A previous request was not completed. The START, STOP, INTR, MODE SEL, CHG DPLY, SPM/O, or DIAG key was pressed while another display console was already in manual control mode.

Recovery: Press the RESET key to clear the message area. To activate function keys for the display, locate the console that is in manual mode, and press the Change Display (CHG DPLY) key. The function keys are now activated.

USE MODE SEL TO EXIT TEST

Meaning: This message prompts you to press the MODE SEL key to exit from the Console Test Pattern (QFP) screen.

Recovery: This is an information message; no recovery action is necessary.

WAIT

Meaning: The processor is in the WAIT state. Refer to the wait indicator on the operator control panel (OCP) for a more accurate indication of the system WAIT status.

Recovery: This is an information message; no recovery action is necessary.

XA

Meaning: This message indicates that the processor is running in 370-XA mode.

Recovery: This is an information message; no recovery action is necessary.

Input and Output Configuration Program (IOCP) Messages

This message section serves as a reference to the messages for those who use the 4381 Processor I/O Configuration Program (IOCP). The error messages generated by IOCP, the format of the messages, the conditions causing them and the action to be taken are described.

Each message in this section is listed numerically by a three-digit message number corresponding to the message number displayed on the screen. This number is followed directly by a single letter indicating severity of the message, then the text of the message.

Each message description tells in which of the three areas of the screen it is displayed. Next is a brief explanation of the circumstances causing the message to be displayed. The last field of each description indicates what recovery actions (if any) should be taken to correct the situation.

Note: Do not use Problem Analysis to resolve IOCP-generated error messages.

Message Format

IOCP messages are composed in the following manner

nnnt **text**

where:

nnn is the three-digit message number uniquely associated with each message.

t is one of these message types:

R = Response required

I = Informational

W = Warning

E = Error

S = Severe Error

T = Terminal.

text is the text of the message.

The text of a message describes the condition detected by IOCP. Certain messages contain variable data; variable fields are noted in a message as *vvvvv*; note that they are always in *lowercase italics*. The number of characters present in the variable represent how many characters are reserved in that message for the variable, even though all the characters may not be present for any one display of the message.

Examples of variables and their meanings:

cccc	This is the number of the record being processed when IOCP detected the error. This field will only be found and displayed for syntax errors.
nnnn *mmmm*	These represent numeric variables, and may be from one to eight digits in length.
xxxx *yyyy*	These fields will be replaced by character strings and are generally eight characters in length.

Message Display Areas

An IOCP message may be displayed in any one of three different areas on the console screen:

- STATUS MESSAGES
- ERROR MESSAGES
- INFORMATION MESSAGES.

The status and error fields are enclosed with asterisks on the QFOIS screen [see "Start IOCP (QFOIS) Screen" on PRG 48]. The information area is on line 20 of the screen, to the right of the rightmost arrow. The display area used depends on the message being displayed.

When a printer has been assigned for use by the IOCP, many of the error messages will be printed, as well as displayed on the system console. The format of the printed messages is identical to those displayed, except that the printed message precedes the module name that generated the message.

IOCP Message List

001E CLEAR RESET REQUIRED

Display Area: INFORMATION

Meaning: This message displays when the system has been IPLed. You need only to IML the 4381 to run IOCP.

Recovery: Perform a QCLEAR reset so that the system is not in an IPL state. You can now read the IOCP system generation (SYSGEN) records into the 4381 Processor.

002E DISKETTE 2 NOT READY

Display Area: INFORMATION

Meaning: This message displays if the functional 2 diskette is not in drive 2 and ready.

Recovery: Be sure that the functional 2 diskette is in drive 2.

003E INVALID PAGE LENGTH

Display Area: INFORMATION

Meaning: The page length parameter is not between the specified line values of 40 and 160.

Recovery: Enter a valid page length using the QFOID screen.

004E INVALID CHANNEL ADDR

Display Area: INFORMATION

Meaning: The channel address of the input or output device assigned to IOCP is not valid. The processor does not assign an I/O device for IOCP.

Recovery: Key the correct I/O device assignment on the QFOID screen.

005E INVALID DEVICE NUMBR

Display Area: INFORMATION

Meaning: The device number assigned to the IOCP has already been reserved.

Recovery: Assign a correct device for IOCP input or output on the QFOID screen.

006E INVALID HEX CHARACTR

Display Area: INFORMATION

Meaning: IOCP checks for valid hexadecimal I/O device assignments. This message states that the entered data contains invalid hexadecimal characters.

Recovery: Assign the correct device address for IOCP input or output on the QFOID screen.

007E INVALID INPUT

Display Area: INFORMATION

Meaning: You entered an invalid option for the QFOID screen.

Recovery: Check what you entered against the valid options for the QFOID screen and enter the correct option. [See "IOCP Device Address (QFOID) Screen" on PRG 46.]

008E INVALID PRINTER TYPE

Display Area: INFORMATION

Meaning: The printer type you entered on the QFOID screen is not valid in IOCP.

Recovery: Check the printer type you entered against the valid options for the QFOID screen and enter the correct option. [See "IOCP Device Address (QFOID) Screen" on PRG 46.]

009E INVALID PRINTER TRAIN

Display Area: INFORMATION

Meaning: The printer train selection you entered on the QFOID screen is not valid for the selected printer type.

Recovery: Check the printer train you entered against the valid options for the QFOID screen and enter the correct option. [See "IOCP Device Address (QFOID) Screen" on PRG 46.]

010E INVALID FIRST DIGIT

Display Area: INFORMATION

Meaning: The I/O data does not have a valid channel identifier in its address.

Recovery: Enter a valid I/O address with the correct first digit.

011E S370 IML REQUIRED

Display Area: INFORMATION

Meaning: IOCP cannot be run unless the processor is in System/370 mode.

Recovery: IML the processor in System/370 mode. (use QLIW1, then enter M). Do not IPL the processor. Restart IOCP.

012E INVALID PAGE WIDTH

Display Area: INFORMATION

Meaning: The page width selection is an invalid value. IOCP only accepts two values: 72 or 100 characters.

Recovery: Enter a valid page width on the QFOID screen.

013E PU IS NOT INSTR STOP

Display Area: INFORMATION

Meaning: The processor is not in instruction-stop state. Before IOCP can be run, the processor must be instruction-stopped.

Recovery: Put the processor in the instruction-stop state. Restart IOCP.

014E INPUT EQUALS OUTPUT

Display Area: INFORMATION

Meaning: The I/O device you selected has the same address as another I/O device.

Recovery: Key the correct I/O device assignment on the QFOID screen.

015E NOT NORMAL OPER RATE

Display Area: INFORMATION

Meaning: The 4381 Processor is in the instruction-step state; it can only execute one instruction.

Recovery: Key normal mode (N) on the QO screen. Begin IOCP.

018E INVALID MODEL NUMBER

Display Area: INFORMATION

Meaning: The model group number you entered on the QFOID screen is not a valid selection.

Recovery: Key a valid model group number on the QFOID screen.

019E NOT ON TARGET SYSTEM

Display Area: INFORMATION

Meaning: The target model group number selected on the QFOID screen does not equal the model group number of the system IOCP.

Recovery: To save the generated data set, the target model group on the QFOID screen must equal the model group number of the system on which IOCP is running.

020I DATA SET *n* SAVED

Display Area: INFORMATION

Meaning: The support processor has written the generated IOCDS on the diskette as *n*; *n* can be either 0 or 1.

Recovery: This is an information message; no recovery is necessary.

021T IOCP FAILURE

Display Area: STATUS

Meaning: IOCP must respond to the support processor within four minutes. This message states that this time has elapsed, and IOCP must be rerun.

Recovery: Make sure that the I/O is operational. If no hardware problems are detected, an internal IOCP has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

022I IOCP PROGRAM STARTED

Display Area: STATUS

Meaning: IOCP has started processing your input.

Recovery: This is an information message; no recovery necessary.

023I LOADING IOCP PROGRAM

Display Area: STATUS

Meaning: The support processor is now loading the IOCP program into the system.

Recovery: This is an information message; no recovery necessary.

030I DATA SET NOT SAVED

Display Area: INFORMATION

Meaning: You have chosen not to save the the data set generated by IOCP.

Recovery: This is an information message; no recovery necessary.

031R SAVE DATA SET (Y/N)

Display Area: INFORMATION

Meaning: IOCP has generated a data set and you must decide whether or not to save it.

Recovery: To save the data set, enter Y where indicated. If you do not want to save it, enter N where indicated.

032R ENTER KEY - SCROLL/PAGE UP - 1 PAGE

Display Area: STATUS

Meaning: The error message area on the screen is full.

Recovery: Press the Page Up key to display the next page of error messages. To scroll messages, press ENTER.

