UNISYS

BTOS Status Codes

Reference Manual

Relative to Release Level 8.0

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Reference Manual

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About This Manual

This manual provides descriptive and operational information regarding the status codes used by BTOS, the Unisys workstation operating system. The status codes are listed for the three most common categories: general operational status codes, BTOS initialization status analysis, and workstation bootstrap status codes.

Who Should Use This Manual

This manual is an appropriate reference for both new and experienced users of BTOS.

How to Use This Manual

Codes are listed in ascending numerical order (or alphanumeric order, if hexadecimal) within each section.

Each code message is followed by an explanation and, in most cases, suggestions for resolving the error.

Reference Material

For your convenience, section 1 provides a list of acronyms used throughout this manual.

Related Product Information

The following technical documentation is referenced within this manual:

BTOS Debugger Programming Reference Manual
BTOS Linker/Librarian Programming Reference Manual
BTOS Reference Manual, Volumes 1 and 2
BTOS Standard Software Operations Guide

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Overview

This manual provides a quick-reference listing of general operational status codes, BTOS initialization status codes, and bootstrap ROM status codes.

Section 2, Operational Status Codes, is a complete compilation of all BTOS status codes. Status code listings for separate software applications appear in an appendix of their respective manuals, and are also referenced within the text. The operational status codes are arranged numerically.

Section 3, BTOS Initialization Status Analysis, lists the status codes that appear during BTOS initialization.

Sections 4 through 9 list the bootstrap ROM status codes for the various types of workstations. The bootstrap ROM status codes are listed numerically by hexadecimal number for each hardware product.

Note: In BTOS 8.0 and later, B 21 and B 22 workstations are supported only as cluster workstations, not as masters or standalones.

List of Acronyms

The following acronyms are used throughout this manual.

Acronym	Meaning
ACTLU	Activate Logical Unit
BCD	Binary Coded Decimal
BSC	Binary Synchronous Communications
BSWA	Byte Stream Work Area
CLCB	Communications Line Configuration Block
CP	Cluster Processor (XE processor board)
CPU	Central Processing Unit
CRC	Cyclical Redundancy Check
CRT	Cathode Ray Tube
CS	Code Segment
CWS	Cluster Workstation
DAM	Direct Access Method
DAWA	Direct Access Work Area
DCB	Device Control Block
DCE	Data Communications Equipment
DCI	Disk Controller Interface
DCX	Data Communications Expansion (four port expansion module)
DISC	Disconnect
DLE	Data Link Escape

Acronym	Meaning
DMA	Direct Memory Access
DP	Disk Processor (XE processor board)
DTE	Data Terminal Equipment
ECC	Error Correction Code
EOF	End Of File
EOM	End Of Medium
EOT	End Of Transmission
FAB	File Area Block
FCB	File Control Block
FDC	Floppy Disk Controller
FHB	File Header Block
FIFO	First In, First Out
FP	File Processor (XE processor board)
HDC	Hard Disk Controller
IOB	Input/Output Block
IP	Instruction Pointer
IRR	Interrupt Request Register
ISAM	Indexed Sequential Access Method
ISR	Interrupt Service Routine
LU	Logical Unit
MCR	Magnetic Card Reader
MFD	Master File Directory
NBS	National Bureau of Standards

Acronym	Meaning
OS	Operating System
PCB	Process Control Block
PDN	Public Data Network
PIT	Programmable Interval Timer
PLU	Primary Logical Unit
PROM	Programmable Read Only Memory
QEH	Queue Entry Handle
RAM	Random Access Memory
RCB	Request Control Block
RD	Request Disconnect
RIM	Request Initialization Mode
RJE	Remote Job Entry
ROD	Regional Overlay Descriptor
ROM	Read Only Memory
RSAM	Record Sequential Access Method
RSWA	Record Sequential Work Area
RTC	Real Time Clock
SDLC	Synchronous Data Link Control
SIO	Serial Input/Output
SMD	Storage Module Drive
SIM	Set Initialization Mode
SNA	System Network Architecture

Acronym	Meaning
SNRM	Set Normal Response Mode
SP	Storage Processor (XE processor board)
SSCP	System Services Control Point
STAM	Standard Access Methods
TP	Terminal Processor (XE processor board)
TSAP	Transport Service Access Point
UA	Unnumbered Acknowledge
UCB	User Control Block
UI	Unnumbered Data Frame
UP	Unnumbered Poll
VCB	Video Control Block
VDM	Video Display Management
VHB	Volume Home Block
VLPB	Variable Length Parameter Block
VTI	Virtual Terminal Interface
XID	Identification Frame

Operational Status Codes

Introduction

This section contains a numerical listing of the status codes BTOS generates. The codes are arranged numerically by decimal value.

The Meaning column of the code listing provides explanations of code messages and also gives some indication of what steps you should take to resolve an error situation. In some cases, a particular status code can result from a variety of error conditions. When this is so, exact remedies cannot be included.

Internal Errors

When an error explanation says **Internal error. Consult Unisys Customer Support Center**, an internal error has occurred that was probably not due to operator action. You should note the code number and as much information as possible about the conditions just preceding the internal error.

BTOS Crash Status Description and Analysis

When BTOS detects a fatal error condition, it reports the error, dumps memory to a crash file (if the CrashDump.Sys file exists), and rebootstraps itself.

If the Debugger is configured into the operating system and is loaded in memory when the fatal error occurs, the operating system enters the Debugger before it does a memory dump and rebootstrap. You can use the Debugger to investigate the cause of the fatal error. You can also use the PLOG command to review the error history of a workstation. (Refer to the *BTOS Standard Software Operations Guide.*)

The error message displays on the screen in the system crash and rebootstrap sequence, when the system detects the error condition, and when the system enters the Debugger. During system reboot, the screen is blank, but the error messages reappear after you reload the operating system. The same information again displays when SysInit and Signon reinitialize the workstation screen. The information is also placed in the system log file, [sys]<sys>Log.Sys. (You use the PLOG command to display the log file.)

Each error message contains an error code in decimal and eight status words in hexadecimal. They display in the following format:

FATAL ERROR xx.

Crash Status: xxxx xxxx xxxx xxxx xxxx xxxx xxxx xxxx

EXAMPLE: If a fatal error 22 occurs while entering the Debugger, the following error message can appear:

FATAL ERROR 22.

Crash Status: 0016 0007 0000 0000 0004 000E 034E 024F

You interpret the eight hexadecimal status words as explained in the following paragraph and under status code 22 in this section.

The first status word contains the hexadecimal error code. The second word is the number of the process that was running when the fatal condition occurred. The seventh and the eighth words contain the Code Segment (CS) and Instruction Pointer (IP) of the instruction following the procedures call to the BTOS fatal error handler, unless specified otherwise. The other four words are either unused or have information unique to each error condition. Status codes 22 through 27, described in this section, use these four words.

Code Listing

0-9 General (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Codes marked with an asterisk (*) cause BTOS termination and an automatic reload.

Decimal Value	Meaning
0	OK. Successful completion.
1	End of file (EOF).
2	End of medium (EOM). An attempt to read or write beyond the end of a file or device.
3*	Inconsistency. Run the crash dump analyzer.
4	Operator intervention.
5	Syntax error.
6	Master workstation not running. Interstation communication with the master workstation of the cluster has been interrupted. (Code 6 is also listed in the *BTOS Context Manager Administration Guide.*)
7	The procedures necessary to implement this operation were excluded at system build.
8	An internal inconsistent state is discovered. Consult the Unisys Customer Support Center.
9	Reserved.

10-39 Kernel (BTOS)

For further information, refer to the *BTOS Reference Manual.*

For further information about codes 22 through 27, see BTOS Crash Status Description and Analysis.

Codes 21 through 28 have slightly different meanings within an XE500 environment, or when the BTOS Customizer is run. For further information, refer to the *XE500 BTOS Administration Guide* or the *BTOS Customizer Programming Reference Manual.*

Decimal Value	Meaning
10	Exchange out of range.
11	Invalid pointer.
12	No link block. Generated by PSend.
13	Invalid interrupt vector. Generated by SetIntHandler. (Refer to the section on Interrupt Handlers in the *BTOS Reference Manual.*)
14	No message available.
15	No link block available. Generated by Send and Request.
16	Inconsistent request block. Information provided in request block does not agree with expected values.
17	Mismatched respond.
18*	No process control block (PCB) available. Create fewer processes or specify more PCBs at system build.

Decimal Value	Meaning
19*	Programmable interval timer (PIT) chain invalid. PIT block that was established by SetTimerInt was erroneously modified. (Refer to Timer Management, 420-429.)
20	Invalid response exchange specified in request block.
21*	Memory protect fault. The third word of the crash status message contains the value of port 56h (B 22 only). The seventh and eighth words are Code Segment (CS) and Instruction Pointer (IP) when the memory protection fault interrupt is detected. (Note that the B 22 is supported only as a cluster workstation.)
22*	B 21/B 22: Bus timeout. The seventh and eighth words of the crash status message are the CS and IP of the instruction following the one that caused the bus timeout (usually by doing I/O to a nonexistent port or referencing a nonexistent memory location). (On a B 22, the third word contains the value of port 56h.) (Note that B 21 and B 22 workstations are supported only as cluster workstations.)

Decimal Value	Meaning
	B 26/B 27/B 28/B 38: The fifth status word contains the lower 16 bits (NMI port 0) of the error address. The lower four bits (0-4) of the sixth status word are the high (NMI port 1) hexadecimal digit of the error address. Possible causes for this error are: □ A nonexistent I/O port is referenced. □ A nonexistent memory location is referenced. A parity error has occurred because the address specified is greater than the top of installed memory. □ An I/O port fails to respond by sending a transfer acknowledge. □ Memory timing and control do not recognize a legal address, and fail to send a transfer acknowledge.
23*	B 21/B 22: Memory parity failure. The seventh and eighth words of the crash status message are CS and IP when the parity error interrupt is detected. The fifth and the sixth words indicate the memory location where the parity error is detected. The fifth word contains the 16 least significant bits of the 20 bits physical memory address. The four low-order bits of the sixth word contain the four most significant bits. The fourth word contains the current content of the memory location where the memory parity error is detected. (On a B 22, the third word contains the value of port 56.) (Note that B 21 and B 22 workstations are supported only as cluster workstations.) B 26/B 27/B 28/B 38: The fifth status word contains the 16 least significant bits of the error address. Bits 0-4 of the sixth status word contain the high hexadecimal digit of the error address.

Decimal Value	Meaning
24*	Power failure (B 22 only). The third word of the crash status message contains the value of port 56. The seventh and eighth words are CS and IP when the power failure interrupt was detected. (Note that the B 22 is supported only as a cluster workstation.)
25*	Unknown nonmaskable interrupt. The third word of the crash status message contains the value of port 56. The seventh and eighth words are code segment (CS) and instruction pointer (IP) when the nonmaskable interrupt is detected.
26*	B 21/B 22: Stray interrupt. The third word of the crash status message contains interrupt type multiplied by 6. The seventh and eighth words are the CS and IP when the interrupt is detected. On a B 22 workstation, the fourth and fifth words contain the values of the ISR and the IRR register of 8259A, respectively. The sixth word contains the value of the mask register of the 8259A. (Note that B 21 and B 22 workstations are supported only as cluster workstations.) B 26/B 27/B 28/B 38: In addition to the above, the 80186, 80286 or 80386 may have attempted to execute an illegal instruction.
27*	Divide overflow. The seventh and eighth words of the crash status message are the CS and IP of the instruction following the one that caused the overflow. The other status words contain the same information as they would for an error 26.
28	Invalid Op Code.

Decimal Value	Meaning
29	Reserved.
30*	Request table inconsistent.
31	No such request code.
32	Invalid message on default response exchange.
33	Service not available. The request is not ready to be served by the system service process. The installed system service process has to call ServeRq to declare its readiness to service the specified request code.
34	Exit run file is not specified.
35	No such X-Bus module.
36	The iBus parameter in a GetModuleID call is illegal (B 26/B 27/B 28/B 38 only). An iBus parameter of 1 specifies the I-Bus and a value of 2 specifies the X-Bus.
37	Request cannot be serviced until the application is swapped into memory. Swap in and reissue the request.
38	X-Bus memory window size is larger than allowed by the system configuration file.
39	Cannot resign as a server of a request you are not serving or attempt to serve a request that is already being served.

40-99 Cluster Request Management (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
40*	Not enough cluster buffer memory. Initialization error in master workstation. Insufficient memory is available to allocate for cluster buffers. Specify smaller data structures at system build.
41	No available request control block (RCB). No RCB is available at the local CWS Agent Service Process to process this request. Specify more RCBs at system build or modify the application system to require fewer concurrent requests.
42	Agent request block too large. User-defined request block is too big for the Agent to handle.
43*	Invalid response from master workstation. The response from the master workstation does not match the request.
44*	Unmatched response at master workstation Agent Service Process. Probably a message was erroneously sent to exchange 12 at the master workstation.
45	Request block too large. The request block (with data fields expanded) is too big for the transmission buffer or line buffer. Reduce the size of the request or specify larger buffers at system build.
46	Master workstation going down. Polling of the cluster workstation is going to stop.

Decimal Value	Meaning
47-51	Reserved.
52	Xbif server already installed. Xbif can be installed only once.
53	The bus is locked. Some other process is using the Xbus/Fbus.
54	Bad user. A process which did not lock the Xbus/Fbus attempted to unlock it.
55	Bad handle. A process attempted to remove an ISR which it did not own.
56-59	Reserved.
60	ercInvalidCommLineSpec Invalid device specification for a communications line. Note that when the DCX Server is not installed, the codes for DCX ports are not recognized.
61	ercCommLineBaudRatesMustMatch InitCommLine or ChangeCommLineBaudRate parameter error. The specified communications line does not support the baud rate clocking option requested. If split baud rates (different baud rates for receiving and transmitting) are not supported by the specified channel, the transmit and receive baud rates must match, unless one is zero (indicating external clock). If one is zero, the other must also be zero, unless the specified communications line supports independent selection of external versus internal clock for receive and transmit.

Decimal Value	Meaning
62	ercInvalidCommLineHandle The commLineHandle argument is not a valid handle previously returned by InitCommLine. The caller does not currently have this channel open. (Once ResetCommLine has been issued, the commLineHandle is no longer valid and no further operations can be performed on the channel until another InitCommLine is done.)
63	ercInvalidCommLineStatusMask ReadCommLineStatus or WriteCommLineStatus parameter error. The specified mask bit is undefined, or an attempt was made to write a bit that can only be read, or vice versa.
64	ercInvalidCommLineArgument A parameter to a CommLine operation is invalid. This error code applies to miscellaneous parameters such as the RxTx argument to ChangeCommLineBaudRate.
65	ercCommLineDoesNotSupportNRZI NRZI encoding is not supported by the hardware on the specified channel.
66	ercCommLineConfigBlockSize The Communications Line Configuration Block (CLCB), a parameter to InitCommLine, is not of the expected size. Since the CLCB is designed to accommodate future expansion, this error code could indicate that the program uses a feature not supported by the older operating system on which it is running. Otherwise, it indicates a programming error.

Decimal Value	Meaning
67	ercInitCommLineRetSize The InitCommLine Return Block, in which results are returned from InitCommLine to the user, is not of the expected size. This error code indicates a programming error.
68-89	Reserved.
90	Stack of an OS process has been corrupted.
91	OS code has been overwritten.
92-99	Reserved.

100-155 Initialization (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
100*	Memory failure detected during initialization.
101*	Insufficient memory for BTOS initialization.
102*	No Device Control Block (DCB) was configured for the device from which the operating system was bootstrapped.
103	Initialization error. The operating system logs this (refer to the PLOG command in the *BTOS Standard Software Operations Guide*) during initialization if it finds something wrong with the keyboard or screen, for example. Refer to section 3, BTOS Initialization Status Analysis, for further initialization error explanation.
104	Insufficient Y blocks or Z blocks specified at system generation. Increase the number of Y blocks or Z blocks of the failing processor by either recustomizing its operating system or modifying the Y or Z block entry in the processor's configuration file. Refer to the *XE500 BTOS Customizer Operations Guide* or the *XE 500 BTOS Installation and Implementation Guide* for more information about Y and Z blocks.

Decimal Value	Meaning
105	Insufficient hardware configuration detected. There are no CPs running or there are too many FPs, DPs, or SPs running.
106	A processor initialization file contains an error. Correct the processor initialization file for the failing processor. The *XE 500 BTOS Installation and Implementation Guide* contains information about the proper format for processor initialization files.
107	Watchdog process on master processor detected failure of another processor on the bus. This error is returned only if a processor other than the master processor crashes and the "NoWatchDog" entry has been removed from the XE500 master configuration file, [sys]<sys>Master.cnf.
108-119	Reserved.
120	Wrong hardware. The Xbif server is not supported on B 21 or B 22 workstations.