050T TERMINAL ERROR(S) DETECTED

Display Area: ERROR

Meaning: IOCP has determined that a device or control unit configured to IOCP has invalid status, or cannot be recovered from the error state.

Recovery: IOCP is terminated; contact your local service representative.

051I .... ATTENTION BIT ON

Display Area: ERROR

Meaning: IOCP has detected invalid status from a device.

Recovery: A message defining the device with the invalid ATTENTION request is displayed. Determine the device in error and correct the invalid condition. IOCP is terminated and must be restarted.

052I .... STATUS MODIFIER BIT ON

Display Area: ERROR

Meaning: IOCP detects invalid status from a device.

Recovey: A message defining the device having the invalid STATUS MODIFIER condition is displayed. From these messages, determine the device in error and correct the invalid condition. With this message, IOCP is terminated and must be restarted.

053T PROG. ERR.: CONFLICTING I/O STATUS

Display Area: ERROR

Meaning: The device or control unit you configured for IOCP has changed status during processing.

Recovery: IOCP is terminated; contact your local service representative.

054T DEVICE SENSING WAS UNSUCCESSFUL

Display Area: ERROR

Meaning: The 4381 has received a UNIT CHECK from a device assigned to IOCP and repeated attempts to sense that device have been unsuccessful.

Recovery: IOCP is terminated; contact your local service representative.

055I .... SENSE NORMAL, IOCP CONTINUES

Display Area: ERROR

Meaning: The 4381 has received a UNIT CHECK from an IOCP device and the sense information contains all zero values.

Recovery: IOCP continues to run at the point prior to the UNIT CHECK interruption.

058T DEVICE PROBLEM IS NOT RECOVERABLE

Display Area: ERROR

Meaning: A device assigned to IOCP has a UNIT CHECK condition. The sense information indicates that the malfunction cannot be manually recovered.

Recovery: The device malfunction is displayed in the sense data for the device. IOCP is terminated.

059I ... PROGRAM CONTROL CHECK

Display Area: ERROR

Meaning: A channel you assigned to IOCP contains a PROGRAM CONTROL CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

060I .... INCORRECT LENGTH

Display Area: ERROR

Meaning: A channel or device you assigned to IOCP contains an INCORRECT LENGTH condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

061I .... PROGRAM CHECK

Display Area: ERROR

Meaning: A channel or device you assigned to IOCP contains a PROGRAM CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

062I .... PROTECTION CHECK

Display Area: ERROR

Meaning: A channel or device you assigned to the IOCP contains a PROTECTION CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

063I .... CHANNEL DATA CHECK

Display Area: ERROR

Meaning: A channel you assigned to the IOCP function contains a CHANNEL DATA CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

064I .... CHANNEL CONTROL CHECK

Display Area: ERROR

Meaning: A channel you assigned to the IOCP function contains a CHANNEL CONTROL CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

065I INTERFACE CONTROL CHECK

Display Area: ERROR

Meaning: A channel you assigned to the IOCP function contains an INTERFACE CONTROL CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

066I ... CHAINING CHECK

Display Area: ERROR

Meaning: A channel assigned to the IOCP function contains a CHAINING CHECK condition in the channel status field.

Recovery: IOCP is terminated; contact your local service representative.

091T IOCP PROGRAM CHECK

Display Area: ERROR

Meaning: A PROGRAM CHECK has occurred during IOCP execution.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

092T UNRECOVERABLE MACH CHECK IOCP ENDED

Display Area: ERROR

Meaning: IOCP detected an unrecoverable machine check condition during IOCP execution.

Recovery: IOCP is terminated; contact your local service representative.

093T USER REQUESTED PROGRAM TERMINATION

Display Area: STATUS

Meaning: The operator has pressed the Console Interrupt key; this terminates IOCP.

Recovery: User-initiated termination; there is no recovery.

100T IOCP UNABLE TO CONTINUE

Display Area: STATUS

Meaning: A terminal error has occurred and has been displayed or printed. All processing for this IOCP generation is terminated.

Recovery: Take recovery procedures indicated by other messages.

101I DEVICE *nnnn* CHANNEL STATUS =

Display Area: ERROR

Meaning: An interrupting device contains channel status bits in the channel status word.

Recovery: IOCP is terminated; contact your local service representative.

102I DEVICE *nnnn* INVALID STATUS =

Display Area: ERROR

Meaning: The STATUS of a device at address *nnnn* contains invalid status bits.

Recovery: IOCP is terminated; contact your local service representative.

103I DEVICE *nnnn* UNIT CHECK

Display Area: ERROR

Meaning: A UNIT CHECK has occurred at device address *nnnn*

Recovery: In addition to this message, other IOCP messages applying to this malfunction are displayed. Depending on the problem, IOCP may be terminated, or it may wait for you to intervene to continue the operation.

104T DEVICE *nnnn* IS NOT OPERATIONAL

Display Area: ERROR

Meaning: IOCP has detected that device at address *nnnn* is not operational.

Recovery: IOCP is terminated. Correct the state of the device and restart IOCP.

1051 DEVICE *nnnn* SENSE DATA =

Display Area: ERROR

Meaning: The device at address *nnnn* went through a UNIT CHECK and has returned sense data.

Recovery: The sense data returned by the device is displayed in hexadecimal. IOCP is terminated.

1061 DEVICE *nnnn* INTERVENTION REQUIRED

Display Area: ERROR

Meaning: The device at address *nnnn* went through a UNIT CHECK and has returned sense data.

Recovery: Other explanatory messages are displayed. IOCP waits for the operator to correct this device problem, then the IOCP continues.

1071 DEVICE *nnnn* EQUIPMENT CHECK

Display Area: ERROR

Meaning: The device at address *nnnn* went through a UNIT CHECK and has returned sense data. IOCP has determined that the operator may be able to correct the EQUIPMENT CHECK.

Recovery: Other explanatory messages are displayed. IOCP waits for the operator to correct the device problem, then IOCP continues.

1081 DEVICE *nnnn* READIED

Display Area: STATUS

Meaning: IOCP has received an interrupt from device *nnnn*, which previously required operator intervention.

Recovery: If the condition that caused the UNIT CHECK on device *nnnn* has been corrected, IOCP will continue to operate. The operator can terminate IOCP by using the Console Interrupt key if the problem cannot be corrected.

1101 *nnnnnnnn nnnnnnnn nnnnnnnn*

Display Area: ERROR

Meaning: This is the sense data returned by a device that just went through a UNIT CHECK. IOCP displays this message in 24 hexadecimal digits.

Recovery: Other messages are displayed that apply to this malfunction. You can take appropriate recovery procedures from the device address and sense information displayed in the sequence of messages. Depending on the problem, IOCP may be terminated, or it may wait for you to intervene. If you intervene, IOCP continues.

111T DEVICE *nnnn* UNRECOVERABLE DATA CHK

Display Area: ERROR

Meaning: A data check has occurred and the error recovery procedure has failed.

Recovery: This is an unrecoverable error and IOCP is terminated. Clean the input tape and retry the operation. If the error persists, you must generate a new input file.

150T INVALID 1403 PRINT TRAIN

Display Area: ERROR

Meaning: An invalid or unsupported 1403 printing element has been specified on the QFOID screen.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

151T INVALID 3203 PRINT TRAIN

Display Area: ERROR

Meaning: An invalid or unsupported 3203 printing element was specified on the QFOID screen.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

152T INVALID 3211 PRINT TRAIN

Display Area: ERROR

Meaning: An invalid or unsupported 3211 print train element was specified on the QFOID screen.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

153T INVALID PRINTER TYPE

Display Area: ERROR

Meaning: An invalid or unsupported printer type was specified on the QFOID screen.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

200S ERROR READING INPUT

Display Area: ERROR

Meaning: IOCP has encountered an error while reading the source input record data set.

Recovery: IOCP is terminated. Refer to message number 301I. Using message number 301I, check the source input record data set for invalid input. Restart the IOCP operation by reloading the source input record data set in the IOCP assigned reader device.

300E *cccc* **INVALID VERB:** *xxxxxxxx*

Display Area: ERROR

Meaning: An unrecognizable macro, *xxxxxxxx*, was found in the input data set record number *cccc*. This often happens when previously unknown SYSGEN macros and control statements are encountered in the input.

Recovery: Review the input data record set for incorrect macro specifications and, if necessary, correct and resubmit the input for processing.

301I *nnnn* **RECORDS READ**

Display Area: STATUS

Meaning: This message helps you determine errors by supplying a count of the valid input data records read from the input record data set.

Recovery: This is an information message; no recovery necessary.

305E *cccc* **IODEVICE INVALID PARM** *mmmmmmmm*

Display Area: ERROR

Meaning: A parameter *mmmmmmmm* that is not known to the IODEVICE macro was found on an IODEVICE card; *cccc* is the number of the record that had the bad IODEVICE parameter.

Recovery: Review the input record data set for valid parameter specification and, if necessary, resubmit for processing.

314E *cccc* **NO PARMS FOUND ON DEVICE VERB**

Display Area: ERROR

Meaning: An IODEVICE macro card was processed, but it did not specify any parameters; *cccc* is the record number where IOCP detected the error.

Recovery: Review the input record data set for valid parameter specification and, if necessary, resubmit for processing.

315I PROCESSING STARTED

Display Area: STATUS

Meaning: This message tells you that the IOCP input has been completely "read" and that the syntax check and path validation has started. If a hard-copy printer is available, reports have been printed.

Recovery: This is an information message; no recovery necessary.

355T SCAN CURSOR EXCEEDED CARD END

Display Area: ERROR

Meaning: Due to an internal error, the cursor used for scanning input records has exceeded the end of a single record.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

405E *cccc xxxxxx* **INVALID PARM** *yyyyyy*

Display Area: ERROR

Meaning: An invalid parameter *yyyyyy* has been specified for the verb *xxxxxx* at input record *cccc*. If the parameter value is in error, IOCP assumes a default value appropriate for that parameter. If the parameter name specified is invalid, IOCP ignores the statement. IOCP then continues processing the source input record data set, starting with the next record that contains a valid verb.

Recovery: If necessary, correct the parameter term in the source input record data set and resubmit for processing.

406W *cccc* **PATH NOT SUPPORTED, IGNORED**

Display Area: ERROR

Meaning: IOCP has detected a PATH= parameter on an IODEVICE input data record.

Recovery: Preferred path processing is not supported on the 4381 Processor. This message is for your information only; no recovery is necessary.

407E *cccc* **DEV #***mmmm* **PREVIOUSLY DEFINED**

Display Area: ERROR

Meaning: An IODEVICE entry was found that had the same device number as a previous IODEVICE. This device was found on record *cccc* and the device number is *mmmm*.

Recovery: IOCP continues, using the first IODEVICE entry with the device number assigned and ignoring all others. Make sure that you selected the proper value.

408E *cccc* **CNTLUNIT DUAL RANGES** *yyyyyyyy*

Display Area: ERROR

Meaning: The CNTLUNIT macro contains overlapping device number ranges in the *yyyyyyyy* parameter on input record *cccc*.

Recovery: IOCP ignores the statement specifying this parameter and continues processing the input record data set, starting with the next statement containing a valid parameter. Supply the proper parameters and, if necessary, restart IOCP.

409E *cccc xxxxx* **CH 5 MODE MIX** *yyyy*

Display Area: ERROR

Meaning: IOCP has detected a mixture of byte and block mode specifications on channel 5 on input record number *cccc* of the *xxxxx* macro statement for the *yyyy* parameter.

Recovery: Supply the proper mode specification and, if necessary, resubmit the deck for processing.

415E *cccc xxxxxx* **MISSING PARM** *yyyyyy*

Display Area: ERROR

Meaning: The IOCP function has detected that the source input did not supply the parameter *yyyyyy* for verb *xxxxxx* at input record *cccc*. IOCP continues, but the resulting IOCDS will contain incomplete specifications.

Recovery: Correct the input record data set and restart IOCP.

419E NATIVE DEV ADDR *nnnn* **IS RESERVED**

Display Area: ERROR

Meaning: A native device with a unit address other than 00F2, 00F3, 00F4, 00F5 or 00FF was defined. Device number *nnnn* is invalidated.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the input data record set.

420W *cccc xxxxx yyyyy* **MISSING PAREN**

Display Area: ERROR

Meaning: IOCP expected parentheses on *yyyyy* at input record *cccc* or verb *xxxxx*, but parentheses were not detected.

Recovery: Review the input record data set for the missing parentheses and, if necessary, resubmit the input record data set for processing.

421W *cccc* **I/O DEVICE "TIMEOUT=N" IGNORED**

Display Area: ERROR

Meaning: IOCP processed an I/O device verb on input record *cccc*, and an attempt was made to disable the device timeout. This parameter is ignored on the 4381 Processor.

Recovery: This parameter is ignored on the 4381 Processor. This is an information message; no recovery necessary.

422E *cccc* **ADDRESS + CNT EXCEEDS X'FF'**

Display Area: ERROR

Meaning: The IOCP function processed an I/O device verb at input record *cccc* on which an initial address and number of desired devices were specified, in a combination that would cause the resulting generated address to exceed the physical maximum unit address of X'FF'.

Recovery: Devices are generated up through address X'FF' and processing continues. This message is for information only, no recovery is necessary.

423E *cccc* **UNITADD SUPERSEDED BY DEVNUMBR**

Display Area: ERROR

Meaning: An IODEVICE macro at input record *cccc* was found to contain both a UNITADD and a DEVNUMBR parameter. These parameters are mutually exclusive; the UNITADD parameter will be ignored. Processing continues with the DEVNUMBR parameter.

Recovery: Review the input record data set for valid parameter specification and, if necessary, resubmit it for processing.

424E *cccc* **DUPLICATE DEVICE PARM** *mmmmmmmm*

Display Area: ERROR

Meaning: An IODEVICE macro at input record *cccc* was found to contain more than one occurrence of the same parameter specification *mmmmmmmm*.

Recovery: Review the input record data set for valid parameter specification and, if necessary, resubmit it for processing.

425E *cccc* **DUPLICATE CU #***nnn*

Display Area: ERROR

Meaning: An IODEVICE macro at input record *cccc* was processed and found to specify the same control unit *nnn* more than once in the CUNUMBR argument. The second, or later occurrences of this control unit will be ignored.

Recovery: Review the input record data set for valid argument specification and, if necessary, resubmit it for processing.

426W *cccc* **DEV NUMBER WRAPPED TO '0000'X**

Display Area: ERROR

Meaning: An IODEVICE macro at input record *cccc* was processed, which caused the device number to be incremented past 'FFFF'. The next device number generated was '0000'. If the count field specified that more devices are to be generated from this macro, the next device number after '0000' will be '0001', and so forth.

Recovery: Review the input record data set for valid specification and, if necessary, resubmit it for processing.

427E *cccc* **TOO MANY CHARACTERS FOR A CU**

Display Area: ERROR

Meaning: An IODEVICE macro at input record *cccc* was processed and the CUNUMBR section was found to contain a series of four or more characters where a control unit specification should have been. Because control units are specified by at most three characters, this cannot be a control unit. Scanning of the CUNUMBR is halted, and only those control units that were specified before this error are retained. Processing of any remaining parameters on this card continues.

Recovery: Review the input record data set for valid argument specification and, if necessary, resubmit it for processing.

430I *cccc* **CNTLUNIT 2ND** *xxxxxxxx* **IGNORED**

Display Area: ERROR

Meaning: Parameter *xxxxxxxx* on a CNTLUNIT data record at *cccc* has been defined more than once.

Recovery: IOCP accepts the first valid parameter entry; the second is ignored. Make sure that you selected the proper value.

431I *cccc* **CNTLUNIT XTRA TEXT W/** *xxxxxxxx*

Display Area: ERROR

Meaning: Parameter *xxxxxxxx* on a CNTLUNIT data record at *cccc* has data specified beyond the valid value field.

Recovery: IOCP processes all data within the valid value field; all other data is ignored. Make sure you selected the proper value.

432E *cccc* **CNTLUNIT PREVIOUSLY SPECIFIED**

Display Area: ERROR

Meaning: The control unit specified at input record *cccc* has already been specified on a previous data record.

Recovery: IOCP accepts the first valid input record for the control unit; all others are ignored. Make sure you selected the proper value.

433E *cccc* **CNTLUNIT CARDS EXCEED 256**

Display Area: ERROR

Meaning: More than the maximum number of control units have been specified at input record *cccc*.

Recovery: IOCP flags all subsequent control unit data records. Remove any additional control unit data records and, if necessary, resubmit for processing.

434E *cccc* **UNITADD + CNT EXCEEDS X'FF'**

Display Area: ERROR

Meaning: An invalid unit address has been defined; this resulted in a unit address greater than the maximum acceptable X'FF'.

Recovery: IOCP flags the UNITADD parameter as invalid, and IOCP does not process the specified control unit. Make sure you assigned the proper UNITADD value, and if necessary, resubmit the data record.

443E *cccc* **NMBR OF IODEVICES EXCEEDS 2048**

Display Area: ERROR

Meaning: More than 2048 devices were specified by the input record. Only 2048 devices are allowed.

Recovery: Processing continues with IOCP using only the first 2048 device definitions. Review the input record data set for the correct number of device assignments and, if necessary, resubmit it for processing.

480T UNABLE TO BUILD DATA SET

Display Area: ERROR

Meaning: IOCP is unable to generate an IOCDS on the support processor storage due to previously reported errors that occurred during data set generation.