Decimal Value	Meaning
121	Old OS. The Xbif server is not supported on pre-8.0 operating systems.
122-127	Reserved.
150	A processor attempted to route a request to itself, which cannot be done.
151	Remote request too large for local buffer. Try increasing the number of Y or Z blocks for the failing processor. Refer to the *XE500 BTOS Customizer Operations Guide* or the *XE500 BTOS Installation and Implementation Guide* for more information about Y and Z blocks.
152	Cannot remote boot a processor that has not been initialized.
153	Target processor did not respond to remote boot.
154	Illegal option used in GetSlotInfo or GetProcInfo, or illegal code in the Cdt issued from RemoteBoot.
155	Too many disk devices declared in the [sys]<sys>Master.cnf file. Increase the size of %nmounted disks in the system generation prefix file table for the master processor and regenerate the master processor's operating system. For more information about customizing XE500 processor operating systems, refer to the *XE500 BTOS Customizer Operations Guide.*

200-299 File Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Codes 203, 204, 205, 215, 219 and 220 are also listed, with slightly different meanings, in the *BTOS Context Manager Administration Guide.*

Decimal Value	Meaning
200	Reserved.
201	No free volume structure. A user should configure the same number of volume home blocks as device control blocks in sysgen.
202	Directory full. Rename all the files in this directory to another directory and then delete this directory. Create a new larger directory with the name of the old directory. Then rename all the files from the other directory to this new, expanded directory. If you receive this message while working in the <Sys> directory, however, you must backup the disk using the BACKUP VOLUME command, then re-initialize the disk (IVOLUME command) with more files in the <Sys> directory.
203	No such file.
204	No such directory.
205	Invalid file specification.

Decimal Value	Meaning
206	Invalid user number.
207	Invalid request code.
208	Duplicate volume.
209	File is read only.
210	Invalid file handle. The file handle is not associated with any open file.
211	Invalid buffer size. This must be a multiple of 512 for disk volumes, unless you are using SetDeviceParams which can set buffers to 128, 256, or 512.
212	Invalid logical file address. This must be a multiple of 512 for disk volumes, unless you are using SetDeviceParams, which can set buffers to 128, 256, or 512.
213	No free File Area Blocks (FABs). Open fewer files concurrently, specify more FABs at system build, or compact the file system by doing a BACKUP VOLUME, IVOLUME, and RESTORE.
214	No free file number. Open fewer files concurrently or specify more File Control Blocks (FCBs) per User Control Block (UCB) at system build.
215	No such volume or no such device. The volume is currently not mounted.

Decimal Value	Meaning
216	Volume not mounted.
217	Invalid password. Password supplied is longer than 12 characters.
218	Invalid mode.
219	Permission denied. A file system request was made that was denied because of the wrong password or an illegal request to modify or access a system file (such as <Sys>Sysimage.Sys).
220	File in use. A process that opens a file in modify mode is guaranteed exclusive access. Only one file handle can refer to a file that is open in modify mode.
221	File Header invalid checksum. The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
222	File Header invalid page number. The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
223	File Header invalid header number. The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
224	File already exists.

Decimal Value	Meaning
225	No free File Headers. Run BACKUP VOLUME, IVOLUME (and specify more File Header Blocks), and RESTORE on this volume. If floppy disk, initialize with more file headers.
226	Free File Headers broken. The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
227	Device in use.
228	Device already mounted.
229	Device not mounted.
230	Disk full. There are not enough available disk sectors to accommodate the current CreateFile or ChangeFileLength request.
231	Not a device that can be mounted.
232	No valid Volume Home Block (VHB). The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
233	File Header invalid file name. The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
234	Odd byte buffer address. The buffer must be word-aligned.
235	Wrong volume mounted.

Decimal Value	Meaning
236	Invalid device specification.
237	Directory page invalid. The volume control structures are invalid. Run BACKUP VOLUME, IVOLUME, and RESTORE on this volume.
238	Request not valid for device.
239	Wrong volume destination. Rename cannot move a file to another volume.
240	Directory already exists.
241	Directory not empty.
242	MFD is full. Run BACKUP VOLUME, IVOLUME (and specify more sectors for the Master File Directory (MFD)), and RESTORE on this volume.
243	Verify error. A Volume Control Structure (VHB, FHB, etc.) was written and then immediately reread to verify that it was written correctly. The information reread does not compare with the information written, although the disk controller did not report an error. Error 243 indicates a serious disk controller, DMA, or memory hardware malfunction.
244*	System device not ready. If a swapping operating system was bootstrapped from a floppy disk, then the operating system floppy disk cannot be removed from the drive.

Decimal Value	Meaning
245	Run file invalid checksum. The file is probably not a run file, or is improperly altered in some way (e.g., with the Editor instead of the Debug file).
246	Invalid run file. The file is probably not a run file.
247	Old format run file. The file is probably not a run file.
248	Wrong pRq argument. CheckReadAsync or CheckWriteAsync does not agree with the preceding ReadAsync or WriteAsync.
249	Invalid attributes for secondary task. A task loaded with LoadTask (as opposed to Chain) cannot use virtual code segments or have a memory array. (Refer to the *BTOS Linker/Librarian Programming Reference Manual*, and Task Management, 430-499.)
250	Too many runs. The file cannot be expanded because it already contains the maximum number of runs. The maximum number of runs per file is a system build parameter. Compact the file system by doing a BACKUP VOLUME, IVOLUME, and RESTORE.
251	Cannot write to the [sys]<sys>Log.Sys.
252	Cannot open the operating system image file for the swapping cluster workstation.
253	Cannot read the operating system overlay for the swapping cluster workstation.

Decimal Value	Meaning
254	All the user numbers on the master workstation have been used. Change the system build parameter for the User Control Block (multiple application partitions only). This message is also returned if you enter an invalid node, volume, or queue name (this last while using the PRINT command).
255	Data verification error.
256-289	Reserved.
290	Log buffer overflow. Multiple errors occurred rapidly and the operating system was unable to log all of them.
291-298	Reserved.
299	Invalid file protection level.

300-319 Device Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
300	Device not ready. Make sure the power is on and the floppy disk is properly inserted in the disk drive. Also check the hard disk.
301	I/O error. This may be caused by a hardware or media fault. Frequent 301s usually indicate a hardware failure; check boards, drives, cables, head alignment, etc. Several 301s at the same head/cylinder/sector numbers usually indicate flawed media, but with floppy diskettes, try using another drive. The problem may be due to incompatible head alignment.
302	Write protected. There is no write enable tab on an 8–inch floppy disk, or there is a write-protect tab on a 5–1/4–inch floppy disk.
303	No free I/O Blocks (IOBs). There are too many concurrent input/output operations. More IOBs should be specified at system build.
304	Odd DMA Count. The number of bytes transferred by Direct Memory Access (DMA) must be even.

Decimal Value	Meaning
305	Attempt to reference unformatted disk. Any attempt to use an unformatted disk by any I/O request, except by the format request, returns this error.
306	Recall failed.
307	Hard disk controller write fault detected.
308-319	Reserved.

320-339 Floppy Disk Controller (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
320	Floppy disk controller busy in command.
321	Floppy disk controller never ready in command.
322	Floppy disk controller data input in command.
323	Floppy disk controller never ready in result.
324	Floppy disk controller not data input in result.
325	Floppy disk controller not busy after transfer request.
326	Floppy disk controller wrong unit after transfer request.
327	Floppy disk controller busy without transfer request.
328	Floppy disk controller interrupt from undefined unit. May result from a failure to include all floppy disks in the system build.
329	Floppy timeout.
330	Incomplete Direct Memory Access (DMA) transfer to or from floppy disk.
331-339	Reserved.

340-399 Hard Disk Controller (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
340	Hard disk controller busy in command.
341	Hard disk controller never ready in command.
342	Hard disk controller data input in command.
343	Hard disk controller never ready in result.
344	Hard disk controller not data input in result.
345	Hard disk controller not busy after transfer request.
346	Hard disk controller wrong unit after transfer request.
347	Hard disk controller busy without transfer request.
348	Hard disk controller interrupt from undefined unit. May result from a failure to include all Winchester disks in the system build.
349	Hard disk timeout.
350	Hard disk controller local Direct Memory Access (DMA) fault.
351	Bad hard disk controller.

Decimal Value	Meaning
352	Hard disk controller remote DMA fault.
353-355	Reserved.
356	ECC inconsistency. An ECC-formatted disk was accessed in CRC mode, or vice-versa.
357-399	Reserved.

400-419 Allocation (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
400	Not enough memory available in a specific partition to satisfy memory allocation request. (Code 400 is also listed, with slightly different meanings, in the *BTOS Context Manager Administration Guide* and the *BTOS Linker/Librarian Programming Reference Manual.*)
401	Cannot allocate long-lived memory. The memory cannot be allocated because the Debugger is locked into memory in multiple-process or interrupt mode. (Refer to the *BTOS Debugger Programming Reference Manual.*)
402	Invalid memory segment specification to DeallocMemorySL/LL.
403	Parameter in a BTOS memory management request is not aligned on a paragraph boundary (that is, the offset part of the segment: offset memory address must be zero).

Decimal Value	Meaning
404-408	Reserved.
409	Not enough memory available for both the Executive and the requested system service.
410	All exchanges already allocated. Specify more exchanges at system build. Also caused by too many files listed in the SUBMIT command. Submit fewer files at a time.
411	Invalid exchange identification specified to DeallocExch.
412-419	Reserved.

420-429 Timer Management (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
420	Too many Real Time Clock (RTC) requests. Specify a larger RTC request table at system build.
421	Invalid timer block specification in CloseRTClock.
422-429	Reserved.

430-499 Task Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
430*	The partition is not large enough to load the exit run file. Possibly the Debugger is locked in memory, or memory specifications at system build were too small.
431	The printer ISR already exists. Another program is using the communications or printer port. For example, the spooler is installed and an application program tried to print on channel A, B, or the line printer port.
432-439	Reserved.
440	Soft vector table full. More space can be created at system build if necessary.
441-499	Reserved.

500-599 Video Display Manager (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
500	Frame number/coordinates do not agree with the Video Control Block (VCB).
501	Invalid argument to Video Display Management (VDM).
502	Video buffer is not word aligned.
503	VCB not completely initialized.
504	Video Direct Memory Access (DMA) hardware failure.
505	Too many attributes on a line (B 21 workstations only). (Note that B 21 workstations are supported only as cluster workstations.)
506	Screen timeout interval too large. The maximum interval is 109 minutes.
507	Reserved.
508	The UnLockVideo operation called more times than LockVideo called by an application or VAM.

Decimal Value	Meaning
509	An unexpected message was received at the video lock exchange (27).
510	Current frame overlaps another frame with unlike double high/wide characteristics.
511	Number of lines collectively defined by all frames exceeds the number of lines on the screen.
512-599	Reserved.

600-699 Keyboard Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
600	Reserved.
601	Duplicate ReadKbd or ReadKbdDirect. Only one ReadKbd or ReadKbdDirect request can be outstanding at a time.
602	No character available. ReadInputEvent specified not to wait for a character code. This message merely indicates that no character code is currently available. (Code 602 is also listed, with a slightly different meaning, in the *BTOS Mail Manager Administration Guide.*)
603	Invalid escape sequence in submit file.
604	Invalid argument to a keyboard operation.
605	Invalid mode code to SetSysInMode.
606	Failure of 8048 keyboard microprocessor.
607	Reserved.
608	Application system being terminated by request of another process or **ACTION-FINISH**.
609	No action code available. ReadActionCode returns this status if the workstation operator has not entered an action code.

Decimal Value	Meaning
610	Type-ahead buffer overflow.
611	Keyboard status change queue overflow. Issue ReadKBDStatus more often.
612-687	Reserved.
688	Failure of 1654 Hardware ID microprocessor.
689	The hardware ID number must be less than 128 and greater than zero.
690-692	Reserved.
693	No device present on the Interface bus (I-Bus).
694	MCR buffer overflow.
695	Too many retries while reading a message from MCR (bad message syntax).
696	No MCR data available.
697	User buffer is not large enough to receive MCR data.
698	Wrong mode specified at ReadMCR function call.
699	An incorrect SYS.KEYS file was loaded.

700-799 Printer Spooler (Executive, BTOS)

For more information, refer to the following manuals:

- *BTOS Standard Software Operations Guide*
- *BTOS Reference Manual*

Codes in the 700 range are also listed in the *BTOS Generic Print System (GPS) Installation and Administration Guide* and the *BTOS Generic Print System (GPS) Programming Reference Manual.*

Decimal Value	Meaning
700	A ConfigureSpooler operation attempted to free a printer that was not attached.
701	A SpoolerPassword operation attempted to enter a password when the printer spooler was not waiting for a password.
702	Invalid printer name specified in a SpoolerPassword operation. Specify O, A, or B.
703	Invalid channel number specified in a ConfigureSpooler operation.
704	A ConfigureSpooler operation attempted to add a new printer to a channel that is not free.
705	Invalid printer spooler configuration file specified in a ConfigureSpooler operation.
706	A spooler was installed with a printer name which was already in use. Printer names must be unique.
707	Invalid Printer Configuration File Spec. The cbConfigureFile field of the ConfigureSpooler service exceeds 91 characters.

Decimal Value	Meaning
708	Invalid Queue Name. The cbQueueName field of the ConfigureSpooler service exceeds 50 characters.
709	Current print request cancelled.
710	Printer restarted.
711	Printer is freed and needs to be reconfigured.
712-719	Reserved.
720	Too many printers specified in spooler configuration file. The limit is 100.
721	Attempt to install a printer spooler manager on a processor that already has a printer spooler manager installed. Check that the failing processor's initialization file has only one printer spooler manager entry.
722	Attempt to install a printer spooler manager on a processor that does not have printer hardware. It can be installed only on a Cluster Processor (CP) or a Terminal Processor (TP). Check your File Processor (FP), Disk Processor (DP), or Storage Processor (SP) initialization files to make sure that they do not contain an entry for a printer spooler manager.

Decimal Value	Meaning
723	Attempt to install a printer spooler manager when there is no Queue Manager installed. (The spooler tries for two minutes, and then gives up.) Check your processor initialization files to make sure that they contain an entry for the Queue Manager.
724-799	Reserved.

800-899 Application Partition Management (BTOS, Executive)

For more information, refer to the following manuals:

- *BTOS Reference Manual*
- *BTOS Standard Software Operations Guide*

Codes 801 and 813 are also listed, with slightly different meanings, in the *BTOS Context Manager Administration Guide.*

Decimal Value	Meaning
800	Partition is not vacant. Vacate the partition first.
801	Cannot create any more partitions. Number of partitions is a system build parameter.
802	Partition name is duplicated.
803	Invalid partition handle is specified.
804	Invalid partition name is specified. Partition name supplied is longer than 12 characters.
805	Partition is vacant.
806	Partition is locked. A task on a locked partition cannot be terminated.
807	Partition is not locked. The partition should be locked before using the SetPartitionExchange operation.

Decimal Value	Meaning
808	Partition exchange has not been set.
809	Partition exchange has already been set.
810	Request is valid only for an application running in the primary partition.
811	Partition is already swapped.
812	Partition is not swapped.
813	Cannot swap out this partition.
814	Request is not valid for the primary partition.
815-899	Reserved.

900-999 Queue Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Codes in the 900 range are also listed in the *BTOS Generic Print System (GPS) Installation and Administration Guide* and the *BTOS Generic Print System (GPS) Programming Reference Manual.*

Decimal Value	Meaning
900	A RemoveQueueEntry, UnmarkQueueEntry, or RewriteMarkedQueueEntry operation was invoked with an invalid Queue Entry Handle (QEH). The QEH specified was for an entry that is not marked.
901	A RemoveQueueEntry operation specified an entry that was previously marked.
902	A RemoveQueueEntry, ReadKeyedQueueEntry, or MarkKeyedQueueEntry operation was invoked for which no matching entry was found.
903	A MarkNextQueueEntry operation was invoked when no entries were available.
904	The ReadNextQueueEntry operation specified an entry that was deleted since its QEH was returned.
905	The pb/cbQueueName fields of an operation specifies an invalid or nonexistent queue.

Decimal Value	Meaning
906	An EstablishQueueEntry operation was invoked when 100 server processes were already established.
907	A Marking operation was invoked by a server process that had not invoked an EstablishQueueServer operation.
908	An AddQueueEntry operation was attempted with the fQueueIfNoServers flag set to FALSE when no server processes were established.
909	A DeleteMarkedQueueEntry, UnmarkQueueEntry, or RewriteMarkedQueueEntry operation was invoked with an invalid QEH.
910	A DeleteMarkedQueueEntry, UnmarkQueueEntry, or RewriteMarkedQueueEntry operation was invoked by a server process other than the server process that marked the entry.
911	A syntax error was found in the Queue Index File.
912	An AddQueueEntry operation specifies a queue type that does not match the queue type in the Queue Index File.
913	An AddQueueEntry operation was invoked with an invalid date/time specification.
914	The server process specified in an EstablishQueueServer operation is already established as a server.
915-999	Reserved.

1300-1399 SWP

Codes in the 1300 range are listed in the *BTOS Secretarial Word Processor (SWP) Installation, Configuration and Administration Guide.*

1400-2349
Sequential Access Method (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
1400-2304	Reserved.
2305	Too many put backs. Only one PutBackByte is allowed before reading again.
2306-2314	Reserved.
2315	Invalid mode to OpenByteStream. Valid modes are: ModeRead, ModeWrite, ModeAppend, ModeModify, and ModeText.
2316-2324	Reserved.
2325	Invalid BSWA. A Byte Stream operation was made with an invalid BSWA. Either the operation is not valid for the Byte Stream, the BSWA was modified erroneously by the user, or the BSWA passed was never opened.
2326-2334	Reserved.

Decimal Value	Meaning
2335	Buffer too small. Buffer must be 1024 bytes to allow device independence.
2336	Invalid video byte stream escape sequence.
2337-2338	Reserved.
2339	ercInvalidStatusMask ReadStatusC or WriteStatusC parameter error. The status mask selects an undefined status bit, or an attempt was made to write a bit that can only be read, or vice versa.
2340	ercParityError Parity error detected. All bytes, except the last one returned from the read operation, were received without error. The last byte is in error and has not been examined or translated in any way (by CR/LF translation or EOF checking, for example). That character is treated as if the byte stream were in image mode.

Decimal Value	Meaning
2341	ercOverrunError Receive overrun (detected by the serial controller hardware). All bytes, including the last one returned from the read operation, were received without error. One or more bytes were lost after the last byte. This error indicates that the serial controller hardware overflowed its internal three-byte buffer because the interrupt service routine did not run soon enough to unload the controller. Unless the system is very heavily loaded with high-frequency communications interrupts at the time, this is probably just an interrupt latency (patience) problem, the fault of some software component that is keeping interrupts disabled for too long a period. Otherwise, the code of the interrupt service routine needs to be optimized. Start by rewriting it as a raw ISR if it is not one already. (Note the difference between this error and 2346.)
2342	ercFramingError Framing error detected. All bytes, except the last one returned from the read operation, were received without error. The last byte is in error and has not been examined or translated in any way (by CR/LF translation or EOF checking, for example). That character is treated as if the byte stream were in image mode. (Typically the character is garbage.)
2343	Wrong configuration type. The specified configuration file is not of the type expected for the device specified.

Decimal Value	Meaning
2344	Invalid configuration file. There was an error in accessing the appropriate configuration file. Either the specified configuration file (or the default if one was not specified) does not exist or an error was encountered when trying to read the file.
2345	Translation File Problems.
2346	ercReceiveQueueOverrun Receive overrun (detected by software). All bytes, including the last one returned from the read operation, were received without error. One or more bytes were lost after the last byte. This error indicates that the interrupt service routine overflowed its receive buffer, because the application process did not call soon enough to unload the buffer. (Note the difference between this error and 2341.) This error may mean that the client of communications byte streams, rather than communications byte streams itself, is falling behind. The following possible remedies should be attempted in sequence: □ Raise the priority of the receiving process. In a full-duplex situation, make sure that the receiving process runs at a higher priority than the transmitting process, for example. □ Use a line control discipline: XON/XOFF unless the data is binary (image mode), or CTS if the hardware connection supports it. This holds off the transmitter while the receiver catches up, then restarts the transmitter. (Refer to the Create Configuration File utility description in the *BTOS Standard Software Operations Guide*.)

Decimal Value	Meaning
	◻ Increase the size of the buffer given to OpenByteStream (or OpenByteStreamC or AcquireByteStreamC, whichever interface you are using). This will not help for long if the receiving process keeps on falling behind, but it enables the receiving process to cope with bursts of activity, provided that it can eventually catch up. ◻ Optimize the offending code. This may be the code in the receiving process. The offending code could also be inefficient interrupt service routines, which leave too little bandwidth for the process to use. First check to see that the process is not insisting on receiving a single character at a time. This method is very inefficient. Ask for a larger chunk or a variable-sized chunk, whatever is available at the time you call. ◻ Use a lower baud rate. ◻ Run fewer communications channels on one processor simultaneously.
2347	ercCantCompleteNow Cannot complete operation now. This code indicates that in order to complete the requested operation, the user process would have had to wait, and the caller explicitly forbade this by using the asynchronous form of the call (for example, FillBufferAsyncC with nonzero idExch argument). This status code can indicate a normal condition as well as an error. Once this code is returned, the caller must expect a subsequent message notifying him when the blocking condition has been removed, at which point he may repeat the call.

Decimal Value	Meaning
2348	ercWrongTimeToCall Wrong time to call. The user previously initiated an asynchronous operation and received the ercCantCompleteNow response. The user may not issue the next operation of the same type until he receives a message indicating that the blocking condition has been removed. **Note:** Receive and transmit operations are independent and may overlap in time. The caller will *not* get ercWrongTimeToCall from a FlushBufferC operation while waiting for a message signaling the end of a FillBufferAsyncC operation, for example.
2349	ercBreakReceived All bytes, including the last one returned from the read operation, were received without error. A break signal was received after the last byte returned was received. This code can be treated in the same way as ercOk if the break signal is not significant to the application.

2440-2499 Parameter Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
2440	No such parameter. In a call to RqParams, the parameter specified exceeds the maximum number of possible parameters. (Code 2440 is also listed, with a slightly different meaning, in the *BTOS Context Manager Administration Guide.*
2441-2449	Reserved.
2450	No such subparameter. In a call to RqParams, the subparameter specified exceeds the maximum number of subparameters allowed in the parameter.
2451-2469	Reserved.
2470	VLPB full. The operation failed because the Variable Length Parameter Block could not be extended by allocating long-lived memory.
2471-2479	Reserved.
2480	Illegal iParam. The value of iParam supplied to RgParamSetListStart or RgParamSetSimple is not less then CParams.

Decimal Value	Meaning
2481-2489	Reserved.
2490	Not in list. An RgParamSetEltNext was invoked after an RgParamSetSimple, or the number of parameters in the list was exhausted.
2491-2499	Reserved.

2500-2699 Executive Forms (Executive)

For more information, refer to the *BTOS Standard Software Operations Guide*.

Decimal Value	Meaning
2500-2549	Internal errors. Consult the Unisys Customer Support Center.
2550-2551	Form too large. Internal errors.
2569-2570	Consult the Unisys Customer Support Center. Invalid form description.
2571-2599	Internal errors. Consult the Unisys Customer Support Center.
2600-2699	Reserved.

2700-2999
Date/Time Conversion (Executive)

For more information, refer to the *BTOS Standard Software Operations Guide*.

Decimal Value	Meaning
2700	Year out of range 1952-2042.
2701	Day not valid for specified month. Must be 1 to 28/29/30/31, as appropriate.
2702	Date and day of week disagree.
2703	Invalid time of day specification.
2704-2999	Reserved.

3000-3099 Direct Access Method (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
3000	DAWA in use. OpenDaFile failed because the Direct Access Work Area (DAWA) is currently associated with another Direct Access Method file.
3001	Not readable by Direct Access Method. OpenDaFile failed because the specified file contains records that cannot be read by the Direct Access Method. For example, the file can contain variable-length records.
3002	sRecord mismatch. OpenDaFile failed because the sRecord parameter did not match the sRecord specified when the file was created.
3003	DAM internal error. The operation failed because an internal inconsistency was detected. Consult the Unisys Customer Support Center.
3004	DAWA invalid. The operation failed because pDAWA specified an invalid DAWA. A DAWA is invalid if it is not recognized as a DAWA or if it is not associated with an open file.
3005	Invalid record fragment. ReadDaFragment or WriteDaFragment failed because the record fragment exceeds the record bounds.

Decimal Value	Meaning
3006	Invalid buffer mode. SetDaBufferMode failed because an invalid buffer mode was given.
3007	Record beyond existing records. The operation failed because the specified record does not exist. This status code is equivalent to ercRecordDoesNotExist (code 3302) except that this code (that is, 3007) provides this additional information: the record is beyond any existing record.
3008-3099	Reserved.

3200-3202 Sort/Merge

These codes are listed in the *BTOS Sort/Merge Operations Reference Manual*.

3300-3399 Standard Access Methods (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
3300	Not a STAM file The operation failed because the file did not contain the proper signature.
3301	STAM header invalid checksum. The operation failed because the checksum computed on the file header did not match the checksum computed when the file was created.
3302	Record does not exist. The operation failed because the specified record does not exist.
3303	Malformed record. The operation failed because data read from the disk contained an inconsistency in the record header and trailer. Use maintain file to fix the database.
3304	Not fixed-length record. The operation failed because the access method cannot reference variable-length records.

Decimal Value	Meaning
3305	Invalid file type. The operation failed because the file cannot be accessed with the specified access method.
3306	Invalid buffer size. The operation failed because the buffer size was too small or not a multiple of 512.
3307	Buffer not word-aligned. The operation failed because the buffer was not word-aligned.
3308- 3399	Internal errors. Consult the Unisys Customer Support Center.

3400-3599 Sort/Merge

Codes in the 3400 and 3500 ranges are listed in the *BTOS Sort/Merge Operations Reference Manual.*

3600-3699 Record Sequential Access Method (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
3600	Record Sequential Work Area (RSWA) in use. OpenRsFile failed because the Record Sequential Work Area (RSWA) is currently associated with another RSAM file
3601	RSWA invalid. The operation failed because pRSWA specified an invalid RSWA. An RSWA is invalid if it is not recognized as an RSWA or is not associated with an open file.
3602	RSAM internal error. The operation failed because an interval inconsistency was detected.
3603	Invalid mode. OpenRsFile failed because the mode parameter was invalid.
3604	Not readable by RSAM. OpenRsFile failed because the specified file cannot be read by RSAM.
3605	Wrong mode. The mode, which was specified when the file was opened, does not allow the operation to succeed. For example, mode read does not allow WriteRsRecord to succeed.

Decimal Value	Meaning
3606	Record too large. The record is too large to fit into the buffer supplied by ReadRsRecord.
3607	Good record not found. ScanToGoodRsRecord was unable to locate a well-formed record.
3608-3699	Reserved.

3700-3799 Forms

Codes in the 3700 range are listed in the *BTOS Forms Designer Programming Reference Manual.*

3800-3899 Date/Time (Executive)

For more information, refer to the *BTOS Standard Software Operations Guide.*

Decimal Value	Meaning
3800	Invalid character in string.
3801	Year is missing from string.
3802	Year is out of range.
3803	Month is missing from string.
3804	Month is out of range.
3805	Day of month is missing from string.
3806	Day of month is out of range 0 to 31.
3807	Day of week is missing from string.
3808	Day of week is out of range 0 to 7.
3809	Time is missing from string.
3810	Minutes are missing from string.
3811	Time is out of range.
3812	Hour is out of range.
3813	Minutes are out of range.
3814	Day and date disagree.
3815	Word in string is not a day, month, am, or pm.
3816	Word in string matches more than one day, month, am, or pm.
3817-3899	Reserved.

4400-4423 Linker/Librarian

Codes 4400, 4403 through 4409, 4411, 4413, 4414, 4418 through 4420, 4422, and 4423 are listed in the *BTOS Linker/Librarian Programming Reference Manual.*

4500-4599 Generic Print System

Codes in the 4500 range are listed in the *BTOS Generic Print System (GPS) Programming Reference Manual.*

4800-4899 Mouse Management (Executive)

For more information, refer to the *BTOS Standard Software Operations Guide.*

Decimal Value	Meaning
4800	Invalid parameters. Check the parameters of the procedures you are calling to be sure they are in the correct range and form.
4801	Coordinate parameters out of range. The coordinates specified in a PDSetCursorPos[NSC] or PDSetMotionRectangle[NSC] procedure are not within the specified range. Either specify new coordinates or, for procedures that use virtual screen coordinates, define a new virtual screen coordinate space with PDSetVirtualCoordinates.
4802	Cursor not in current window. You attempted to get the cursor position with PDGetCursorPos[NSC] when the mouse had been moved out of the application window. In most cases, the application would probably ignore this status code; for example, the last valid cursor position received would be used.

Decimal Value	Meaning
4803	Mouse and keyboard not assigned to process. You attempted to move the cursor position with PDSetCursorPos[NSC], but you are not allowed to move the cursor position unless the application is the current context. This status code should normally be handled by the application. In most cases, the application would probably ignore the code.
4804	Workstation not supported. Only B 26/B 27/B 28/B 38 workstations are supported. This status code is generated when you attempt to install the Mouse Server.
4805	Graphics type not supported. Only B 26/B 27/B 28/B 38 graphics are supported. This status code is generated when you attempt to install the Mouse Server.
4806	Unsupported graphics cursor type. In PDLoadCursor, the valid cursor type is 3 for the XOR cursor.
4807	Invalid gear value. In PDSetControls and PDSetSystemControls, the valid gear speeds are 0 through 10.
4808	Not an icon [file]. The icon [file] specified in PDLoadCursor or PDReadIconFile is not an icon [file] with the specified structure.
4809	Icon too large for specified structure. The icon [file] specified in PDReadCurrentCursor or PDReadIconFile does not fit into the specified structure.

Decimal Value	Meaning
4810	Work area too small; it should be 512 bytes and word aligned. The work area specified in PDReadIconFile must be 512 bytes and word aligned.
4811	OS not supported; must be 7.0. Only operating systems 7.0 and higher are supported. This status code is generated when you attempt to install the Mouse Server.
4812-4899	Reserved.

5000-5099 B-NET Server

Codes in the 5000 range are listed in the *BTOS B-NET Administration and Operations Guide.*

5100-5199 B-NET Agent

Codes in the 5100 range are listed in the *BTOS B-NET Administration and Operations Guide*.

7300-7552 Virtual Code Segment Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
7300	Overlay already in memory.
7301	Next overlay does not fit. The swap buffer is not large enough to swap in the next overlay. Increase the size of the swap buffer.
7302	ROD will not fit. The swap buffer is not large enough. Increase the size of the swap buffer.
7303	Swap failed. Internal system error detected. Possibly a file system error involving the run file.
7304	Inconsistent ProcInfo table. An internal data structure has been corrupted. Possibly caused by link time errors reported in the runfile load map.
7305-7552	Reserved.

7553-7599
Configuration Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
7553	The configuration exceeds 32 hardware modules. May indicate an X–Bus problem or a defective hardware module.
7554-7560	Reserved.
7561	Invalid module type code. A B 26/B 27/B 28/B 38 hardware module (an X–Bus module or an input device) supplied an unrecognized self–identification code. The hardware module may be defective or the version of BTOS you are using may not support the device.
7562-7599	Reserved.

8000-8099 Communications (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
8000	Reserved.
8001	Maximum size of receive data buffer was exceeded. Indicates a breakdown in protocol or possible hardware problems.
8002	Lost clear to send during transmission. This generally indicates a modem problem.
8003	Lost carrier during reception. This indicates a problem with the modem or transmission facilities, or at the host computer site.
8004	Invalid asynchronous communication request.
8005	Character overrun detected. Receive buffers in SIO were full and another character was received, overwriting the last character. Indicates possible hardware problems.
8006	Parity error detected. There is a bad data communication line or possible hardware problems.

Decimal Value	Meaning
8007	Framing error detected. In async mode, indicates loss of stop bits at end of received character. In sync mode, the comparison between received and calculated CRCs failed. There is a bad data communication line or possible hardware problems.
8008	Invalid asynchronous communication parameters.
8009	DataSetReady (DSR) signal was not set when expected.
8010-8013	Internal errors. Consult the Unisys Customer Support Center.
8014-8099	Reserved.

8100-8199 Master/Cluster Workstation Communications (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
8100	Timeout. A workstation no longer responds to polling. In the context of 2780/3780, 8100 also means: the host computer failed to respond to a transmission. Possibly indicates a total break in communications.
8101*	Invalid state. Run the crash dump analyzer if available.
8102*	Communications hardware failure. Run the communications diagnostic.
8103*	Unrecoverable protocol failure detected by the master workstation. A cluster workstation no longer follows proper protocol procedure or attempts to recover (including an attempt to refuse communication with the master workstation). This can be caused by a hardware failure (including cabling) or excessive DMA loading.

Decimal Value	Meaning
8104*	Invalid Direct Memory Access (DMA) buffer address. An error in system initialization has caused the DMA buffer of the CWS Agent Service Process to fall outside the low-order 128K bytes of memory or on an odd-byte boundary.
8105	Internal error. Consult the Unisys Customer Support Center.
8106	Busy bit I/O. An error has occurred in the Cluster Line Protocol Handle. Consult the Unisys Customer Support Center.
8107	An unexpected interrupt was detected while attempting to transmit or receive data.
8108	Transmit DMA underrun.
8109*	Unrecoverable protocol failure detected by a cluster workstation. The cluster workstation indicates that the master workstation is no longer following proper protocol procedures. This can be caused by a hardware failure (including cabling) or excessive Multibus DMA loading.
8110	Reserved.
8111	An error in the hardware (SIO or cabling) on the cluster line has caused a temporary inability of the cluster workstation to communicate with the master workstation.

Decimal Value	Meaning
8112*	Master workstation disconnect. An unrecoverable protocol failure has occurred at the master workstation and further communications with this workstation have ceased. The most likely cause is a duplicate workstation identification somewhere within the cluster (if so, the workstation with the duplicate identification should have simultaneously crashed with this error). Other possible causes are the same as code 8109.
8113	Request block error. An improperly formatted request block was sent by a workstation.
8114	Reserved.
8115	Bootstrap failure. A protocol failure occurred during the bootstrap process.
8116	No IDs. The ID search algorithm was unable to find a free ID. In general, this indicates that the system build performed for the operating system currently running on the master workstation specified too few IDs for the cluster configuration.
8117	ID search failure. The ID search algorithm found a free ID but was unable to lock onto it for use. In general, this indicates a serious hardware or software problem.
8118-8199	Reserved.

8400-8499
Communications Interrupt Handlers (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
8400	Invalid line number. The line number specified in SetCommISR or ResetCommISR must be either 0 or 1.
8401	Line in use. The line specified in SetCommISR is being used by the operating system.
8402-8499	Reserved.

8600-8799 CommIOP (BTOS)

For more information, refer to the *BTOS Reference Manual*.