Recovery: If possible, correct the "flagged" errors and resubmit the input record data set.

499I NO ERRORS DETECTED

Display Area: PRINTER ASSIGNED FOR IOCP

Meaning: IOCP detected no errors during syntax checking and path validation. This message appears only on the hard-copy printer assigned to IOCP.

Recovery: This is an information message; no recovery necessary.

500R GOOD COMPLETION, SAVE DATA SET?

Display Area: STATUS

Meaning: IOCP detected no errors during input processing.

Recovery: You can now transfer the IOCDS from the support processor to the diskette. IOCP waits for your action.

501R ERRORS DETECTED, SAVE DATA SET?

Display Area: STATUS

Meaning: IOCP detected errors during processing, but continues to store the IOCDs in support processor storage.

Recovery: IOCP will ask you if you want to save the data set. Examine the error messages and available configuration reports to make sure that the data set in support processor storage is valid.

502S EMPTY DATA SET, CANNOT BE SAVED

Display Area: STATUS

Meaning: IOCP has detected severe errors during processing. The resulting data set either has no valid control units or I/O devices specified, or a portion of the data set is empty or null.

Recovery: IOCP is terminated. You must correct the input data records and resubmit them for processing.

504T DATA SET CANNOT BE SAVED

Display Area: STATUS

Meaning: A severe error has occurred during path validation, and as a result, the data set cannot be saved.

Recovery: Review the input data set to determine the cause of the severe errors. Then correct the input data set and resubmit it for processing.

550E *cccc* **ZERO LENGTH ARGUMENT**

Display Area: ERROR

Meaning: A parameter specified an argument with the *equal to* sign (=), but IOCP found no argument. IOCP continues processing without an argument for this parameter; *cccc* is the record number where IOCP detected the error.

Recovery: Review the input data set record for valid argument assignment and, if necessary, resubmit the data set for processing.

551W *cccc* **WARNING: PARM** *mmmmmmmm* **HAS NO ARGUMENT**

Display Area: ERROR

Meaning: IOCP detected a parameter that did not specify an argument. IOCP continues processing without an argument for this parameter; *cccc* is the record number where IOCP detected the error; *mmmmmmmm* is the parameter with no argument.

Recovery: Review the input data set record for valid argument assignment and, if necessary, resubmit the data set.

552E *cccc* **UNCLOSED QUOTE OR PAREN**

Display Area: ERROR

Meaning: An opening quote or parenthesis was not closed before the logical end of record; *cccc* is the record number where IOCP detected the error.

Recovery: Review the input data set record for valid argument assignment and, if necessary, resubmit the data set.

553E *cccc* **TOO MANY RIGHT PARENTHESES**

Display Area: ERROR

Meaning: IOCP detected too many closing parentheses for the number of opening parentheses specified. IOCP terminates scanning the record; *cccc* is the record number where IOCP detected the error.

Recovery: Review the input data set record for valid argument assignment and, if necessary, resubmit the data set.

554E *cccc* **UNCLOSED LEFT PARENTHESIS**

Display Area: ERROR

Meaning: An argument was ended before all opening parentheses were closed. IOCP terminates scanning; *cccc* is the record number where IOCP detected the error.

Recovery: Review the input data set record for valid argument assignment and, if necessary, resubmit the data set.

555E *cccc* **UNEXPECTED END OF SOURCE**

Display Area: ERROR

Meaning: IOCP could not find a record following continuation specification; *cccc* is the record number with the continuation character.

Recovery: Review the input data set for proper continuation specification and, if necessary, resubmit the data set.

556E *cccc* **PARAMETER HAS ZERO LENGTH**

Display Area: ERROR

Meaning: IOCP has detected a parameter with zero length (successive commas). Scanning continues; *cccc* is the record number where IOCP detected the condition

Recovery: Review the input data set record for valid parameter specification and, if necessary, resubmit the data set.

557W *cccc* **PARM TRUNCATED TO 8 CHARS**

Display Area: ERROR

Meaning: IOCP detected a parameter containing more than eight characters. IOCP continues scanning, using only the first eight characters; *cccc* is the record number where the error was detected.

Recovery: Review the input data set record for valid parameter specification and, if necessary, resubmit the data set.

558W *cccc* **DANGLING COMMA FOUND**

Display Area: ERROR

Meaning: The last character in the parameter list was a comma. This condition may indicate a missing parameter; *cccc* is the record number where the error was detected.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the data set.

559E *cccc* **TOO MANY CONTINUATION CARDS**

Display Area: ERROR

Meaning: IOCP allows you to code only ten continuation records per statement. IOCP processes a maximum of eleven records for each statement. Processing of the next statement starts with the next non-continuation record; *cccc* is the record number of the current statement.

Recovery: Review the input data set for valid continuation specification and, if necessary, resubmit the data set.

560E *cccc* **ARGUMENT LENGTH OVER 720 CHARS**

Display Area: ERROR

Meaning: An argument on a parameter exceeded 720 characters. IOCP will process the first 720 characters, then continue scanning; *cccc* is the record number.

Recovery: Review the input data set record for valid argument assignment and, if necessary, resubmit the data set.

561W *cccc* **ONLY FIRST TEN PARMS SCANNED**

Display Area: ERROR

Meaning: IOCP encountered a statement with more than ten parameters. IOCP continues to scan, using the first ten parameters; the remaining parameters are ignored; *cccc* is the record number.

Recovery: Review the input data set record for the proper number of parameters and, if necessary, resubmit the data set.

562E *cccc* **INVALID CONTINUATION CARD**

Display Area: ERROR

Meaning: IOCP found a record that contained a continuation character, but the record text did not extend to column 71 and the record text did not end with a comma. IOCP will not treat this record as a continuation record. IOCP treats the next record as the start of a new statement; *cccc* is the record number.

Recovery: Review the input data set record for proper continuation specification and, if necessary, resubmit the data set.

602E **CHPID** *nn* **IS MULTIPLY DEFINED**

Display Area: ERROR

Meaning: IOCP detected a CHPID number *nn* that was repeated in the input record data set.

Recovery: IOCP uses the parameters of the first definition found for this CHPID. Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

603E **CU '***nnn***' BAD PROTOCL FOR BYTE CHAN**

Display Area: ERROR

Meaning: A BYTE CHPID was found in the input record data set on a control unit that is not specified as PROTOCL=S.

Recovery: IOCP invalidates the control unit. Examine the error messages and any available configuration reports to ensure that the data set in support processor storage valid.

604E CHPID *nn* IS NOT ALONE ON CU '*mmm*'

Display Area: ERROR

Meaning: IOCP has detected CHPID 00 or CHPID 05 in byte mode that was specified on a control unit with other CHPIDs; *nn* is the CHPID and *mmm* is the control unit number.

Recovery: IOCP invalidates the control unit. Examine the error messages and any avaliable configuration reports to ensure that the data set in support processor storage is valid.

605E BLOCK/BYTE MISMATCH ON CU '*nnn*'

Display Area: ERROR

Meaning: IOCP has detected that all CHPIDs in a control unit entry were not specified as all block or all byte; *nnn* is the control unit number.

Recovery: IOCP invalidates the control unit. Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

606T DEV *nn* ALREADY HAS 256 CUS: CU '*mmm*'

Display Area: ERROR

Meaning: IOCP has detected that more than 256 control units have specified a unit address of *nn*; *mmm* is the control unit number of the 257th control unit specified at unit address *nn*.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

607W WARNING: CHPID *nn* IS UNREFERENCED

Display Area: ERROR

Meaning: CHPID *nn* was defined, but never referenced by a control unit.

Recovery: This message is for information only; no recovery necessary.

608T PROTOCOL '*nnnn*'X BAD FOR CU #*mmmm*

Display Area: ERROR

Meaning: The protocol field for CU entry number *mmmm* was neither '0001'X nor '0002'X. Its value was '*nnnn*'X.

Recovery: An internal IOCP failure has occurred, there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

609T NO CHPIDS FOUND ON CU #*nnnn*

Display Area: ERROR

Meaning: A control unit entry did not specify any CHPIDs. *nnnn* is the number of the control unit entry.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

610E UNKNOWN CHPID *nn* ON CU '*mmm*'

Display Area: ERROR

Meaning: The control unit entry for control unit number *mmm* has specified an unknown CHPID number *nn*. IOCP invalidates this CHPID. If all the CHPIDs on this control unit are invalidated, IOCP invalidates the control unit.

Recovery: Examine the error messages and available configuration reports to ensure that the data set in support processor storage is valid.

611T CU OF '*nnnnnn*'X IS BAD FOR CU #*mmmm*

Display Area: ERROR

Meaning: The control unit number field in the control unit pool table is in error; '*nnnnnn*'X is the hexadecimal value of the control unit number field in error; *mmmm* is the entry number with this value.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

612T VPM OF '*nn*'X IS BAD FOR CU #*mmmm*

Display Area: ERROR

Meaning: The VPM field on a control unit pool entry is in error; '*nn*'X is the hexadecimal value of the VPM field and *mmmm* is the number of the control unit pool entry.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

613T BAD CHPID REF '*nnnn*'X ON CU #*mmmm*

Display Area: ERROR

Meaning: A CHPID field on a control unit pool entry is invalid; '*nnnn*'X is the invalid hex value of the CHPID field and *mmmm* is the number of the control unit pool entry.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

614T BAD CHPID REF *nnnn* ON CU #*mmmm-ss*

Display Area: ERROR

Meaning: A CHPID field on a control unit pool entry points beyond the end of the CHPID table; *nnnn* is the value of the CHPID field and *mmmm* is the number of the control unit pool entry; *ss* indicates which of the four CHPID fields had this reference.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

615T BAD VAL OF *'nnnn'*X FOR CHPID *#mmmm*

Display Area: ERROR

Meaning: A CHPID field specified a CHPID with a value that doesn't match the corresponding entry in the CHPID table; *'nnnn'*X is the hexadecimal value of the invalid CHPID table entry and *mmmm* is the entry number in the CHPID table.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

616T LOGICAL ENTRY MISSING FOR CU *#mmmm*

Display Area: ERROR

Meaning: IOCP could not find the control unit pool entry *mmmm*.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

617T BAD VAL *'nnnn'*X IN UL: CU=*mmmm #sss*

Display Area: ERROR

Meaning: IOCP found an invalid value in the unit list: *'nnnn'*X is the hexadecimal value of the invalid unit in the list; *mmmm* is the number of the control unit pool entry; *sss* is the number of the entry in the unit list.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

618T BAD TABLE LEN. OF *nnnn* FOR CU=*mmmm*

Display Area: ERROR

Meaning: The length specified for the unit list table is invalid; *nnnn* is the invalid length specified and *mmmm* is the number of the control unit pool entry.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

619T USP IN ERROR ON CU *#nnnn*

Display Area: ERROR

Meaning: IOCP found the unit-string pointer of a control unit pool entry uninitialized; *nnnn* is the number of the control unit pool entry.

Recovery: An internal IOCP failure has occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

620T BAD REF TO CU=*nnnn* FROM SUBC *#mmmm*

Display Area: ERROR

Meaning: A reference to an out of range control unit entry was made from an entry in device pool entry; *nnnn* is the out of range reference and *mmmm* is the number of the device pool entry.

Recovery: An internal IOCP failure occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

621E DEVICE *nnnn* SPECIFIES CU '*mmm*', BUT CU DOES NOT SPECIFY DEVICE

Display Area: ERROR

Meaning: A device specifies a control unit, but the control unit does not specify that device in its list of units; *nnnn* is the device number and *mmm* is the number of the specified control unit. This control unit will not be connected to this I/O device.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

622E MORE THAN 4 CHPIDS ON *nnnn*: CU '*mmm*'

Display Area: ERROR

Meaning: More than four CHPIDS are specified for device *nnnn* with *mmm* being the control unit number that specified the additional CHPIDs. All CHPIDs from control unit *mmm* will be ignored.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

623T BAD UNIT '*nnnn*'X ON SUBCTBL #*mmmm*

Display Area: ERROR

Meaning: The unit address field on a device pool entry is invalid. '*nnnn*'X is the hexadecimal value of the invalid unit address field and *mmmm* is the number of the device pool entry. IOCP is halted.

Recovery: An internal IOCP failure occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

624E PROTOCOL MISMATCH FOR DEVICE *nnnn*

Display Area: ERROR

Meaning: A device has several control unit entries, but the control units do not specify the same protocol. IOCP uses only those control units that match the first valid control unit's characteristics; *nnnn* is the device number.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

625E UNITADD '*nn*' ON CU '*mmm*' NOT DEFINED

Display Area: ERROR

Meaning: A control unit specified a unit address *nn* that was not defined; *mmm* is the control unit number.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

627T CU SEQ '*nn*'X IS BAD ON SUBC #*mmmm*

Display Area: ERROR

Meaning: A device pool entry contains an invalid sequence of valid control units. '*nn*'X is the hexadecimal value of the invalid sequence and *mmmm* is the number of the device pool entry.

Recovery: An internal IOCP failure occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

628E CU '*nnn*' SPECIFIES UNITADD *mm*, BUT UNITADD DOES NOT SPECIFY CU

Display Area: ERROR

Meaning: A control unit *nnn* specified a unit address *mm*, but no devices with that unit address specify this control unit.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

629E CU TYPE MISMATCH ON DEVICE *mmmm*

Display Area: ERROR

Meaning: The control units on an I/O device entry were not matched as all byte or all block multiplex. IOCP uses only the control units that match the first valid control unit's characteristics; *mmmm* is the device number.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

630E MULTIPLE REFERENCES TO UNITADD *nn*: FROM CHANNEL *mm*; CHPID *ss* ON CONTROL UNIT '*ttt*' ON DEVICE *rrrr*

Display Area: ERROR

Meaning: Duplicate device address were found on a channel path; *nn* is the unit address of the device; *ss* is the CHPID; and *mm* is the channel that corresponds to it. *ttt* is the control unit specifying CHPID *ss*, and *rrrr* is the device number. IOCP ignores the CHPID for this IODEVICE entry and all other CHPIDs on control unit '*ttt*'.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

631T DEV '*nnnnnnnn*'X IS BAD: SUBC #*mmmm*

Display Area: ERROR

Meaning: The device number field of a device pool entry contains invalid characters; '*nnnnnnnn*'X is the hexadecimal value of the invalid field and *mmmm* is the number of the device pool entry field.

Recovery: An internal IOCP failure occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

632E UNKNOWN CU '*nnn*' ON DEVICE *mmmm*

Display Area: ERROR

Meaning: A device entry specified an undefined control unit; '*nnn*' is the number of the missing control unit and *mmmm* is the device number. IOCP ignores this control unit entry.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

633W WARNING: CU '*nnn*' IS UNREFERENCED

Display Area: ERROR

Meaning: A control unit *nnn* was defined that was not referenced by any device entry.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

634W WARNING: DEVICE #00FF NOT DEFINED

Display Area: ERROR

Meaning: The unit address 'FF' was not defined on channel zero. It must be defined if 00F2, 00F3, 00F4 or 00F5 are defined for native consoles.

Recovery: This message is for information only; no recovery necessary.

635W WARNING: NO CONSOLES ARE DEFINED

Display Area: ERROR

Meaning: A console has not been defined. One of these addresses (00F2, 00F3, 00F4 or 00F5) on channel zero must be assigned if the native console devices are to be used.

Recovery: This message is for information only; no recovery necessary.

636E CHPID *nn* IS NOT ALONE ON DEV #*mmmm*

Display Area: ERROR

Meaning: A CHPID representing byte channel 0 (or 5 if assigned) is not the only CHPID specified on an IODEVICE entry; *mmmm* is the number of the input record where the error was detected. IOCP will ignore this CHPID.

Recovery: Examine the error messages and any available configuration reports to ensure that the data set in support processor storage is valid.

637E IGNORING CHPID *nn* ON DEVICE #*mmmm*

Display Area: ERROR

Meaning: A CHPID representing byte channel 0 (or channel 5 if assigned) was already assigned as the first CHPID on an IODEVICE entry. This CHPID should be the only one assigned; IOCP will ignore all other CHPIDs; *nn* is the CHPID that IOCP will ignore, and *mmmm* is the device number where the error was found.

Recovery: This message is for information only; no recovery necessary.

638E BLOCK/BYTE MISMATCH ON DEV #*mmmm*

Display Area: ERROR

Meaning: Both BLOCK and BYTE CHPIDs are specified on device *mmmm*. IOCP will only use the CHPID that matches the first valid control unit's CHPID type.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the data set for processing.

639E WRONG CU TYPE FOR NATIVE DEV *nnnn*

Display Area: ERROR

Meaning: A native device was defined on other than a type-2 control unit; *nnnn* is the device number where the error was found. The device is deleted.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the data set for processing.

640E CU '*nnn*' USE IS RESERVED; DEV *mmmm*

Display Area: ERROR

Meaning: A non-native device was assigned to a control unit previously assigned as a native device control unit; *nnn* is the control unit number and *mmmm* is the device number. IOCP ignores the control unit for this device.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the data set for processing.

641E NATIVE DEV *nnnn* NOT ON CU '*mmm*'

Display Area: ERROR

Meaning: A native device assignment was found on a different control unit from one previously assigned for native devices; *nnnn* is the device number of the invalid native device. The device is deleted.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the data set for processing.