These codes are specific to the B 22 master workstation. In BTOS 8.0 and later, however, the B 22 is supported only as a cluster workstation.

Decimal Value	Meaning
8600	Reserved.
8601	CommIOP timeout. The CommIOP failed to update the status cell within a certain time period. Run the CommIOP diagnostic to determine the cause of the error.
8602	Line not configured. The communications line number is not currently configured in the system. Change the system build parameters.
8603	Missing system image for CommIOP. The file [Sys]<Sys>CommIOP>SysImage.Sys was not found.
8604	CommIOP loading error. The CommIOP could not be loaded successfully. Run the CommIOP diagnostic.
8605	Invalid CommIOP data structure. There is an invalid queue entry, an invalid CommIOP number, etc. Take a crash dump and run the CommIOP diagnostic.

Decimal Value	Meaning
8606	CommIOP channel restart. The carrier problem on the CommIOP channel was cleared.
8607	CommIOP channel hold. There is a carrier problem on one of the CommIOP channels. Disconnect the CWSs one at a time to determine which is failing.
8608-8609	Reserved.
8610	CommIOP command failure. The CommIOP returned erroneous control information to the master workstation.
8611-8614	Reserved.
8615	Invalid master workstation to CommIOP command. The CommIOP did not recognize the command from the master workstation.
8616	CommIOP bootstrap checksum failure. The CommIOP checksum test failed while loading its code file from the master workstation.
8617	CommIOP stacker/destacker failure. The Multibus interface hardware (stacker/destacker) on the CommIOP is not functional.
8618	Invalid CommIOP interrupt. The CommIOP received an interrupt from an unknown source.
8619-8520	Reserved.

Decimal Value	Meaning
8621	CommIOP RAM failure in write/read test.
8622	CommIOP RAM failure–invalid bit set.
8623	CommIOP failure–invalid bit cleared.
8624	CommIOP RAM failure in addressing test.
8625-8630	Reserved.
8631	CommIOP handler timeout. The CommIOP did not get proper status information. The most probable cause is a software problem in the master workstation that caused the master workstation Agent Service Process to be permanently suspended.
8632	Invalid CommIOP check word. The CommIOP has encountered an invalid check word in its queues. There is probably a memory error in the master workstation.
8633	CommIOP RAM checksum error. The CommIOP's RAM is probably faulty. Run the CommIOP diagnostic.
8634	Invalid queue entry. The CommIOP has discovered an invalid queue entry in its data queues. This is possibly a software error.
8635	Invalid CommIOP buffer pointer. The CommIOP received an invalid memory address of a buffer.
8636	CommIOP carrier problem.

Decimal Value	Meaning
8637	CommIOP software inconsistency. This is probably a software error. A crash dump should be taken.
8638-8640	Reserved.
8641	CommIOP timer failure. The timer hardware on the CommIOP failed the initialization tests.
8642	CommIOP DMA failure. The Direct Memory Access (DMA) hardware on the CommIOP failed the initialization tests.
8643	CommIOP SIO static test failure. The communications hardware on the CommIOP failed the static initialization test.
8644	CommIOP SIO functional test failure. The communications hardware on the CommIOP failed the functional test.
8645-8698	Reserved.
8699	The Cluster is too heavily loaded when the GetClusterStatus operation is invoked.
8700	Invalid Baud Rate specified in SetBaudRate operation.
8701	CWS timeout. The CWS did not respond in the allotted time period.

Decimal Value	Meaning
8702	CWS CRC error. An excessive number of Cyclical Redundancy Check (CRC) errors were encountered from the CWS. Run the communications and the CommIOP diagnostics.
8703	CWS overrun error. The CWS sent too much data per buffer. Check the CWS/master workstation system build parameters.
8704-8712	Invalid protocol errors. These errors are probably due to (1) a reset or power down on the CWS or (2) a faulty CWS.
8713-8799	Reserved.

8900-8999 B-NET Net Transport Service

Codes in the 8900 range are listed in the *BTOS B-NET Administration and Operations Guide.*

9000-9099 Tape Management (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
9000-9001	Reserved.
9002	Tape operation timed out. This error is usually caused by an operator error or a hardware malfunction.
9003-9008	Reserved.
9009	End-of-tape encountered. For the QIC server, this is the logical end-of-tape (in write mode, the estimate of the remaining tape space has reached zero; in read mode, blank tape has been reached).
9010	Unrecoverable I/O error occurred during a read or write operation.
9011-9015	Reserved.
9016	Tape drive is not ready. Tape drive is either off-line or busy.
9017-9020	Reserved.

Decimal Value	Meaning
9021	A file mark was encountered during a read operation.
9022-9023	Reserved.
9024	A hardware error occurred in the tape drive or the controller.
9025-9031	Reserved.
9032	A tape service request was made with an invalid tape handle or user number.
9033	A tape service was made with invalid parameters.
9034	The half-inch tape server ran out of device control blocks.
9035	An open tape service was requested with an invalid tape name.
9036	An open tape service was requested on a drive currently being used by another user.
9037	An attempt was made to write on a write-protected tape or cartridge.
9038	An unrecognized command was issued as a tape operation request.
9039	A read or write request was issued to a a half-inch tape drive that had tape errors outstanding.
9040	An open tape service was requested with an unrecognized open mode.

Decimal Value	Meaning
9041	A close tape service request was issued to a half-inch tape drive that had operations outstanding.
9042-9049	Reserved.
9050	During read mode, a tape was detected as being corrupted.
9051	During write mode with a QIC tape, the physical end-of-tape was reached before the logical end-of-tape; therefore, information was lost.
9052	Invalid tape position. A half-inch tape is neither at load point nor at the start of a file.
9053	Invalid tape reel. The tape is not part of the archive tape set currently being used for a restore operation.
9054	Invalid tape sequence. The tape is not the next archive tape in the current sequence being used for a restore operation.
9055	Invalid tape configuration file for the BTOS tape utility.
9056	Missing tape configuration file for the BTOS tape utility.
9057	Invalid tape record size specified for buffer in tape read/write request.
9058	Missing tape controller hardware.

Decimal Value	Meaning
9059-9069	Reserved.
9070	No internal buffers are available for remote processor copy-in/copy-out. This happens only if the read/write request is from a remote processor. Reissue the request.
9071	Bad alignment of user-supplied data buffer. Be sure data buffers are aligned on word boundaries.
9072	The user request specified a data buffer size larger than that specified at tape server installation time.
9073	QIC tape was removed from the drive after being opened by a user.
9074	QIC server was given an illegal command.
9075	QIC tape is not a bootable tape.
9076	QIC tape is a corrupted bootable tape.
9077-9079	Reserved.
9080	The user of tape access methods supplied a buffer that was too small. The buffer must be at least three times the record size specified in the tape configuration file used by the access method.
9081	Too many tape servers installed in the system.
9082-9098	Reserved.
9099	An attempt was made to install a tape server on a processor that already had one.

10000-10890 Mail Manager

Codes in the 10000 range are listed in the *BTOS Mail Manager Administration Guide.*

(Codes 10651 through 10669 are duplicated in the *BTOS B-NET Administration and Operations Guide.*)

11200-11299 Voice Services

Codes in the 11200 range are listed in the *BTOS Voice Services Programming Reference Manual.*

11800-11805 BTOS System Requests (BTOS)

For more information, refer to the *BTOS Reference Manual.*

Decimal Value	Meaning
11800	Internal waiting-on-Yblk error.
11801	Time-out waiting for Data Set Ready (DSR) after an open terminal request.
11802	The target processor does not respond. The processor has crashed or has a hardware failure.
11803	Routing area too small. When adding request codes, the size of the routing area in the master processor's Cdt was not increased. Increase the value of the sRouteArea parameter in the master processor's Prefix.asm file to accommodate the additional requests. Refer to the *XE 500 BTOS Customizer Operations Guide.*
11804	Illegal parity option. A mark or space parity was specified with eight data bits; the hardware does not allow this combination.
11805	The user number table used to map global user numbers to local user numbers is too small. Increase the value of the %nRemoteUser parameter in the SysGen.mdf file. Refer to the *XE 500 BTOS Customizer Operations Guide.*

11900-11902 AdminAgent (BTOS)

For more information, refer to the *BTOS Reference Manual*.

Decimal Value	Meaning
11900	The default path supplied to MfAdminAgent.run from WsAdminAgent.run is not a valid XE 500 path (for example, the path is local to a workstation volume).
11901	The AdminAgent is busy and cannot service the request.
11902	The internal request block sent from the WsAdminAgent to the MfAdminAgent has an improper format. This error can occur if the WsAdminAgent and MfAdminAgent run files are not at the same version level.

12000-14284 Miscellaneous

The following codes and code ranges are listed in various manuals, as indicated:

12000-12011 and 12084-12109

BTOS Context Manager Administration Guide

12242, 12246, 12247, 12258, 12281, 12283, 12367, and 12419

BTOS Multiplan Operations Guide

12530-12540, 12542-12560, and 12570-12586

BTOS System Performance Accelerator (SPA) Installation Guide

12700-12899

BTOS B-NET Administration and Operations Guide

13300, 13310-13315, and 13350

BTOS System Performance Accelerator (SPA) Installation Guide

13500-13599

BTOS B-NET Administration and Operations Guide

14000-14284

BTOS Protected Mode Operating System Server (PMOSS) Installation Guide

15100-15199 Math Server

Decimal Value	Meaning
15100	Math server or math co-processor exception. A floating point operation failed due to an illegal operand.
15101-15199	Reserved

15200-40026 Miscellaneous

The following codes and code ranges are listed in various manuals, as indicated:

15200

BTOS Generic Print System (GPS) Programming Reference Manual

30000-30350

BTOS OFISbridge Operations Guide

31600-31759

BTOS Local Area Network (B-LAN) Operations and Programming Guide

40001-40026

BTOS Context Manager Administration Guide

BTOS Initialization Status Analysis

BTOS tests the following hardware components during its initialization process:

Memory parity error detection circuitry
Memory
Keyboard
Interrupt circuitry
Programmable Interval Timer (PIT)

In addition, on the B 22 workstation, the following hardware components are tested during BTOS initialization:

Bus timeout circuitry
Video
Real Time Clock (RTC)

If the video test succeeds, but any of the other tests fail, the system displays the following message on the screen:

Initialization Error Status wxyzh

Each of the four digits (or bits) in the error status word corresponds to a set of one or more error conditions detected during the test. Use the bit assignment chart below to determine which of the errors have occurred. Following the table are the meanings of the 16 error conditions, numbered 0 through F (hexadecimal).

Bit assignment:

W	X	Y	Z h
F E D C	B A 9 8	7 6 5 4	3 2 1 0

The operating system continues to load the Executive if any error other than a video error is detected. If the video test fails, the operating system halts and beeps 10 times. It also displays the error code in the LEDs on the keyboard (and on the I/O memory board of the B 22 workstation). In order to distinguish from the error codes which are displayed by the bootstrap ROM, the operating system turns on the LEDs on the **OVERTYPE** key and on the **LOCK** key.

The LEDs on the I/O memory board of the B 22 workstation are numbered according to the following convention: if you are facing the LEDs on the I/O memory board, the rightmost LED is LED 0 and the leftmost one is LED 5.

Error (bit)	Meaning
0 (LED F10)	B 22/B 26/B 27/B 28/B 38: Video hardware does not respond. Possible causes are: □ There is no video board. □ The video board is not seated. □ The cables are loose or not connected. (Note that the B 22 is supported only as a cluster workstation.)
1 (LED F9)	B 22/B 26/B 27/B 28/B 38: DMA failure in "load font." (Note that the B 22 is supported only as a cluster workstation.)
2 (LED F8)	B 22/B 26/B 27/B 28/B 38: DMA failure in "read font." (Note that the B 22 is supported only as a cluster workstation.)
3 (LED F3)	B 22/B 26/B 27/B 28/B 38: The font read back from the Font RAM fails to compare with the font written to it. (Note that the B 22 is supported only as a cluster workstation.)
4	Memory test failure.
5	Bus timeout interrupt is not generated when a nonexistent memory location is referenced.
6	Invalid memory parity is not detected.

Error (bit)	Meaning
7	Keyboard hardware does not respond. Possible causes are: □ The keyboard is not connected. □ The keyboard hardware is faulty.
8	Keyboard does not return good status after the reset command. Possible causes are: □ Keys were pressed during the initialization. □ The keyboard hardware is faulty.
9	Keyboard ROM checksum failure.
A	Keyboard loopback test failure.
B	Keyboard interrupt test failure. No interrupt is generated during loopback, or TRANSMIT READY status in 8251A does not generate interrupt.
C	Real Time Clock (RTC) test failure. No interrupt occurred, or the time interval between two RTC interrupts was inconsistent with the time interval measured by Programmable Interval Timer (PIT).
D	PIT test failure. No PIT interrupt.
E	Continuous PIT interrupts.
F	Communications hardware test failure (cluster or master workstation only).

B 21-1 Workstation Bootstrap Status Codes

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears either on the screen or on the keyboard LEDs. For E0 and E1 error codes only, the audible alarm is cycled on and off five times.

No Activity During Bootstrap or Dump

The bootstrap or dump routines do not stop to report an error if there is no activity on the RS-422 cluster communications line. This can occur when the cable to the master workstation is disconnected, when the master workstation crashes, or when the Disable Cluster utility disables the master workstation. When the connection with the master workstation is reestablished, the bootstrap or dump routine automatically starts (indicated on the screen by a period for every sector transferred).

Interpreting Keyboard Codes

The error code displayed on the keyboard LEDs is interpreted as an 8-bit value with the following assignments:

LED	Bit
OVERTYPE (OT)	7 (most significant bit)
LOCK (LK)	6
F1	5
F2	4
F3	3
F8	2
F9	1
F10	0 (least significant bit)

Code Listing

For most of the status codes listed in hexadecimal format below, there is also a list of possible causes for the error (listed with the most likely cause first).

Note that the B 21-1 workstation is supported as a cluster workstation only.

Status Code (hexadecimal)	Meaning/Possible Causes
00-A2	Reserved.
A3	Serial input/output error. The serial input/output initialization routine detected an error in the serial input/output communications controller chip. Check: The CPU board (7201)
A4	8253 error. The clock initialization routine detected an error in the 8253 programmable counter/timer chip. Check: The CPU board (8253)
A5	No Set Initialization Mode (SIM). Request Initialization Mode (RIM) was sent to the master workstation, but no SIM was received. This indicates that the workstation is able to receive but not transmit, or the the master workstation is able to transmit but not receive. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
A6	No UP in initialization Set Normal Response Mode (SNRM). An Unnumbered Acknowledge (UA) or Identification Frame (XID) was sent to acknowledge the SIM sent by the master workstation, but the master workstation sent back an SNRM instead of a UA. The master workstation's time limit most likely expired waiting for the UA or XID. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
A7	No UP in initialization (DISC). A UA or XID was sent to acknowledge the SIM sent by the master workstation. The master workstation sent back a Disconnect (DISC) instead of a UA. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
A8	No UP in initialization. A UA or XID was sent to acknowledge the SIM sent by the master workstation. The master workstation sent back something other than a UA. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
A9	No identification available. The initialization routine monitored the cluster communications line but never found a free identification number. This is usually caused by attaching more workstations to a cluster communications line than the operating system of the master workstation is designed to accept. Check: Whether the operating system of the master workstation has crashed
AA	Identification failure. The initialization routine found free identification numbers by monitoring the communications line, but errors were detected when it tried to use one. This is usually caused by a failure of the collision recovery algorithm and can be overcome by pressing the reset button on the rear panel of the workstations that collided.