642E CU '*nnn*' ALREADY USED, NATIVE DEV *mmmm*

Display Area: ERROR

Meaning: A native device was assigned to a control unit that was previously assigned as a non-native device control unit; *nnn* is the control unit number and *mmmm* is the device number. The device is deleted.

Recovery: Review the input record data set for valid parameter assignment and, if necessary, resubmit the data set for processing.

643S DEV #00FF NOT DEFINED WITH CONSOLES

Display Area: ERROR

Meaning: Although consoles were defined, a unit address of 'FF' was not defined on channel zero.

Recovery: IOCP continues processing and will report any other errors, but will not permit the user to save the data set. Correct the input record data set and rerun IOCP.

700T MEMORY OVERFLOW!

Display Area: ERROR

Meaning: More memory was needed than was allocated for logical control unit group processing.

Recovery: An internal IOCP failure has occurred; there is no user error recovery procedure. IOCP is terminated; contact your local service representative.

701T LCU *nnnn* HAS OVER 256 DEVICES; DEV *mmmm*

Display Area: ERROR

Meaning: More than 256 devices were assigned to logical control unit group *nnnn*. Device number *mmmm* was the 257th device that was attempted to be added to the group.

Recovery: An internal IOCP failure has occurred; there is no user error recovery procedure. IOCP is terminated; contact your local service representative.

702T OVER 2048 LCU'S DETECTED

Display Area: ERROR

Meaning: More than 2048 logical control unit groups were generated.

Recovery: An internal IOCP failure has occurred; there is no user error recovery procedure. IOCP is terminated; contact your local service representative.

800I CHPID SUMMARY REPORT STARTED

Display Area: STATUS

Meaning: The channel path identifier report is printing on the IOCP assigned printer.

Recovery: This is an information message; no recovery necessary.

801I DEVICE I/O CONFIG. REPORT STARTED

Display Area: STATUS

Meaning: The input/output configuration report is printing on the IOCP assigned printer.

Recovery: This is an information message; no recovery necessary.

802I CHPID CONFIGURATION REPORT STARTED

Display Area: STATUS

Meaning: The channel path ID configuration report is printing on the IOCP assigned printer.

Recovery: This is an information message; no recovery necessary.

804T PRINTER IS NOT OPERATIONAL

Display Area: ERROR

Meaning: The IOCP assigned printer is not in operation.

Recovery: IOCP is terminated. You must clear the cause of the non-operational status at the printer, reload the input data records, and have the printer made ready before you can restart IOCP.

810I INPUT IMAGE REPORT STARTED

Display Area: STATUS

Meaning: IOCP displays this message when the program begins to compile the configuration report.

Recovery: This is an information message; no recovery necessary.

811I LOGICAL CONTROL UNIT REPORT STARTED

Display Area: STATUS

Meaning: The logical control unit report is printing on the IOCP assigned printer.

Recovery: This is an information message; no recovery necessary.

900I PAGE NUMBER *nnnn* IS NOW PRINTING

Display Area: STATUS

Meaning: This message tells you the page number *nnnn* of the report that is currently being printed. It is displayed for each five pages of the report.

Recovery: This is an information message; no recovery necessary.

999I UNKNOWN MSG #'*nnn*'

Display Area: STATUS

Meaning: An invalid message number *nnn* has been passed to the IOCP message handler.

Recovery: An internal IOCP failure occurred; there is no user-recovery procedure. IOCP is terminated; contact your local service representative.

Index

abbreviations xiv
activating blocks DIR 4
activating patches DIR 7
address
  adjust PRG 64
  compare screen PRG 78
  compare trace screen PRG 80
  field, system status OPR 57
ALPHA, system status OPR 62
alphabet and number keys OPR 19
ALT key OPR 20
alter iml parameters screen OPR 71, PRG 14
assigning
  byte multiplexer channels PRG 25
  console mode controls PRG 25
  console ports PRG 26
  copy key device PRG 25
  power on control fields PRG 25
audible alarm
  volume control, 3278 OPR 12
  volume control, 3279 OPR 14

back tab key OPR 21
backspace key OPR 21
base/mono color, 3279 OPR 14
basic check, operator control panel OPR 17
basic check indicator OPR 17
block
  activation DIR 4
  and patch selection DIR 2
  halt command DIR 4
  /patch
    field, system status OPR 59
    screen DIR 3
  save area display screen DIR 5
brightness control
  3278 OPR 12
  3279 OPR 14

calculator, display/alter screen PRG 74
changing the screen content OPR 39
changing the screen selection OPR 38
channel-to-channel disabled OPR 16
channel-to-channel disabled indicator OPR 16

channel
  installation and activation OPR 47
  interface logout screen DIR 15
  interface logout summary screen DIR 14
  introduction OPR 2
  to channel switch OPR 16
  specification fields OPR 12
characteristics selection tables
  –part 1 PRG 35
  –part 2 PRG 36
  –part 3 PRG 37
  –part 4 PRG 38
check
  control screen PRG 18
  control selection, general selection
    screen OPR 69, PRG 11
  reset, system controls and indicators OPR 10
CHG DPLY key OPR 25
clear system reset OPR 67

cncl (PA2) key OPR 23
code
  reference OPR 59
  extension DIR 24
color convergence screen OPR 76
color convergence pattern screen OPR 77
color display console OPR 13
concepts, microcode patch implementation DIR 7
comm req key OPR 26
communication req field, system status OPR 60
compare/trace screen PRG 76
compare/trace selection, general
  selection screen OPR 69, PRG 11
configuration
  example OPR 41
  function, input/output PRG 24
  remote screen PRG 20
  remote screen OPR 74
  screen group OPR 40
  screen contents OPR 42
  set time of day clock screen OPR 90

console
  address, program load
    screen OPR 70, PRG 12
  color convergence screen OPR 76
  color convergence pattern screen OPR 77
  I/O waiting field, system status OPR 60
  keyboard OPR 18
  mode, program load screen PRG 12
  printers, system OPR 3
  test pattern screen OPR 78
  keyboard, display OPR 2
contrast control, 3278 OPR 12
controlling the system display screens OPR 36
controls and indicators, system OPR 9
control panel, display console OPR 11
control panel, operator OPR 16
control registers, display/alter screen PRG 62
convergence instructions OPR 77
convergence, pattern screen OPR 77
copy key OPR 25
copy SP storage data OPR 10
copying a screen to console printer PRG 27
copying a screen to channel printer PRG 27
cursor
  control keys, console keyboard OPR 21
  down key OPR 22
  left key OPR 22
  right key OPR 22
  up key OPR 22

customer
  data and security control screen PRG 108
  messages, manual control mode MSG 1

DAKO field, system status OPR 57
data
contents compare screen PRG 82
contents compare trace screen PRG 84
field, system status OPR 58
security control PRG 108
DEG field, system status OPR 58
delete key OPR 24
device status PRG 20
diag key OPR 25
directed use function screens DIR 1
disable selection, check control screen PRG 19
disconnected console status OPR 61
disk handling OPR 6
diskette
analysis display screen DIR 12
analysis selection screen DIR 11
device status DIR 13
drive OPR 5
drive, system OPR 2
drives, 2 OPR 2
drives 1 and 2, general procedures OPR 45
handling OPR 6
display
block list DIR 3
block save area DIR 4
console/keyboard OPR 2
console status areas OPR 56
I/O device status PRG 70
instruction trace data screen PRG 87
line 22 OPR 57
line 23 OPR 59
line 24 OPR 60
line 25 OPR 60
console status OPR 60
screen OPR 56
mode, system status OPR 56
patch list screen DIR 6
PSW and I/O trace data
screen S/370 mode PRG 91
PSW and I/O trace data
screen 370-XA mode PRG 93
screen OPR 3
screens, operator OPR 56
the saved screen DIR 30
to printer/keyboard mode OPR 50
alter control register screen PRG 62
alter current PSW screen PRG 72
alter floating-point register screen PRG 60
alter general registers screen PRG 58
alter hex calculator screen PRG 74
alter I/O device status screen PRG 70
alter real storage screen PRG 64
alter screen PRG 57
alter storage key screen PRG 68
alter virtual storage screen PRG 66
display console
audible alarm volume control OPR 12, 14
base/mono color OPR 14
brightness control OPR 12, 14
contrast control OPR 12
control panel OPR 11, 13
cursor control keys OPR 22
dual case/mono case switch OPR 12, 14
general entry keys OPR 19
indicator 1 OPR 11, 13
indicator 2 OPR 11, 13
indicator 3 OPR 13
input control keys OPR 23
keyboard OPR 18
normal/test switch OPR 12, 14
operator control panel OPR 16
power-on procedure OPR 44
power on/off switch OPR 11, 13
program function keys OPR 28
security keylock OPR 15
space bar OPR 18
status, system status OPR 60
system function keys OPR 25
typematic keys OPR 18
drive
diskette OPR 2, 5
system diskette OPR 2, 5
dual address space facility PRG 67
dual case/mono case
3278 OPR 12
3279 OPR 14