Status Code (hexadecimal)	Meaning/Possible Causes
AB	Read identification timeout. The initialization routine's response time limit expired after waiting 10 seconds while monitoring the communications line for an identification number. This error code is generated only after a number of successful reads. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
AC	Bad address (dump routine). The workstation identification that was sent in a frame by the master workstation did not match the one expected. Check: 1 The communications cable 2 The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
AD	Disconnected (dump routine). The master workstation sent a DISC because of excessive line or protocol errors, or because there was a conflict with the crash/dump file at the master workstation. Check: 1 Whether the file [Sys]<Sys>WS>CrashDump.Sys at the master workstation (a) does not exist, (b) is in use by another workstation that is dumping, or (c) is not large enough 2 The communications cable 3 The CPU board
AE	No UP - SNRM.
AF	No UP - REJ.
B0	No UP. After transmitting a dump block, an unexpected response was received from the master workstation. Check: 1 Whether the B 22 cluster workstation is using the fixed identification mode 2 The CPU board (7201)
B1	Read UI error. A bootstrap block (frame type UI) was expected but another frame type was received.
B2	Read SNRM error. A bootstrap block (frame type UI) was expected but an SNRM was received. Check: The CPU board (7201)

Status Code (hexadecimal)	Meaning/Possible Causes
B3	Disconnected. The master workstation chose to send a DISC because of a conflict with the System Image file, or possibly because of excessive errors during transmission. Check: 1 Whether there is a [Sys]<Sys>WSnnn>SysImage.Sys file at the master workstation for the workstation type selected nnn. The type is either 255 (the default) or whatever was selected with the T option on the menu 2 The cluster communications cables 3 The CPU board
B4	Bad checksum of System Image. The System Image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 Whether the operating system of the cluster workstation is valid 2 The CPU board (7201 or cluster communications logic) 3 The operating system or Communications Input/Output Processor of the master workstation (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
B5	Read error. Excessive input/output errors while trying to read a bootstrap interface block. Check: 1 The CPU board (7201 or cluster communications logic) 2 The cluster communications cables
B6	Read timeout. During a read operation, no response was received from the master workstation. Check: Whether the operating system of the master workstation has crashed
B7	Write DMA count is bad. After completion of a write operation, it was found that the entire block was not sent. Check: The CPU board (7201 or 8257)
B8	Write timeout. A write operation did not properly go to completion. Check: The CPU board (7201, 8257, or 8253)
B9	Bad bootstrap block format. A bootstrap block of an invalid length was received. Check: Whether the format of the bootstrap file is correct

Status Code (hexadecimal)	Meaning/Possible Causes
BA	DMA error. After initializing the DMA for a read or write, the 8257 DMA controller did not contain the same information that was written to it. Check: The CPU board (8257)
BB-CF	Reserved.
E0	ROM checksum error There is a bad ROM chip on the CPU board at device location 3H.
E1	RAM error. An error occurred during initialization of the bootstrap ROM work area. The address where the error occurred is shown on the screen, followed by the value written and the value read. Check: The CPU board
E2	RAM write/read 0's error.
E3	RAM write/read 1's error.
E4	RAM write/read address error. An error occurred during the read/write RAM test. All 1s, all 0s, or the sum of DS and DI are written, read, and compared. The comparison failed. Check: 1 The insertion of the CPU board 2 The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
E5	RAM address test error. An error occurred during the RAM addressing test. After completion of the RAM read/write address test, each RAM word should contain the sum of its own DS and DI. The RAM address test verifies that this is true. This error can be caused by a short or an always low address line causing different addresses to be written to the same RAM. It can also be caused by memory that picks up or drops bits when idle. Check: 1 The insertion of the CPU board 2 The CPU board
E6	Keyboard initialization error. An error occurred while the bootstrap ROM was initializing the hardware.
E7-EF	Reserved.

B 21-2/-3 Workstation Bootstrap Status Codes

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines, which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears on the screen. For E0 and E1 error codes only, the audible alarm is cycled on and off five times and the error code appears on the keyboard LEDs.

Errors During Bootstrap or Dump

The communications bootstrap or dump routines do not stop to report an error if there is no activity on the RS-422 cluster communications line. This can occur when the cable to the master workstation is disconnected, when the master workstation crashes, or when the Disable Cluster utility disables the master workstation. When the connection with the master workstation is reestablished, the bootstrap or dump routine automatically starts (indicated on the screen by a period for every sector transferred).

Interpreting Keyboard Codes

The E0h and E1h error codes are displayed on the keyboard LEDs. They are interpreted as follows:

LED	Error E0h	Error E1h
OVERTYPE	on	on
LOCK	on	on
F1	on	on
F2	off	off
F3	off	off
F8	off	off
F9	off	off
F10	off	on

Code Listing

For most of the status codes listed in hexadecimal format below, there is also a list of possible causes for the error (listed with the most likely cause first).

Note that B 21-2 and B 21-3 workstations are supported as cluster workstations only.

Status Code (hexadecimal)	Meaning/Possible Causes
00-02	Reserved.
03	Timeout waiting for an interrupt after a SEEK command. The floppy disk controller did not interrupt the CPU after being issued a SEEK command. Check: 1 That the operator did not open the door of the floppy disk drive 2 That the FDC and CPU boards are correctly seated on the motherboard
04	Data bit set. The data input/output bit of the floppy main status register (port 80h bit 6) is continually set to 1. The CPU cannot issue a command to the floppy disk controller. Check: The FDC board (8272)

Status Code (hexadecimal)	Meaning/Possible Causes
05	Data bit not set. The request for master bit of the floppy main status register (port 80h bit 7) is never set to 1. The floppy disk controller can neither accept a data byte from the bus master nor send a byte to the bus master. Check: The Floppy Disk Controller (FDC) board (8272)
06	DMA not done. The byte count register of the 8257 channel 0 never decreased to 0, which means that the DMA operation never finished. Check: The CPU board (8257)
07-08	Reserved.
09	Run file checksum error.
0A	File header invalid. The system image file on the floppy disk in drive 0 does not contain a valid run file. Since the IVOLUME utility does not automatically copy a system image onto the volume it is initializing, the user must copy a valid system image onto the volume. Check: The floppy disk

Status Code (hexadecimal)	Meaning/Possible Causes
0B	Floppy control register inconsistent. The floppy main status register was polled until it became ready (Port 80h was 80h). The floppy main status register was then polled again and it was not ready. Check: The FDC board (8272)
0C	Floppy disk drive became not ready during a seek. This error can be caused by opening the door of the floppy disk drive or by a bad cable from the floppy disk drive to the motherboard. Check: 1 Operator intervention 2 The cable from the floppy disk drive to the motherboard 3 The floppy disk drive 4 The FDC board (8272)
0D	Invalid floppy disk drive controller command received. The floppy disk drive controller received an undefined command during a SEEK or RECALIBRATE command. Check: 1 The seating of the FDC board on the motherboard 2 The FDC board (8272)

Status Code (hexadecimal)	Meaning/Possible Causes
0E	Floppy disk drive not ready. The floppy disk drive was not ready when the SEEK or RECALIBRATE command was issued. Check: 1 That the floppy disk is inserted in drive 0 with the disk label facing the opposite side of the release latch 2 That the door of the floppy disk drive is properly closed
OF	Floppy disk drive fault condition during a SEEK or RECALIBRATE command. The floppy disk drive did not recalibrate to track 00 after 77 step pulses or the drive fault line went active. Check: 1 The cable between the floppy disk drive and the motherboard 2 The floppy disk drive 3 The FDC board (8272)
10	Abnormal termination of SEEK command. The floppy disk drive did not complete the SEEK command correctly. Either the floppy disk drive failed or the ready status changed. Check: 1 Operator intervention 2 The floppy disk 3 The cable between the floppy disk drive and the motherboard 4 The floppy disk drive 5 The FDC board (8272)

Status Code (hexadecimal)	Meaning/Possible Causes
11	The floppy disk drive was not ready during a data transfer. Usually, this error is caused by opening the door of the floppy disk drive. Check: 1 Operator intervention 2 The floppy disk 3 The cable between the floppy disk drive and the motherboard 4 The floppy disk drive 5 The FDC board (8272)
12	Invalid floppy disk drive command received. The floppy disk drive controller reported an undefined command when the bootstrap ROM requested a data transfer. Check: 1 The seating of the FDC board on the motherboard 2 The FDC board (8272)
13	The floppy disk drive was not ready when a READ or WRITE command was issued. This error can occur only if the floppy disk drive was ready during a previous RECALIBRATE or SEEK command. Check: Operator intervention

Status Code (hexadecimal)	Meaning/Possible Causes
14	Floppy disk drive fault condition during a data transfer. The floppy disk drive's fault line went active. Check: 1 The cable between the floppy disk drive and the motherboard 2 The floppy disk drive
15	End of track. After a READ or WRITE command no EOT signal was received from the 8257. Check: 1 The cable between the floppy disk drive and the motherboard 2 The CPU board (8257) 3 The FDC board (8272)
16	Data error (data field). The floppy disk drive controller cannot read data from the floppy disk drive correctly. Check: 1 The floppy disk 2 The cable between the floppy disk drive and the motherboard 3 The floppy disk drive 4 The FDC board (8272)

Status Code (hexadecimal)	Meaning/Possible Causes
17	Data error (identification field). The floppy disk drive controller cannot read the identification field of the addressed sector. Check: 1 The floppy disk 2 The cable between the floppy disk drive and the motherboard 3 The floppy disk drive 4 The FDC board (8272)
18	Data late. The floppy disk drive controller did not get service from the 8257 in time. Check: 1 The seating of the CPU and FDC boards on the motherboard 2 The CPU board (8257) 3 The FDC board (8272)
19	No data (wrong track). During a READ or WRITE command, the floppy disk drive was on the wrong track. That is, either the floppy disk is incorrectly initialized or a SEEK command sent the read/write head to the wrong track. Check: 1 The floppy disk 2 The cable between the floppy disk drive and the motherboard 3 The floppy disk drive 4 The FDC board (8272)

Status Code (hexadecimal)	Meaning/Possible Causes
1A	No data (bad track). The track accessed was marked as number 255 (0FFh). Check: 1 The floppy disk 2 The FDC Board (8272)
1B	No data. The floppy disk drive controller reported a no data condition. The specified sector could not be found. Check: 1 The floppy disk 2 The cable between the floppy disk drive and the motherboard 3 The floppy disk drive 4 The FDC board (8272)
1C	Floppy disk write protected. This error code appears only during the dump operation and indicates that the floppy disk has a write protect tab in place. Check: The floppy disk

Status Code (hexadecimal)	Meaning/Possible Causes
1D	Missing address mark (data field). The floppy disk drive controller cannot find any identification address marks on the track. Usually, this error means that the IVOLUME utility did not initialize the floppy disk. Check: 1 The floppy disk 2 The cable between the floppy disk drive and the motherboard 3 The floppy disk drive 4 The FDC board (8272)
1E	Reserved.
1F	Abnormal termination of command. The floppy disk drive controller reported abnormal termination of a command without reporting the cause. Check: The FDC board (8272)

B 21-4/-5/-6 Workstation Bootstrap Status Codes

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines, which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears on the screen. For E0 and E1 error codes only, the audible alarm is cycled on and off five times and the error code appears on the keyboard LEDs.

Errors During Bootstrap or Dump

The communications bootstrap or dump routines do not stop to report an error if there is no activity on the RS-422 cluster communications line. This condition can occur when the cable to the master workstation is disconnected, when the master workstation fails, or when the Disable Cluster utility disables the master workstation. When the connection with the master workstation is reestablished, the bootstrap or dump routine automatically starts (indicated on the screen by a period for every sector transferred).

Interpreting Keyboard Codes

The E0h and E1h error codes are displayed on the keyboard LEDs. Interpret them as follows:

LED	Error E0h	Error E1h
OVERTYPE	on	on
LOCK	on	on
F1	on	on
F2	off	off
F3	off	off
F8	off	off
F9	off	off
F10	off	on

Code Listing

For most of the status codes listed in hexadecimal format below, there is also a list of possible causes for the error (listed with the most likely cause first).

Note that B 21-4, B 21-5 and B 21-6 workstations are supported as cluster workstations only.

Status Code (hexadecimal)	Meaning/Possible Causes
20-22	Reserved.
23	Timeout waiting for an interrupt after issuing a READ or WRITE command. The disk controller did not interrupt the CPU after performing a READ or WRITE command. Check: 1 That the operator did not open the door of the floppy disk drive 2 That the HDC and CPU boards are correctly seated on the motherboard
24	CMDBUSY always set. Bit 5 of flag register 1 (port 8Eh) is continually set, which means that the disk controller cannot accept a command. Check: The Hard Disk Controller (HDC) board
25	STRDY never set. Bit 1 of flag register 0 (port 8Fh) is never set, which means that the status registers cannot be read. Check: The HDC board

Status Code (hexadecimal)	Meaning/Possible Causes
26	DMA not done. The byte count register of 8257 channel 0 never decreased to 0, which means that the DMA operation never finished. Check: The CPU board (8257)
07-08	Reserved.
29	Run file checksum error.
2A	File header invalid. The system image file on the floppy disk in drive 0 does not contain a valid run file. Since the IVOLUME utility does not automatically copy a system image onto the volume it is initializing, the user must copy a valid system image on the volume. Check: The floppy disk
2B	Reserved.
2C	Invalid command received. The disk controller received an undefined command from the host processor. Check: The seating of the HDC and CPU boards on the motherboard
2D	Drive not ready. The disk drive was not ready when a SEEK or RECALIBRATE command was issued. Check: The disk drive power connections.

Status Code (hexadecimal)	Meaning/Possible Causes
2E	Disk fault condition during FAULT or RECALIBRATE command. The disk drive did not recalibrate, or the drive fault line became active. Check: 1 The disk drive cable to the motherboard 2 The disk drive
2F	Abnormal termination of SEEK command. The disk drive did not successfully seek a specified track. Either the drive failed or the ready status changed. Check: 1 The disk drive cable 2 The disk drive 3 The HDC board
30	Disk drive was not ready. The disk drive was not ready during a data transfer. Check: 1 The disk drive cable 2 The disk drive 3 The HDC board
31	Invalid command (bad head). See 34 for explanation.
32	Invalid command (bad sector). See 34 for explanation.
33	Invalid command (bad track). See 34 for explanation.

Status Code (hexadecimal)	Meaning/Possible Causes
34	Invalid disk command issued. This explanation applies to codes 31-34. The disk controller received an invalid parameter or an undefined command from the CPU. Check: 1 The disk drive cable 2 The HDC board 3 The CPU board
35	Disk drive not ready. The disk drive was not ready when a READ or WRITE command was issued. This error can occur only if the disk drive was ready during execution of a previous RECALIBRATE or SEEK command. Check: 1 The disk drive cable 2 The HDC board 3 The CPU board
36	Disk drive fault condition during input/output. The disk drive fault line went active. Check: 1 The disk drive cable 2 The disk drive
37	Data late. The drive controller did not receive service from the 8257 DMA channel in time to satisfy the disk drive. This error code can occur only in reference to drive 0 on the B 21-4/-5/-6.

Status Code (hexadecimal)	Meaning/Possible Causes
	Check: 1 The floppy disk drive cable 2 The HDC board 3 The CPU board (8257)
38	Data CRC. See 39 below for explanation.
39	Identification CRC. This explanation applies to codes 38 and 39. A Cyclical Redundancy Check (CRC) error occurred in a sector of data read or in the address information of the sector (identification). This generally indicates an error on the disk media. Check: 1 The disk drive 2 The disk drive cable 3 The HDC board (data separator) 4 The CPU board
3A	Halt during execution. The disk controller received a HALT command during execution of another command. Check: 1 The disk drive cable 2 The HDC board 3 The CPU board
3B	Sector not found. The sector in a READ or WRITE command was not found on the track. This can occur if neither a sector mark nor a matching sector number were found.

Status Code (hexadecimal)	Meaning/Possible Causes
	Check: 1 The disk drive 2 The disk drive cable 3 The HDC board (data separator) 4 The CPU board
3C	Abnormal termination of command (no specified cause). The disk reported abnormal termination of a command without reporting any cause. Check: The HDC board
3D	Invalid hard disk parameters. The parameters returned by the disk controller for either the number of sectors per track or the number of tracks per head was zero. Check: The HDC board
3E	Disk write protect. A write operation was attempted to a write protected disk.
3F-40	Reserved.
41-5E	These codes are for drive 1 (hard disk) on the B 21-4C/-5C/-6C workstation and are the same, respectively, as the 21-3E error codes listed above.
5F-A2	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
A3	Serial input/output error. The serial input/output initialization routine detected an error in the serial input/output communications controller chip. Check: The CPU board (7201)
A4	8253 error. The clock initialization routine detected an error in the 8253 programmable counter/timer chip. Check: The CPU board (8253)
A5	No SIM. RIM was sent to the master workstation, but no SIM was received. This indicates that the workstation is able to receive but not transmit, or that the master workstation is able to transmit but not receive. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
A6	No UP in initialization (SNRM). A UA or XID was sent to acknowledge the SIM sent by the master workstation, but the master workstation sent back an SNRM instead of a UA. The master workstation probably timed out while waiting for the UA or XID Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
A7	No UP in initialization (DISC). A UA or XID was sent to acknowledge the SIM sent by the master workstation. The master workstation sent back a DISC instead of a UA. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
A8	No UP in initialization. A UA or XID was sent to acknowledge the SIM sent by the master workstation. The master workstation sent back something other than a UA.

Status Code (hexadecimal)	Meaning/Possible Causes
	Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
A9	No identification available. The initialization routine monitored the cluster communications line but never found a free identification number. This is usually caused by attaching more workstations to a cluster communications line than the operating system of the master workstation is designed to accept. Check: Whether the operating system of the master workstation has crashed
AA	Identification failure. The initialization routine found free workstation identification numbers by monitoring the communications line, but errors were detected when it tried to use one. This is usually caused by a failure of the collision recovery algorithm and can be overcome by pressing the reset button on each of the back panels of the workstations that collided.

Status Code (hexadecimal)	Meaning/Possible Causes
AB	Read identification timeout. The initialization routine timed out after waiting 10 seconds while monitoring the communications line for a workstation identification number. This error code is generated only after a number of unsuccessful reads. Check: 1 The CPU board (7201 and cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation (for a crash)
AC	Bad address (dump routine). The workstation identification number sent in a frame by the master workstation did not match the one expected. Check: 1 The communications cable 2 The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
AD	Disconnected (dump routine.) The master workstation sent a DISC because of excessive line or protocol errors or because of a conflict with the crash/dump file at the master workstation. Check: 1 That either the file [Sys]<Sys>WSnnn>CrashDump.Sys or [Sys]<Sys>WS>CrashDump.Sys at the master workstation exists 2 That the file is not in use by another workstation that is dumping 3 That the file is large enough 4 The communications cable 5 The CPU board
AE	No UP - SNRM. See B0 for explanation.
AF	No UP - REJ. See B0 for explanation.
B0	No UP. This explanation applies to codes AE, AF, and B0. After transmitting a dump block, the master workstation sent an unexpected response. Check: 1 Whether a cluster workstation is using the fixed identification mode 2 The CPU board (7201)

Status Code (hexadecimal)	Meaning/Possible Causes
B1	Read UI error. A bootstrap block (frame type UI) was expected, but another frame type was received.
B2	Read SNRM error. A bootstrap block (frame type UI) was expected, but a SNRM was received. Check: The CPU board (7201)
B3	Disconnected. The master workstation chose to send a DISC because of a conflict with the system image file, or possibly because of excessive errors during transmission. Check: 1 That there is a [Sys]<Sys>WSnnn>SysImage.Sys file at the master workstation for the workstation type selected nnn. The type defaults to 253 for the B 21-4/-5/-6, to 254 for the B 21-2/-3, or to whatever was selected with the T option on the menu. If [Sys]<Sys>WSnnn>SysImage.Sys cannot be found, the default system image file [Sys]<Sys>WS>SysImage.Sys is loaded 2 The cluster communications cables 3 The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
B4	Bad checksum of system image. The system image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 Whether the operating system of the cluster workstation is valid 2 The CPU board (7201 or cluster communications logic) 3 Whether the communications input/output processor of the master workstation has crashed
B5	Read error. Excessive input/output errors occurred while the bootstrap interface block was being read. Check: 1 The CPU board (7201 or cluster communications logic) 2 The cluster communications cables
B6	Read timeout. During a read operation, no response was received from the master workstation. • Check: Whether the operating system of the master workstation has crashed

Status Code (hexadecimal)	Meaning/Possible Causes
B7	Write DMA count is invalid. After completion of a write operation, the bootstrap ROM determined that the entire block was not sent. Check: The CPU board (7201 or 8257)
B8	Write timeout. A write timeout did not properly complete. Check: The CPU board (7201, 8257, or 8253)
B9	Bad bootstrap block format. A bootstrap block of an invalid length was received. Check: Whether the format of the bootstrap file is correct
BA	DMA error. After initializing the DMA channel for a read or write operation, the 8257 DMA controller did not contain the same information that was written to it. Check: The CPU board (8257)
BB-CF	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
E0	ROM checksum error. There is a bad ROM chip on the CPU board at device location 3H. This error is displayed on the keyboard LEDs, not the screen. (Refer to Interpreting Keyboard Codes.)
E1	RAM error. An error occurred during initialization of the bootstrap ROM work area. This error is displayed on the keyboard LEDs, not the screen. (Refer to Interpreting Keyboard Codes.) Check: The CPU board
E2	RAM read and write 0's error. See E4 for explanation.
E3	RAM read and write 1's error. See E4 for explanation.
E4	RAM read and write address error. This explanation applies to codes E2, E3, and E4. An error occurred during the read and write RAM test. All 1s, all 0s, or the sum of DS and DI are written, read, and compared. The comparison showed that the DS and DI were not identical. The error display for E2, E3, E4, and E5 is: E: E2 1000:675C 0000 0002 where E: E2 is the error code 1000:675C is the hexadecimal address 0000 is the expected value 0002 is the received value

Status Code (hexadecimal)	Meaning/Possible Causes
	Check: That the CPU board is correctly seated on the motherboard
E5	RAM address test error. An error occurred during the RAM addressing test. After completion of the RAM read/write address test, each RAM word should contain the sum of its own DS and DI. The RAM address test verifies that this is true. This error can be caused by a short or an always low address line allowing different addresses to be written to the same RAM. It can also be caused by memory that picks up or drops bits when idle. Check: That the CPU board is correctly seated on the motherboard
E6	Keyboard initialization error. An error occurred while the bootstrap ROM was initializing the hardware.
E7-EF	Reserved.

The F0-F9 errors are generated by the communications test (menu option C). They indicate problems with the cluster communications and DMA logic or that the cluster cable was still connected to the workstation when the test was started.

F0	Underrun transfer ready not set. Status bits transmit underrun and/or transmit buffer empty were not set after a reset.
F1	CTS and/or DCD set. The status bits CTS and DCD were not set after the transmitter was enabled.

Status Code (hexadecimal)	Meaning/Possible Causes
F2	Carrier not clear. DCD did not clear after the transmitter was disabled.
F3	DMA write receive not ready. A character was written using DMA to the transmit buffer, but no character was received in the receive buffer.
F4	DMA write data error. A character was written using DMA to the transmit buffer. The character received in the receive buffer does not match the one written.
F5	DMA write data error bits. A frame was written using DMA to the transmit buffer. Though all characters within the frame were received correctly, no End of Frame character was received in the receive file. This usually indicates a chip failure.
F6	Timeout waiting for DMA read ready. A character was written using programmed input/output to the transmit buffer, but no character was received in the receive buffer.
F7	DMA read End of Frame not set. A frame was written using programmed input/output to the transmit buffer. Though all characters within the frame were received correctly, no End of Frame character was received in the receive file. This usually indicates a chip failure.

Status Code (hexadecimal)	Meaning/Possible Causes
F8	DMA read data error. A character was written using programmed input/output to the transmit buffer. The character received in the receive buffer does not match the one written.
F9	Carrier set after DISC. The DCD is still set. The most probable cause of the problem is the cluster communications cable. Check: 1 The cluster communications cable (whether it is connected to the workstation) 2 The CPU board
FA-FF	Reserved.

B 22 Workstation Bootstrap Status Codes

Introduction

When the B 22 workstation is bootstrapped, it goes through diagnostic, memory dump, and bootstrapping routines which are resident in the ROM. These routines light LEDs on the I/O memory board and on the keyboard. When the ROM program detects an error, that error code is displayed on eight keyboard LEDs: **OVERTYPE (OT)**, **LOCK (LK)**, **F1**, **F2**, **F3**, **F8**, **F9**, and **F10**. (**OT** indicates the most significant bit of the error code; **F10**, the least.)

When an error code is displayed on the workstation keyboard LEDs, the workstation audio signal is cycled on and off. This cycling continues indefinitely if the bootstrap ROM program was entered from a BTOS crash, five times if the bootstrap ROM was entered from power-up or a reset, and three times if a boot timeout error (40h) occurs.

Before performing each diagnostic test, the bootstrap ROM program displays the diagnostic test it is about to run on the six I/O memory board LEDs, CR1 through CR6. If an error occurs during the test, the same LED pattern that is displayed on the keyboard LEDs **F1**, **F2**, **F3**, **F8**, **F9**, and **F10** is left on the I/O memory board. (CR1 through CR6 display the lower six bits of an error code.)

The I/O memory board LEDs should be examined only if the workstation audio signal is cycling or if the processor has stopped executing. If the error code shown on the I/O memory board LEDs is different from the error code shown on the workstation keyboard, the I/O memory board LEDs are more likely to be correct.

If the workstation audio signal does not cycle and there has been no disk activity, the problem is probably with the processor or the power. If the signal does not cycle and there has been disk activity, the problem could lie within the operating system or diagnostic being loaded, the signal could be defective, or the I/O memory board switches could be set improperly. (SW2 on the I/O memory board has a default setting of all switches ON.)

Using Panel to Diagnose an Error

A peripheral CRT and keyboard can be connected to the workstation using an RS-232-C crossed cable assembly. The CRT should be set up to be 300 baud even parity. The Panel debugger program can be entered by pressing the **Spacebar** (20h), the **Carriage Return** (0Dh), or the **ESCAPE** key (1Bh) on a dumb terminal.

Note: If the error code is 40h (boot timeout), the space bar entry to Panel must be performed within five seconds after the error code is displayed, or the ROM program continues trying to bootstrap.

The 8086 register CX is set up to contain the error code before Panel is entered. If the error is a memory error, information related to the error is contained in registers DS, DI, SI, and BP, as follows:

Register	Contents
CX	Error code
DS	Segment base address of memory error
DI	Offset address of memory error
SI	Data written to memory
BP	Data read back from memory

If there is an error in RAM, Panel could be unreliable, as it uses RAM (0:1D0 to 0:1F0) for its stack, and uses its stack for internal argument passing and to save the values of registers. (Panel saves flags and register values when it is entered and restores them when it is exited.) Note that the only valid values of DS when a memory error occurs are those in which the last three digits are 0, such as 0000h, 1000h, etc. This information can be used to measure the reliability of Panel. In the case of a memory read/write error (60h), the only valid values of SI are 0000h, FFFh, and (DS+DI). In the case of a memory addressing error (80h), SI can only be (DS+DI). Register DI ranges from 0000h to FFFEh and is always even.

Error Code Display

The 2716 ROMs display their error codes on the six LEDs located on the I/O memory board; 2732s display their error codes on the eight keyboard LEDs described below. Both methods of error display are accompanied by the system audio signal; it sounds three times for a boot timeout error, and five times if a hardware error occurs. You can determine the ROM type by looking at the keyboard LEDs after pressing the **RESET** button. If the system has a 2732 ROM, it displays a 1 (the **F10** key lights), then a 21h (the **F1** and **F10** keys light), and an A1 (the **OVERTYPE**, **F1**, and **F10** keys light). All LEDs light at the end of a successful boot. There is no display during a boot if your system has a 2716; only error codes are displayed.

Interpreting Keyboard Codes

The error code displayed on the keyboard LEDs is interpreted as an 8-bit value, with the following bit assignments:

LED	Bit
OVERTYPE (OT)	7 (most significant bit)
LOCK (LK)	6
F1	5
F2	4
F3	3
F8	2
F9	1
F10	0 (least significant bit)

Code Listing

For most of the status codes listed in hexadecimal format below, there is also a list of possible causes for the error (listed with the most likely cause first).

Note that the B 22 workstation is supported as a cluster workstation only.

Status Code (hexadecimal)	Meaning/Possible Causes
00	No power or inoperative keyboard. If the audio signal is cycling on and off, the keyboard may be inoperative. If the keyboard is inoperative, the lower six bits of the error code are displayed on the I/O memory board LEDs as described in the introduction. If the signal is not cycling and there is no disk activity, check the power. If there is disk activity, the problem may be with the program that was booted. Note that it can take as long as five minutes for a cluster workstation operating system to initialize if the master workstation is heavily loaded. Check: 1 The workstation power indicator 2 The cable from the keyboard to the workstation 3 The keyboard 4 The software in SysImage.Sys file
01	Starting floppy dump or boot. This is not an error. This code is displayed on the LEDs just before a dump or boot is started, and it is left there until the dump or boot is completed successfully or an error occurs.

Status Code (hexadecimal)	Meaning/Possible Causes
02	No floppy disk controller. A timeout occurred when the ROM program tried to access the floppy disk controller port (port 72h). The DCI cable could be disconnected or the floppy disk controller could be installed, in which case the workstation should be powered down and up again to clear the error. Check: 1 The DCI cable connection (both ends) 2 The I/O memory board 3 The CPU board
03	Floppy disk controller register did not become ready in three seconds. The sequencer in the floppy disk controller was never ready to be used (that is, port 72h was not 80h). There is probably no power to the disk controller or, as mentioned for 02h, the floppy disk controller could be installed. In this case, the workstation should be powered down, and then up again. Check: 1 The power-on indicator 2 The floppy disk controller or Storage Module Drive (SMD) Controller board 3 The I/O memory board 4 The CPU

Status Code (hexadecimal)	Meaning/Possible Causes
04	Data-in bit set in command. The floppy disk controller was trying to send information to the processor while the processor was trying to send a new command to the controller. Usually this error code means that the floppy disk controller received an invalid command. However, this error can also result from a defective or poorly connected DCI cable. Check: 1 The DCI cable 2 The Floppy Disk Controller board or the SMD Controller board 3 The I/O memory board 4 The CPU
05	Data-in not set in result. When the processor expected result information, none was available. This error is similar to error 03. Check: 1 The DCI cable 2 The Floppy Disk Controller board or the SMD Controller board 3 The I/O memory board 4 The CPU

Status Code (hexadecimal)	Meaning/Possible Causes
06	DMA not completed. At the end of a disk transfer, the 8237 DMA count register was not 0FFFFh. This condition indicates a DMA problem. The DCI cable and the boards listed below can also cause this error. Check: 1 The DCI cable 2 The CPU 3 The Floppy Disk Controller board or the SMD Controller board 4 The I/O memory board 5 The video board
07	Volume home block checksum error. The first block of information read from the floppy disk into memory is invalid. This might be because the floppy disk in drive 0 was never processed by the IVOLUME utility. This error might also occur because the floppy disk is defective, the DMA logic is storing the wrong data in memory, or the floppy disk controller is malfunctioning. Check: 1 The floppy disk 2 The DCI cable 3 The CPU 4 The Floppy Disk Controller board or the SMD Controller board 5 The I/O memory board

Status Code (hexadecimal)	Meaning/Possible Causes
08	No file on floppy disk. The volume home block on the floppy disk in drive 0 has a length of 0 for the (SysImage.Sys in boot, Crashdump.Sys in dump) that contains the program to be booted. When the IVOLUME utility processed the floppy, the number of pages for the file was zero. Check: The floppy disk
09	Run file checksum. See 0A for explanation.
0A	File header invalid. This description applies to codes 09 and 0A. The system image file on the floppy disk in drive 0 does not contain a valid run file. You must copy a valid system image onto it. The IVOLUME utility does NOT automatically copy a system image onto the volume it is initializing. Check: The floppy disk
0B	Floppy disk controller register inconsistent. The floppy disk controller register was polled until it became ready (port 72h was 80h), but the next time it was polled it was not ready. Check: 1 The DCI cable 2 The floppy disk controller or SMD Controller board 3 The I/O memory board 4 The CPU

Status Code (hexadecimal)	Meaning/Possible Causes
0C	Floppy disk drive was not ready during seek. The floppy disk drive was not ready while seeking. Usually the operator causes this error by opening the door of the drive. Other causes are a bad floppy disk or a bad cable from the floppy disk controller to the drive. Check: 1 The floppy disk drive 2 The disk drive cable 3 The floppy disk controller or SMD Controller board
0D	Invalid floppy disk command received. This error code occurs when the floppy disk controller receives an undefined command during the seek/recalibrate phase. It is usually caused by a defective DCI cable rather than a defective floppy disk controller. Check: 1 The DCI cable 2 The floppy disk controller or SMD Controller board 3 The I/O memory board
0E	Floppy disk drive was not ready when the SEEK or RECALIBRATE command was issued. Check: 1 That the floppy disk is in drive 0 2 That the floppy disk label is on the side opposite the release latch 3 That the door is closed properly

Status Code (hexadecimal)	Meaning/Possible Causes
0F	Floppy disk drive fault condition during seek/recalibrate. This floppy disk drive failure occurs when the floppy disk does not recalibrate after 77 step pulses or when the drive fault line goes active. Check: 1 The floppy disk drive 2 The disk drive cable
10	Abnormal termination of seek. If the floppy disk did not finish a seek correctly, the drive could be defective or the ready status could have changed. Check: 1 The operator 2 The floppy disk 3 The floppy disk drive 4 The Floppy Disk Controller board or the SMD Controller board
12	Invalid floppy disk command received. This error occurs if the floppy disk controller receives an undefined command when the ROM requests a data transfer. It is possibly due to a defective DCI cable. Check: 1 The DCI cable 2 The Floppy Disk Controller board or the SMD Controller board 3 The I/O memory board

Status Code (hexadecimal)	Meaning/Possible Causes
13	Floppy disk drive not ready. This error can occur only if the floppy disk was ready during a previous recalibrate and seek. It is caused by the floppy disk drive not being ready when the READ or WRITE command is issued. The most likely cause for this error is removing the floppy disk after the bootstrap sequence has started. Check: The operator
14	Floppy disk fault condition during data transfer. Floppy disk drive fault line went active. Check: 1 The floppy disk drive 2 The disk drive cable
15	End of cylinder. After a read or write, no EOP signal is received from the DMA logic. This error usually indicates either a DCI problem or a DMA problem. Check: 1 The DCI cable 2 The 8237 CPU 3 The Floppy Disk Controller board or the SMD Controller board 4 The I/O memory board

Status Code (hexadecimal)	Meaning/Possible Causes
16	Data error: data field. The floppy disk controller was unable to read data from the floppy disk correctly. Usually the floppy disk is defective. Other possible causes are the disk cable or the floppy disk controller. Check: 1 The floppy disk 2 The floppy disk drive 3 The disk drive cable 4 The Floppy Disk Controller board or the SMD Controller board
17	Data error: ID field. The floppy disk controller was unable to read the ID of the addressed sector. Usually the floppy disk is defective. Other possibilities are the disk drive cable or the floppy disk controller. Check: 1 The floppy disk 2 The floppy disk drive 3 The disk drive cable 4 The Floppy Disk Controller board or the SMD Controller board
18	Data late. The floppy disk controller did not get service from the DMA chip in time for the floppy disk. Check: 1 The 8237 CPU 2 The DCI cable 3 The Floppy Disk Controller board or the SMD Controller board 4 The I/O memory board 5 The video board

Status Code (hexadecimal)	Meaning/Possible Causes
19	No data: wrong cylinder. During a read or write operation, the floppy disk was on the wrong cylinder. That is, either the floppy disk was initialized incorrectly or a seek went to the wrong place. Check: 1 The floppy disk 2 The floppy disk drive 3 The disk drive cable 4 The Floppy Disk Controller board or the SMD Controller board
1A	No data: bad cylinder. The cylinder accessed is marked as number 255 (0FFh). Check: 1 The floppy disk 2 The Floppy Disk Controller board or the SMD Controller board
1B	No data. The floppy disk controller reported a no data condition. This means that the specified sector could not be found. Most likely, the floppy disk is defective. Check: 1 The floppy disk 2 The floppy disk drive 3 The disk drive cable 4 The Floppy Disk Controller board or the SMD Controller board
1C	Floppy disk write protected. This error is never sent to the keyboard LEDs, because it can occur only in the dump when the floppy is being written to.