emergency power off OPR 45
emergency switch, unit OPR 10
enter key OPR 24
erase EOF key OPR 23
erase input key OPR 23
error display/logout screen DIR 10
error display selection DIR 10
error logouts DIR 2
extended mode overview PRG 42
external registers screen PRG 106

fast selection
IML/IPL PRG 13
of hexadecimal calculations OPR 53
of manual operations OPR 52
of manual screens OPR 52
floating-point register screen,
display/alter PRG 60

general entry keys, console keyboard OPR 19
general registers screen, display/alter PRG 58
general selection screen OPR 66
check control screen PRG 4
compare/trace screen PRG 4
configuration PRG 4
display/alter selection screen PRG 4
operation rate control screen PRG 4
program load screen PRG 4
grouping the screen functions OPR 37

halt block function DIR 4
hardstop selection, check control screen PRG 18
hex calculator function, display/alter
screen PRG 74
home key OPR 21
horizontal positioning keys OPR 22

idxx idyy field, system status OPR 60
IML OPR 16, 48, 70
error analysis screen PRG 107
names-run block at IML screen DIR 9
parameters screen PRG 14
power on/IML switch OPR 16
procedures OPR 48
program load screen OPR 70, PRG 12
system controls and indicators OPR 16
switch OPR 16

immediate commands OPR 36, 66
time-of-day enable, QY OPR 66
interval timer switch, QJ OPR 67, PRG 8
store status, QS OPR 67
system reset, normal, QN OPR 67
system reset, clear, QC OPR 67
indicator
1, 3278 OPR 11
1, 3279 OPR 13
2, 3278 OPR 11
2, 3279 OPR 13
3, 3279 OPR 13
MSS Code OPR 10
Power Code OPR 10
service panel OPR 9
system controls and OPR 10
inhibited, console status OPR 61
initial microcode load, operating
procedures OPR 48
initial program load, operating
procedures OPR 49
initializing the index DIR 4
input
and output areas, display mode screen OPR 56
control keys, console keyboard OPR 23
deck device PRG 47
output configuration (UCW & IOCP)
function PRG 28
output configuration program (IOCP)
overview PRG 28
insert key OPR 24
insert mode, console status OPR 61
instruction loop analysis
screen PRG 102
instruction step, operation rate
control screen PRG 17
instruction trace screen PRG 86
interval timer switch OPR 67, PRG 8
intr key OPR 25
introduction
IBM 4381 Processor OPR 1
channels OPR 2
storage OPR 2
intv-timer field, system status OPR 59
I/O configuration screen PRG 30
I/O configuration in System/370 mode overview PRG 28
I/O configuration in 370-XA mode overview PRG 42
IOCDS selection considerations PRG 50
IOCP device screen PRG 46
IOCP function description PRG 28
IOCP function screens PRG 43
IOCP message section MSG 35
IOCP operation flow diagram PRG 44
IOS OPR 58
IPL
procedures OPR 49
unit OPR 71, PRG 13

KAT, system status OPR 62
key
ALT OPR 20
back tab OPR 21
backspace OPR 21
CHG DPLY OPR 25
CNCL (PA2) OPR 23
comm req OPR 26
copy OPR 25
cursor down OPR 22
cursor left OPR 22
cursor right OPR 22
cursor up OPR 22
delete OPR 24
diag OPR 25
ENTER OPR 24
erase EOF OPR 23
erase input OPR 23
home OPR 21
insert OPR 24
INTR OPR 26
line disc OPR 26
mode sel OPR 25
new line OPR 22
page down OPR 27
page up OPR 27
REQ (PA1) OPR 24
reset OPR 24
SPM/O OPR 25
start OPR 26
stop OPR 26
tab OPR 21
keyboard, display console OPR 2, 18
keylock, security OPR 15
keys
alphabet and number OPR 18
cursor control OPR 21
general entry OPR 19
horizontal positioning OPR 22
input control OPR 23
program function OPR 28
shift and shift lock OPR 18
symbols and punctuation marks OPR 20
system function OPR 25
typamatic OPR 18
vertical positioning OPR 22

label identification DIR 5, 15
lamp test OPR 10
operator control panel OPR 17
as part of system controls OPR 10
language support screen OPR 92
line disc key OPR 26
line 22 display system status OPR 57
line 23 display system status OPR 59
line 24 display system status OPR 60
line 25 display system status OPR 60
list of abbreviations xiv
load and save field, system status OPR 58
loading and unloading the diskette drive OPR 46
logic reset pushbutton OPR 10
logic reset, system controls and
indicators OPR 10
logout of channel and I/O error screen PRG 103

manual
and wait fields, system status OPR 57
control and operating system mode
switching OPR 50
control console status OPR 60
control mode screen OPR 65
control mode – customer messages MSG 1
operations OPR 51
operations, fast selection of OPR 52
screens, fast selection of OPR 52
message section, IOCP MSG 35
microcode loop analysis screen PRG 105
microcode patch implementation DIR 7
mode sel key OPR 25

modes of operation, introduction OPR 2
MSS Code OPR 10
MVS nucleus suffix PRG 13

new line key OPR 22
no retry selection, check control screen PRG 18
normal selection, check control screen PRG 18
normal selection, operation rate
control screen PRG 16
normal system reset OPR 67
nnnn field, system status OPR 59
normal/test switch
3278 OPR 12
3279 OPR 14

OP field, compare/trace screen PRG 83
operating
procedures, general OPR 31
system modes OPR 56
operation
modes of OPR 2
rate selection screen, general
selection screen PRG 11
rate screen PRG 16
status field, system status OPR 56
operator
control panel OPR 16
screens OPR 55
screens, overview OPR 55
option
4, PA send service information PRG 96
5, PA detail screens PRG 101
6, PA customer security PRG 108
optional consoles and printers OPR 4
overview
DIAG IOCP PRG 44, 45
I/O in System/370 mode PRG 28
I/O in 370-XA mode PRG 42

page down key OPR 27
page up key OPR 27
paging procedure OPR 53, PRG 67
panel, operator control OPR 16
panel, problem determination guide
access OPR 29
password for storage dump PRG 97
password protection PRG 108
patch implementation procedures DIR 7
patch name DIR 6
patch status DIR 6
perform IML OPR 70, PRG 12
perform IPL OPR 70, PRG 12
power
code indicators OPR 10
complete indicator OPR 17
complete, operator control panel OPR 16
error logout screen DIR 34
error logout directory screen DIR 33
error logouts screen DIR 32
in process, operator control panel OPR 17
in process indicator OPR 17
off, emergency OPR 10
off, operator control panel OPR 16
off procedure, system OPR 54
off switch OPR 16
on, operating procedures OPR 47
on/iml, operator control panel OPR 16
on/off, 3278 OPR 11
on/off, 3279 OPR 13
specification fields PRG 22
powering on OPR 44
printer
busy, system status OPR 61
check, system status OPR 61
intv reqd, system status OPR 61
keyboard mode, system status OPR 60
keyboard mode screen OPR 63
keyboard modes OPR 63
keyboard to display mode OPR 50
keyboard to display mode switching
procedure OPR 50
problem determination guide access
panel OPR 29
Problem Analysis OPR 94, PRG 95
function screens PRG 95
option 4, send service
information PRG 96
option 5, detail screens PRG 94
option 6, customer security
function PRG 108
procedures
diskette drive loading/unloading OPR 5
display console power on OPR 44
emergency power off OPR 45
fast selection
hex calculations OPR 53
manual operations OPR 52
manual screens OPR 52
initial microcode load (IML) OPR 48
initial program load (IPL) OPR 49
manual operations OPR 50
general OPR 31
power on OPR 44
switching between display and
ptr/kybd OPR 50
switching between manual ctrl/oper sys OPR 51
switching from display to
ptr/kybd mode OPR 50
switching from ptr/kybd to
display mode OPR 50
system power off OPR 54
system power on OPR 44
processing
unit logout directory screen DIR 19
unit logout microword directory screen DIR 21
unit logout selection screen DIR 18
processor
frame controls and indicators OPR 9
introduction OPR 1
option select screen PRG 101
unit microword logout directory screen DIR 21
program
function, input/output configuration PRG 28
function keys, console keyboard OPR 28
function keys, ROCF mode DIR 36
loading OPR 44
load screen OPR 70, PRG 12
load selection, general
selection screen OPR 66, PRG 12
program reset
QCLEAR OPR 67, PRG 9
QNORMAL OPR 67, PRG 9
programmer/analyst screen overview PRG 1
PSW and I/O trace screen S/370 mode PRG 91
PSW and I/O trace screen
370-XA mode PRG 93