Status Code (hexadecimal)	Meaning/Possible Causes
1D	Missing address mark: data field. The floppy disk controller was unable to find the data address mark of a sector. Usually this means that the floppy disk is bad. Check: 1 The floppy disk 2 The floppy disk drive 3 The disk drive cable 4 The Floppy Disk Controller board or the SMD Controller board
1E	Missing address mark: ID field. The floppy disk controller was unable to find any ID address mark on a track. Usually this is because the floppy disk has not been initialized by the IVOLUME utility. Check: 1 The floppy disk 2 The floppy disk drive 3 The disk drive cable 4 The Floppy Disk Controller board or the SMD Controller board
1F	Abnormal termination of command (no specified cause). The floppy disk controller reported abnormal termination of a data command without reporting any cause. Check: 1 The Floppy Disk Controller board 2 The SMD Controller board

Status Code (hexadecimal)	Meaning/Possible Causes
20	ROM checksum error. There is a bad ROM chip on the CPU board (location F14 or F15). Check: CPU Board (2716 or 2732 ROMs)
21-2B	Same as 01-0B. These error codes are for hard disk unit 0; they are the same as those for the floppy disk, except that the controller is the hard disk controller board (or SMD Controller board), and the control register is port 7Ah.
2C	Invalid hard disk command received. The disk controller thinks that it has received an undefined command from the processor. Usually this is due to a defective DCI cable. Check: 1 The DCI cable 2 The hard disk controller board or the SMD Controller board 3 I/O memory board 4 The 8237 CPU
2D	Drive not ready. The disk drive (unit 0) was not ready when the SEEK or RECALIBRATE command was issued. Check: Power indicator on disk drive

Status Code (hexadecimal)	Meaning/Possible Causes
2E	Hard disk fault condition during seek/recalibrate. Hard disk drive (unit 0) failure (did not recalibrate after 77 step pulses or the drive fault line goes active). Check: 1 The hard disk drive 2 The disk drive cable
2F	Abnormal termination of seek. This error indicates that the hard disk did not finish a seek correctly. Either the drive (unit 0) failed or the ready status changed. Check: 1 The hard disk 2 The hard disk drive 3 The disk drive cable 4 The hard disk controller board or the SMD Controller board
30	Unit became not ready. The hard disk drive (unit 0) went not ready during a data transfer. Check: 1 The hard disk drive 2 The hard disk drive cable 3 The hard disk controller board or the SMD Controller board
31	Invalid command: bad head. See 34 for explanation.
32	Invalid command: bad sector. See 34 for explanation.
33	Invalid command: bad cylinder. See 34 for explanation.

Status Code (hexadecimal)	Meaning/Possible Causes
34	Invalid hard disk command issued. This explanation applies to codes 31 through 34. The hard disk controller thinks it received an illegal parameter or an undefined command from the processor. This error is usually due to a bad DCI cable. Check: 1 DCI cable 2 The hard disk controller board or the SMD Controller board 3 The I/O memory board
35	Drive not ready. The disk drive (unit 0) was not ready when the READ or WRITE command was issued. This error can occur only if the disk was ready during a previous recalibrate and a previous seek, and then went not ready. Check: 1 The DCI cable 2 The hard disk controller board or the SMD Controller board 3 The I/O memory board
36	Hard disk fault condition during I/O. Hard disk drive (unit 0) failure (drive fault line goes active). Check: 1 The DCI cable 2 The hard disk drive

Status Code (hexadecimal)	Meaning/Possible Causes
37	Data late. The hard disk controller did not get service from the DMA chip in time to satisfy the hard disk. Check: 1 The 8237 CPU 2 The DCI cable 3 The hard disk controller board or the SMD Controller board 4 The I/O memory board
38	Data CRC. See 39 for explanation.
39	ID CRC. This explanation applies to codes 38 and 39. A Cyclical Redundancy Check (parity error) occurred in a sector read (for a data CRC), or in the address information of the sector (for an ID CRC). This generally means an error on the hard disk (unit 0). Check: 1 The hard disk 2 The data separator (on the Floppy Disk Controller board) 3 The disk drive cable 4 The hard disk controller board or the SMD Controller board

Status Code (hexadecimal)	Meaning/Possible Causes
3A	Halt during execution. The hard disk controller received a HALT command during execution of some other command. Usually this is due to a bad DCI cable. Check: 1 The DCI cable 2 The hard disk controller board or the SMD Controller board 3 The I/O memory board 4 The 8237 CPU
3B	Sector not found. The sector in a READ or WRITE command was not found on the track (unit 0). It is possible that no sector mark or no matching sector number was found. Check: 1 The hard disk 2 The data separator (on the floppy controller board) 3 The disk drive cable 4 The hard disk controller board or the SMD Controller board
3C	Abnormal termination of command (no specified cause). The hard disk reported abnormal termination of a data command without reporting any cause. Check: The hard disk controller board or the SMD Controller board

Status Code (hexadecimal)	Meaning/Possible Causes
3D	Invalid disk parameters. The parameters that the hard disk controller returned, for either the number of sectors per cylinder or the number of cylinders per head, were zero. Check: 1 The hard disk controller board 2 The SMD Controller board
3E-3F	Reserved.
40	Boot timeout. If the boot program cannot find a floppy or hard disk that is ready and contains a system image before the communications routine times out (error code 0A2h), the program retries all devices. After four complete cycles, this error code is displayed, and the audio signal sounds three times. This error code is displayed for eight seconds. If a video terminal is attached and the correct character is typed on the keyboard, Panel can be entered; otherwise the program recycles. After each subsequent set of four cycles, the error code is displayed for five seconds, but the signal does not sound again. The error codes that can be reported as 40h are 02h, 22h, 42h, 62h, 82, (no DCR); 08h, 28h, 48h, 68h, 88h, (unit has no system image file); 0Eh, 2Dh, 4Dh, 6Dh, 8Dh (unit not ready); and 0A2h (never polled).
41-5F	Same as 21-3F. These error codes are for disk unit 1; they are the same as those for disk unit 0.

Status Code (hexadecimal)	Meaning/Possible Causes
60	RAM read/write test error. An error occurred during the read/write RAM test; all one, all zeros, and the sum of DS and DI were written and then read and compared. This error code indicates that the comparison failed. Check: 1 I/O memory board insertion 2 I/O memory board 3 The 8237 CPU
61-7F	Same as 21-3F. These error codes are for disk unit 2; they are the same as those for disk unit 0.
80	RAM address test error. An error occurred during the RAM addressing test. After the completion of the RAM read/write test, each RAM word must contain the sum of its own DS and DI. The RAM address test verifies that this is true. This error can result from a short that causes data for different addresses to be written to the same RAM. It can also be caused by memory that picks or drops bits when idle. Check: 1 I/O memory board insertion 2 The I/O memory board 3 The 8237 CPU
81-9F	Same as 21-3F. These error codes are for disk unit 3; they are the same as those for disk unit 0.

Status Code (hexadecimal)	Meaning/Possible Causes
A0	Communications data transfer.
A1	Doing dump or boot. This code is displayed at the start of a dump or boot; it is left there until the master protocol is initialized or until an error occurs. Once the protocol is established, the codes 0A0h and 0A1h are shown alternately after every successful data transfer. This does not indicate any problem. This code is cleared at the end of the boot or dump procedure.
A2	Never polled. This indicates a nonfatal error and occurs when a disk waits 10 seconds for an initial poll from the master workstation. This error is reported during the boot initialization routine as part of error code 40h. It is never displayed in the LEDs of the keyboard. Check: 1 The communications cable 2 The I/O memory board (SIO or RS-422 receivers) 3 That the master workstation operating system is running
A3	SIO error. This error is shown when the SIO initialization routine detects an error in the SIO communications controller IC. Check: The I/O memory board (SIO port)

Status Code (hexadecimal)	Meaning/Possible Causes
A4	8253 error. The Clock Initialization routine detects an error in the programmable counter/timer IC. Check: The I/O memory board (8253)
A5	No SIM. A RIM was sent to the master workstation, but no answering SIM was received. This can indicate that the workstation is able to receive but not transmit, or that the master workstation is able to transmit but not receive. Check: 1 The I/O memory board (SIO or RS-422 receivers/drivers) 2 The master workstation 3 The communications cable 4 The master workstation operating system (for a crash)
A6	No UP in initialization (SNRM). A UA or XID was sent to acknowledge the SIM sent by the master, but the master sent back an SNRM instead of a UA. This is probably caused by the master timing out while waiting for the UA or XID. Check: 1 The I/O memory board (SIO or RS-422 receivers/drivers) 2 The master workstation 3 The communications cable 4 The master workstation operating system (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
A7	No UP in initialization (DISC). A UA or XID was sent to acknowledge the SIM sent by the master, but the master sent back a DISC instead of a UA. The most likely cause is that switches are set for something other than fixed WsNumber mode, and the master workstation BTOS is version 4.x or earlier, which does not accept the XID as valid protocol. Check: 1 Switch settings 2 The I/O memory board (SIO or RS-422 receivers/drivers) 3 The master workstation 4 The communications cable 5 The master workstation operating system (for a crash)
A8	No UP in initialization. A UA or XID was sent to acknowledge the SIM sent by the master, but the master sent back something else instead of a UA. Check: 1 The I/O memory board (SIO or RS-422 receivers/drivers) 2 The master workstation 3 The communications cable

Status Code (hexadecimal)	Meaning/Possible Causes
A9	No ID available. The initialization routine listened to the communications line, but never found a free ID number. This is usually caused by attaching more workstations to a line than the master workstation operating system can handle. Check: The master workstation operating system (for a crash)
AA	ID failure. The initialization routine found free ID numbers when it listened to the communications line, but errors were detected every time it tried to use a number. This error is usually due to a failure of the collision recovery algorithm. It can be overcome by pressing the reset button on the stations that have collided.
AB	Read ID timeout. The initialization routine timed out after 10 seconds while listening to the communications line for an ID number. This error is generated only after some number of successful reads. Check: 1 The I/O memory board (SIO or RS-422 receivers/drivers) 2 The master workstation 3 The communications cable 4 The master workstation operating system (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
AC	Bad address (dump routine). This error occurs when the workstation ID sent in a frame by the master workstation does not match the one expected. This error is never displayed on keyboard LEDs because the program continues to do a memory test and then boot.
AD	Disconnected (dump routine). The master workstation sends a DISC because of excessive line or protocol errors, because there is no file to which to write the memory dump, or because the file is not large enough for the entire dump. This error is never displayed on keyboard LEDs because the program continues to do a memory test and then boot.
AE	No UP: SNRM. See B0 for explanation.
AF	No UP: REJ. See B0 for explanation.
B0	No UP. This explanation applies to codes AE, AF, and B0. After the dump block was transmitted, an unexpected response was received from the master workstation. These errors are never displayed on keyboard LEDs because the program continues to do a memory test and then boot.

Status Code (hexadecimal)	Meaning/Possible Causes
B1	Read UI error. A bootblock (frame type UI) is expected, but another frame type is received. Check: 1 The I/O memory board 2 That there is not a duplicate workstation ID
B2	Read SNRM error. A bootblock (frame type UI) is expected, but an SNRM is received. Check: The I/O memory board (SIO)
B3	Disconnected. The master workstation sends a DISC due to excessive errors during transmission. This can be caused by having several workstations in the fixed WsNumber mode with the same switch settings. Check: 1 The communications cables 2 The I/O memory board (SIO or RS-422 transmitters) 3 Workstation IDs in fixed WsNumber mode (duplicate IDs)

Status Code (hexadecimal)	Meaning/Possible Causes
B4	Bad checksum of system image. The system image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 Cluster workstation operating system file validity 2 Workstation IDs (fixed WsNumber mode) to insure that there are no duplicates 3 The I/O memory board (SIO or RS-422 receivers) 4 The communications cables 5 The master workstation operating system or IOP (for a crash)
B5	Read error. Excessive I/O errors occurred while trying to read a bootblock. Check: 1 The I/O memory board (SIO or RS-422 receivers) 2 The communications cables
B6	Read timeout. During a read operation, no response was received from the master workstation. Check: The master workstation operating system (for a crash)

Status Code (hexadecimal)	Meaning/Possible Causes
B7	Write DMA count bad. This error occurs after completion of a write operation, if the entire block has not been sent. Check: 1 The I/O memory board (SIO) 2 The 8237 CPU
B8	Write timeout. A write operation did not properly go to completion. Check: 1 The 8273 CPU 2 The I/O memory board (SIO or 8253)
B9	Bad bootblock format. An illegal length bootblock was received. Check: The boot file format
BA	DMA error. After initializing the DMA for a read or write, the 8237 DMA controller does not contain the same information as was written to it. Check: 1 The 8237 CPU 2 The I/O memory board 3 The video board

Status Code (hexadecimal)	Meaning/Possible Causes
BB-FE	Reserved.
FF	Successful boot. This is not an error. This code is displayed on the keyboard LEDs for 1 second just before the bootstrap ROM jumps into the program that it loads.

B 26/B 28/B 38 Workstation Bootstrap Status Codes

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines, which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears on the screen.

Errors During Bootstrap or Dump

The communications bootstrap or dump routines do not stop to report an error if there is no activity on the RS-422 cluster communications line. An error can occur when the cable to the master workstation is disconnected, when the master workstation fails, or when the Disable Cluster utility disables the master workstation. When the connection with the master workstation is reestablished, the bootstrap or dump routine automatically starts (shown on the screen by a period for every sector transferred).

Interpreting Keyboard Codes

The E0h and E1h error codes are displayed on the keyboard LEDs. Interpret them as follows:

LED	Error E0h	Error E1h
OVERTYPE	on	on
LOCK	on	on
F1	on	on
F2	off	off
F3	off	off
F8	off	off
F9	off	off
F10	off	on

Code Listing

For most of the status codes listed in hexadecimal format below, there is also a list of possible causes for the error (listed with the most likely cause first).

Status Code (hexadecimal)	Meaning/Possible Causes
00-01	Reserved.
02	No floppy controller. Processor cannot communicate with floppy controller. Check: The Dual Floppy Disk Module connection to X-Bus
03	Timeout waiting for an interrupt after a SEEK command. The floppy disk controller did not interrupt the CPU after being issued a SEEK command. Check: 1 That the user did not open the door of the floppy disk drive 2 The Dual Floppy Disk Module connection to X-Bus
04-05	Reserved.
06	DMA never finished. The Byte Count register of the 80186 DMA Channel 0 never decreased to 0, which means that the DMA operation never finished. Check: 1 The CPU board (Processor Module) 2 The Dual Floppy Disk Module (8253, WD2797)
07-08	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
09	Run file checksum error. Floppy disk contains no run file. Check: 1 The CPU board (Processor Module) 2 The Dual Floppy Disk Module
0A	File header invalid. The System Image file on the floppy disk does not contain a valid run file. Since the IVOLUME utility does not automatically copy a System Image onto the volume it is initializing, the user must copy a valid System Image onto the volume. Check: The floppy disk
0B	Floppy Control register inconsistent. The Status register was polled until it became ready. The Floppy Status register was then polled again and it was not ready. Check: The dual floppy controller (WD2797)
0C	Floppy disk drive was not ready while performing a seek. This error can be caused by opening the door of the floppy disk drive or by a bad cable from the floppy disk drive to the motherboard. Check: 1 User intervention 2 The cable from the floppy disk drive to the floppy disk controller 3 The floppy disk drive 4 The dual floppy controller (WD2797)
0D-0E	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
0F	Floppy disk drive fault condition during a SEEK or RECALIBRATE command. The floppy disk drive did not recalibrate to track 00 after 77 step pulses, or the drive fault line went active. Check: 1 The cable between the floppy disk drive and the Floppy Disk Controller board 2 The floppy disk drive 3 The dual floppy controller (WD2797)
10	Abnormal termination of SEEK command. The floppy disk drive did not complete the SEEK command correctly. Either the floppy disk drive failed, or the ready status changed. Check: 1 User intervention 2 The floppy disk 3 The cable between floppy disk drive and Floppy Disk Controller board 4 The floppy disk drive 5 The dual floppy controller (WD2797)
11-12	Reserved.
13	Floppy disk drive was not ready when a READ or WRITE command was issued. This error can occur only if the floppy disk drive was ready during a previous RECALIBRATE or SEEK command. Check: User intervention

Status Code (hexadecimal)	Meaning/Possible Causes
14	Reserved.
15	End of track. After a READ or WRITE command, no Terminal Count signal was received from the DMA. Check: 1 The cable between the floppy disk drive and Floppy Disk Controller board 2 The CPU board (Processor Module) 3 The dual floppy controller (8253)
16	Data error (data field). The floppy disk drive controller cannot read data from the floppy disk drive correctly. Check: 1 The floppy disk 2 The cable between floppy disk drive and Floppy Disk Controller board 3 The floppy disk drive 4 The dual floppy controller (WD2797)
17	Data error (identification field). The floppy disk drive controller cannot read the identification field of the addressed sector. Check: 1 The floppy disk 2 The cable between floppy disk drive and floppy disk controller 3 The floppy disk drive 4 The dual floppy controller (WD2797)