Q function screens OPR 65

real storage, display and alter PRG 64
reconfiguration data DIR 22
reference code
RC=XXXXXXXX, system status OPR 59
logout file screen DIR 24
logout screen DIR 23
remote
console initialization screen DIR 35
operator console communication screen OPR 89
operator console facility description OPR 82
operator console facility logon screen OPR 83
operator console facility screen OPR 86
REQ (PA1) OPR 24
reset, check OPR 10
reset, keyboard OPR 24
reset, logic OPR 10
restart (QRES) OPR 68, PRG 10
RSF line error statistics screen DIR 17
return to previous screen OPR 52
return to prog sys
check control screen PRG 18
compare/trace screen PRG 80
general selection screen OPR 66, PRG 7
program load screen OPR 70, PRG 12
ROCF
active field, system status OPR 60
messages OPR 84
monitor active field, system status OPR 60
program function keys DIR 36

screen
address compare PRG 78
address compare trace PRG 80
alter IML parameters OPR 72, PRG 14
block save area display DIR 5
block DIR 3file
channel interface logout display DIR 15
channel interface logout summary DIR 14
check control PRG 18
color convergence OPR 76
color convergence pattern OPR 77
console test pattern OPR 78
compare/trace PRG 76
configuration/remote OPR 74, PRG 20
customer data and security control PRG 108
data contents compare PRG 82
data contents compare trace PRG 84
diskette analysis display DIR 12
diskette analysis selection DIR 11
block list DIR 3
display instruction trace data PRG 8 7
display patch list DIR 6
display psw and I/O trace data S/370 PRG 91
display PSW and I/O trace data 370-XA PRG 93
display the saved screen DIR 30
display/alter PRG 57
display/alter control register PRG 62
display/alter current PSW PRG 72
display/alter floating-point register PRG 60
display/alter general registers PRG 58
display/alter hex calculator PRG 74
display/alter I/O device status PRG 70
display/alter real storage PRG 64
display/alter storage key screen PRG 68
display/alter virtual storage PRG 66
error display DIR 10
external registers PRG 106
general selection OPR 66, PRG 7
IML error analysis PRG 107
IML names-run block at IML DIR 9
IML parameters PRG 14
instruction loop analysis PRG 102
instruction trace PRG 86
I/O configuration PRG 30
IOCDS PRG 50
IOCP device address PRG 46
language support screen OPR 92
logout of channel and I/O error PRG 103
microcode loop analysis PRG 105
operation rate PRG 16
operator screens overview OPR 55
power error logout detail DIR 34
power error logout directory DIR 33
power error logout selection DIR 32
Problem Analysis,
option 4 select PRG 96
option 5 select PRG 101
option 6 select PRG 108
select OPR 94
processing unit logout directory screen DIR 19
processing unit logout selection DIR 18
processor option select PRG 101
processor unit microword logout directory DIR 21
program load PRG 12
PSW and I/O trace PRG 88
reconfiguration data DIR 22
reference code logout DIR 23
reference code logout file DIR 24
remote console initialization DIR 35
remote operator console communication OPR 89
remote operator console facility OPR 86
remote operator console facility logon OPR 85
RSF line error statistics DIR 17
select IOCDS configuration PRG 50
send service information PRG 96
send service information-warning PRG 100
set time of day clock OPR 90
software problem isolation PRG 104
SP events counter DIR 28
SP detail log DIR 27
SP logout summary DIR 26
start IOCP PRG 48
subchannel image listing PRG 52
subchannel selection display PRG 54
support processor detail log DIR 27
support processor logout summary DIR 26
system configuration-customer OPR 80, PRG 24
system configuration-service PRG 22
time-of-day enable OPR 66
UCW directory PRG 40
UCW directory update PRG 32
directed use function DIR 1
overview, operator OPR 55
problem analysis OPR 94
security keylock, 3278 OPR 15

security keylock, 3279 OPR 15
select IOCDS configuration PRG 50
send service
information screen PRG 96
information messages PRG 98
information-warning screen PRG 100
service panel indicators OPR 9
set time of day clock screen OPR 90
shift and shift lock keys OPR 19
software problem isolation screen PRG 104
space bar OPR 18
SPM/O key OPR 25
start key OPR 26
start IOCP program screen PRG 48
status
and error messages PRG 48
display console OPR 60
system OPR 58
status messages, send service
information PRG 98
stop after log-switch, check
control screen PRG 19
stop key OPR 26
storage
data, copy SP OPR 10
introduction OPR 2
key/page description,
display/alter screen PRG 68
screens, display/alter PRG 57
specification PRG 23
store status OPR 67, PRG 8
subchannel selection display screen PRG 54
subchannel image listing PRG 52
support processor
events counters DIR 28
logouts DIR 25
detail log screen DIR 27
logout summary screen DIR 26
switching between display and
ptr/kybd modes OPR 50
switching between manual control and
operating system modes OPR 51
symbol and punctuation mark keys OPR 20
diskettes 1 and 2, operating procedures OPR 45
function keys, console keyboard OPR 25
operator control panel OPR 16
power off OPR 53
power off with channel-to-channel
adapter OPR 53
power off without channel-to-channel
adapter OPR 53
power off, operating procedures OPR 53
power on, operating procedures OPR 44
status OPR 56
display console status area OPR 60
system
indicators OPR 17
modes PRG 14
resets PRG 9

tab key OPR 21
target system PRG 47
test
field, system status OPR 57
lamp OPR 10, OPR 17
pattern screen, console OPR 78
TOD enable OPR 66, PRG 8
TOD field, system status OPR 59
transferring blocks DIR 4
transferring patches DIR 7
translate function PRG 59
typematic keys OPR 18
type parameters, compare/trace
screen PRG 78
turning display console power on OPR 45

UCW and IOCP configuration functions PRG 28
UCW directory screen PRG 40
UCW directory update screen PRG 32
unit control word function
unit, diskette drive OPR 5
update UCW directory PRG 32
characteristics selection tables PRG 35
display UCW directory PRG 40
operation examples list PRG 34
unit emergency, system controls and
indicators OPR 9
unit emergency switch OPR 10
usage conflict, system status OPR 61
using the copy key PRG 25
using the operationscmanual OPR 34

vertical positioning keys OPR 22
virtual storage, display/alter PRG 66
volume control, audible alarm OPR 12, 14
V/R field, compare/trace screen PRG 79

wait
indicator OPR 17
manual fields, system status OPR 57
operator control panel OPR 16

2 diskette drives OPR 2

3278
audible alarm volume control OPR 12
brightness control OPR 12
contrast control OPR 12
control panel OPR 11
dual case/mono case OPR 11
indicator 1 OPR 11
indicator 2 OPR 11
Model 2A OPR 11
normal/test OPR 12
power on/off OPR 11
security keylock OPR 15

3279
audible alarm volume control OPR 14
base/mono color OPR 14
brightness control OPR 14
color convergence screen OPR 76
control panel OPR 13
dual case/mono case OPR 14
indicator 1 OPR 13
indicator 2 OPR 13
indicator 3 OPR 13
Model 2C OPR 13
normal/test OPR 14
power on/off OPR 13
security keylock OPR 15
370-XA field, system status OPR 59

4341/4381 Comparisions
similarities OPR 31
differences OPR 31
enhancements OPR 33

IBM 4381 Processor
Operations Manual
Order No. GA24-3949-0

READER'S COMMENT FORM

Your comments will help us improve the quality of this manual. Elaborate on all negative responses in the COMMENTS section below.

	YES	NO
1. Does the publication meet your needs?	—	—
2. Did you find the information:		
• Accurate?	—	—
• Complete?	—	—
• Written for your technical needs?	—	—

3. Please rate the publication for the following:

	GOOD	FAIR	POOR
• Usability (Is information easy to find?)	—	—	—
• Readability (Is information easy to read & understand?)	—	—	—

4. Your occupation is: _____

COMMENTS:

You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

No postage stamp is necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will forward your comments or you can mail your comments directly to the address in the Edition Notice on the back of the title page.)

Note: Please direct requests for copies of publications and for assistance in using your system to your IBM representative, or to the IBM branch office serving your locality.

Reader's Comment Form

Cut or Fold Along Line

Fold and Tape | Please Do Not Staple | Fold and Tape

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 40 ARMONK, N.Y.

POSTAGE WILL BE PAID BY ADDRESSEE:

International Business Machines Corporation
Department K10
P.O. Box 6
Endicott, New York 13760

Fold | Fold

If you would like a reply, *please print:*

Your Name _____

Company Name _____ *Department* _____

Street Address _____

City _____

State _____ *Zip Code* _____

IBM Branch Office serving you _____

IBM®

IBM

4381 Processor Operations Manual

Publication Number: GA24-3949-0
File Number: 4300-01

GA24-3949-0

Printed in USA