Status Code (hexadecimal)	Meaning/Possible Causes
18	The floppy disk drive controller did not get service from the 80186 DMA in time. Check: 1 The seating of the CPU on motherboard 2 The CPU board (Processor Module) 3 The dual floppy controller (WD2797) 4 The Dual Floppy Disk Module connection to the X-Bus
19-1B	Reserved.
1C	Floppy disk write protected. This error code appears only during the dump operation and indicates that the floppy disk has a write protect tab in place. Check: The floppy disk
1D-1E	Reserved.
1F	Abnormal termination of command. The floppy disk drive controller reported abnormal termination of a command without reporting the cause. Check: The dual floppy controller (WD2797)
20-22	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
23	Timeout waiting for an interrupt. The hard disk controller did not interrupt the CPU after being issued a command. Check: 1 The Floppy/Hard Disk Module connection to the X-Bus 2 The Hard Disk Controller board 3 The CPU board (Processor Module)
24-25	Reserved.
26	DMA not done. The Word Count register of the 8237 DMA Channel 3 never decreased to 0FFFFh, which means that the DMA operation never finished. Check: 1 The CPU board (Processor Module) 2 The hard disk controller (8253s, WD1010)
27	No valid volume home block. No volume home block could be found within the first track of the disk. Check: That the disk was initialized by the IVOLUME utility
28	No file. No System Image or Crash Dump file exists. Check: That the disk was initialized by the IVOLUME utility

Status Code (hexadecimal)	Meaning/Possible Causes
29	Run file checksum error. The System Image file on the hard disk failed a checksum test. Check: 1 That a valid run file was copied to the System Image file 2 The Memory board and Memory Expansion Cartridges (Processor Module) 3 The CPU board (Processor Module) 4 The Floppy/Hard Disk Module
2A	File header invalid. The System Image file on the hard disk does not contain a valid run file. Since the IVOLUME utility does not automatically copy a System Image onto the volume it is initializing, the user must copy a valid System Image onto the volume. Check: The hard disk System Image file
2B	Hard disk Status register inconsistent. The status register was polled until it became ready. The Status register was then polled again and it was not ready. Check: The Hard Disk Controller board (WD1010)
2C	No seek complete. The seek complete status was not set after an implied seek. Check: 1 The cable from the hard disk drive to the hard disk controller motherboard 2 The hard disk drive 3 The hard disk controller (WD1010)

Status Code (hexadecimal)	Meaning/Possible Causes
2D-30	Reserved.
31	Drive not ready. The hard disk drive was not ready during an operation. Check: 1 The cable from the hard disk drive to the hard disk controller motherboard 2 The hard disk drive 3 The hard disk controller (WD1010)
32	Reserved.
33	Hard disk controller was not ready. The hard disk controller remained in a busy state after a write or read operation should have completed. Check: 1 The hard disk controller (WD1010) 2 The hard disk drive
34	Reserved.
35	Sector not found. The hard disk controller could not locate a particular sector on a track. Check: 1 That the hard disk drive has been formatted 2 The cables between the hard disk drive and hard disk controller 3 The hard disk controller (WD1010) 4 The hard disk drive

Status Code (hexadecimal)	Meaning/Possible Causes
36	Data error (data field). The hard disk controller could not read data from the hard disk drive correctly. Check: 1 That the hard disk drive has been formatted 2 The cables between the hard disk drive and hard disk controller 3 The hard disk controller (WD1010) 4 The hard disk drive
37	Reserved.
38	Data late. The hard disk drive controller did not get service from the 8237 DMA controller in time. Check: 1 The seating of the CPU board on the Processor Module motherboard 2 The CPU board (Processor Module) 3 The hard disk controller (WD1010) 4 The Floppy/Hard Disk Module connection to the X-Bus
39-3B	Reserved.
3C	Hard disk write fault. This error code appears only during the dump operation. Check: 1 The cables from the hard disk drive to the motherboard 2 The hard disk controller (WD1010) 3 The hard disk drive
3D-3E	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
3F	Abnormal termination of command. The hard disk drive controller reported abnormal termination of a command without reporting the cause. Check: The hard disk controller (WD1010)
3G-A1	Reserved.
A2	Never polled. This indicates a nonfatal error and occurs when a disk waits 10 seconds for an initial poll from the master workstation. This error is reported during the boot initialization routine as part of error code 40h. It is never displayed in the LEDs of the keyboard. Check: 1 The communications cable 2 The I/O memory board (SIO or RS-422 receivers) 3 That the master workstation operating system is running
A3	Serial input/output error. The serial input/output initialization routine detected an error in the serial input/output communications controller chip. Check: 1 The I/O board (Processor Module) 2 The CPU board (Processor Module)
A4	8254 error. The clock initialization routine detected an error in the 8254 programmable counter/timer chip. Check: The CPU board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
A5	No SIM. RIM was sent to the master workstation, but no SIM was received. This indicates that the workstation is able to receive but not transmit, or that the master workstation is able to transmit but not receive. Check: 1 The I/O board (Processor Module) (cluster communications logic) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation, which may have crashed
A6	No UP in initialization (SNRM). A UA or XID was sent to acknowledge the SIM sent by the master workstation, but the master workstation sent back an SNRM instead of a UP. The master workstation probably timed out, while waiting for the UA or XID. Check: 1 The I/O board (Processor Module) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation, which may have crashed

Status Code (hexadecimal)	Meaning/Possible Causes
A7	No UP in initialization (DISC). A UA or XID was sent to acknowledge the SIM sent by the master workstation. The master workstation sent back a DISC instead of a UP. Check: 1 The I/O board (Processor Module) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation, which may have crashed
A9	No identification available. The initialization routine monitored the cluster communications line but did not find a free identification number. This is usually caused by attaching more workstations to a cluster communications line than the operating system of the master workstation is designed to accept. Check: The operating system of the master workstation, which may have crashed
AA	Identification failure. The initialization routine found free workstation identification numbers by monitoring the communications line, but errors were detected when it tried to use one. This is usually caused by a failure of the collision recovery algorithm and can be overcome by pressing the reset button on the back panels of each workstation that collided.

Status Code (hexadecimal)	Meaning/Possible Causes
AB	Read identification timeout. The initialization routine timed out after waiting 10 seconds while monitoring the communications line for a workstation identification number. This error code is generated only after a number of unsuccessful reads. Check: 1 The I/O board (Processor Module) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation, which may have crashed
AC	Bad address (dump routine). The workstation identification number sent in a frame by the master workstation did not match the one expected. Check: 1 The communications cable 2 The I/O board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
AD	Disconnected (dump routine). The master workstation sent a DISC because of excessive line or protocol errors or because of a conflict with the crash/dump file at the master workstation. Check: 1 That either the file [Sys]<Sys>WSnnn>CrashDump.Sys or [Sys]<Sys>WS>CrashDump.Sys at the master workstation exists 2 That the file is not in use by another workstation that is dumping 3 That the file is large enough 4 The communication cable 5 The I/O board (Processor Module)
AE	No UP - SNRM. Check: 1 The I/O board (Processor Module) 2 The master workstation
AF	No UP - REJ. Check: 1 The I/O board (Processor Module) 2 The master workstation
B0	No UP. After transmitting a dump block, an unexpected response was received from the master workstation. Check: 1 Whether a cluster work-station is using the fixed identification mode 2 The I/O board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
B1	Read UI error. A bootstrap block (frame type UI) was expected, but another frame type was received. Check: The I/O board (Processor Module)
B2	Read SNRM error. A bootstrap block (frame type UI) was expected, but a SNRM was received. Check: The I/O board (Processor Module)
B3	Disconnected. The master workstation chose to send a DISC because of a conflict with the System Image file, or possibly because of excessive errors during transmission. Trying to bootstrap a nonexistent operating system can cause this error to occur. Operating system number 252 is used for a workstation with no mass storage, number 251 is used for a workstation with floppy disk storage only, and number 250 is used for a workstation with both floppy and hard disk storage. Check: 1 That there is a [Sys]<Sys>WSnnn>SysImage.Sys file at the master workstation for the workstation type selected (nnn). The master workstation does not have the operating system requested. If [Sys]<Sys>WSnnn>SysImage.Sys cannot be found, the default System Image file [Sys]<Sys>WS>SysImage.Sys is loaded. 2 The cluster communications cables 3 The I/O board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
B4	Bad checksum of System Image. The System Image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 Whether the operating system of the cluster workstation is invalid 2 The I/O board (Processor Module) 3 The CPU board (Processor Module) 4 The Memory board (Processor Module)
B5	Read error. Excessive input/output errors occurred while the bootstrap interface block was being read. Check: 1 The I/O board (Processor Module) 2 The cluster communications cables
B6	Read timeout. During a read operation, no response was received from the master workstation. Check: The operating system of the master workstation, which may have failed
B7	Write DMA count is bad. After completion of a write operation, the bootstrap ROM determined that the entire block was not sent. Check: 1 The I/O board (Processor Module) 2 The CPU board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
B8	Write timeout. A write operation did not properly complete. Check: The I/O board (Processor Module)
B9	Bad bootstrap block format. A bootstrap block of an invalid length was received. Check: Whether the format of the bootstrap file is correct
BA	DMA error. After initializing the DMA channel for a read or write operation, the DMA controller did not contain the same information that was written to it. Check: The CPU board (Processor Module)
BB-DF	Reserved.
E0	ROM checksum error. There is a bad 2732 ROM on the CPU board. This error is displayed on the keyboard LEDs, not the screen. (Refer to Interpreting Keyboard Codes.) Check: The CPU board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
E1	RAM error. There is a failure in the Bootstrap ROM's RAM work area. The Bootstrap ROM uses this work area to compose error codes. If a failure occurs, the error appears on the keyboard LEDs, not on the screen. (Refer to Interpreting Keyboard Codes.) Check: The CPU board (Processor Module)
E2	RAM read and write 0's error. See E4.
E3	RAM read and write 1's error. See E4.

Status Code (hexadecimal)	Meaning/Possible Causes
E4	RAM read and write address error.

This explanation applies to codes E2, E3, and E4. An error occurred during the read and write RAM test. All 1's, all 0's, or an address pattern are written, read, and compared. The comparison showed that the data written and read were not identical. Note that if a failure is confined to a small number of memory locations, the likely source of the failure can be derived from the high-order byte of the failed addresses. The high-order addresses in the Processor Module are:

03	Memory board
47	1st RAM Expansion Cartridge
8B	2nd RAM Expansion Cartridge
C-F7	3rd RAM Expansion Cartridge
F8-F9	Video RAM
FA-FB	Font RAM

The error display for E2, E3, E4, and E5 (below) is:

E; E2

1000:675C 0000 0002

where

E: E2	is the error code
1000:675C	is the hexadecimal address
0000	is the expected value
0002	is the received value

Check:

1 The Memory board (Processor Module, includes expansion)

2 The CPU board (Processor Module)

3 The motherboard for any module connected on the X-Bus

Status Code (hexadecimal)	Meaning/Possible Causes
E5	RAM address test error. An error occurred during the RAM addressing test. After completion of the RAM read/write address test, each RAM word should contain the sum of its own address. The RAM address test verifies that this is still true after one complete cycle of the test. This error can be caused by a short or a shorted address line allowing different RAM locations to respond to the same CPU. It may also be caused by memory that picks up or drops bits when idle. Check: 1 The Memory board (Processor Module) 2 The RAM Expansion Cartridges (Processor Module)
E6	Keyboard initialization error. An error occurred while the bootstrap ROM was initializing the hardware. Check: 1 The video board (Processor Module) 2 The I/O board (Processor Module)
E7-FF	Reserved.

B 27 Workstation Bootstrap Status Codes

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines, which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears on the screen and/or keyboard LEDs/speaker.

Errors During Bootstrap or Dump

The communications bootstrap or dump routines do not stop to report an error if there is no activity on the RS-422 cluster communications line. An error can occur when the cable to the master workstation is disconnected, when the master workstation fails, or when the Disable Cluster utility disables the master workstation. When the connection with the master workstation is reestablished, the bootstrap or dump routine automatically starts (shown on the screen by a period for every sector transferred).

Interpreting Keyboard and Speaker Codes

An example of error codes is displayed on the keyboard LEDs and speaker. Interpret them as follows:

Error E0h	LED	Speaker
OVERTYPE	on	short
LOCK	on	short
F1	on	short
F2	off	long
F3	off	long
F8	off	long
F9	off	long
F10	off	long

Note: LED on corresponds to binary 1, LED off to binary 0. Short tone corresponds to binary 1, long tone to binary 0.

Code Listing

For most of the status codes listed in hexadecimal format below, there is also a list of possible causes for the error (listed with the most likely cause first).

Status Code (hexadecimal)	Meaning/Possible Causes
00-01	Reserved.
02	No floppy controller. Processor cannot communicate with floppy controller. Check: The Dual Floppy Disk Module connection to F-Bus
03	Timeout waiting for an interrupt after a SEEK command. The floppy disk controller did not interrupt the CPU after being issued a SEEK command. Check: 1 That the user did not open the door of the floppy disk drive 2 The Dual Floppy Disk Module connection to F-Bus
04-05	Reserved.
06	DMA never finished. The Byte Count register of the 80186 DMA Channel 0 never decreased to 0, which means that the DMA operation never finished. Check: 1 The CPU board (Processor Module) 2 The Dual Floppy Disk Module (8254, WD1793)

Status Code (hexadecimal)	Meaning/Possible Causes
07	Volume home block checksum error. The volume home block has a bad checksum. Check: That the disk was initialized by the IVOLUME utility.
08	No dump or system image file. If DUMP then there is no crashDump.sys file. If BOOT then there is no sysImage.sys file. Check: 1 That the disk was initialized by the IVOLUME utility 2 That a valid run file was copied to the System Image File 3 The size of the Crash Dump file 4 The memory board and the memory expansion module 5 The CPU board 6 The floppy/hard module
09	Run file checksum error. Floppy disk contains no run file. Check: 1 The CPU board (Processor Module) 2 The Dual Floppy Disk Module
0A	File header invalid. The System Image file on the floppy disk does not contain a valid run file. Since the IVOLUME utility does not automatically copy a System Image onto the volume it is initializing, the user must copy a valid System Image onto the volume. Check: The floppy disk

Status Code (hexadecimal)	Meaning/Possible Causes
0B	Floppy Control register inconsistent. The Status register was polled until it became ready. The Floppy Status register was then polled again and it was not ready. Check: The dual floppy controller (WD1793)
0C	Floppy disk drive was not ready while performing a seek. This error can be caused by opening the door of the floppy disk drive or by a bad cable from the floppy disk drive to the motherboard. Check: 1 User intervention 2 The cable from the floppy disk drive to the floppy disk controller 3 The floppy disk drive 4 The dual floppy controller (WD1793)
0D-0E	Reserved.
0F	Floppy disk drive fault condition during a SEEK or RECALIBRATE command. The floppy disk drive did not recalibrate to track 00 after 77 step pulses, or the drive fault line went active. Check: 1 The cable between the floppy disk drive and the Floppy Disk Controller board 2 The floppy disk drive 3 The dual floppy controller (WD1793)

Status Code (hexadecimal)	Meaning/Possible Causes
10	Abnormal termination of SEEK command. The floppy disk drive did not complete the SEEK command correctly. Either the floppy disk drive failed, or the ready status changed. Check: 1 User intervention 2 The floppy disk 3 The cable between floppy disk drive and Floppy Disk Controller board 4 The floppy disk drive 5 The dual floppy controller (WD1793)
11	Drive is not ready. The floppy disk drive was not ready when a READ or WRITE command was issued. Check: 1 User intervention 2 The floppy disk 3 The cable between the floppy disk and the floppy controller board 4 The floppy disk drive 5 The floppy controller
12	Reserved.
13	Drive is busy. The floppy disk drive was busy when a READ or WRITE command was issued. Check: 1 User intervention 2 The floppy disk 3 The cable between the floppy disk and the floppy controller board 4 The floppy disk drive 5 The floppy controller

Status Code (hexadecimal)	Meaning/Possible Causes
14	Reserved.
15	End of track. After a READ or WRITE command, no Terminal Count signal was received from the DMA. Check: 1 The cable between the floppy disk drive and Floppy Disk Controller board 2 The CPU board (Processor Module) 3 The dual floppy controller (WD1793)
16	Data error (data field). The floppy disk drive controller cannot read data from the floppy disk drive correctly. Check: 1 The floppy disk 2 The cable between floppy disk drive and Floppy Disk Controller board 3 The floppy disk drive 4 The dual floppy controller (WD1793)
17	Data error (identification field). The floppy disk drive controller cannot read the identification field of the addressed sector. Check: 1 The floppy disk 2 The cable between floppy disk drive and floppy disk controller 3 The floppy disk drive 4 The dual floppy controller (WD1793)

Status Code (hexadecimal)	Meaning/Possible Causes
18	Data late. The floppy disk drive controller did not get service from the 80186 DMA in time. Check: 1 The seating of the CPU on motherboard 2 The CPU board (Processor Module) 3 The dual floppy controller (WD1793) 4 The Dual Floppy Disk Module connection to the F-Bus
19-1B	Reserved.
1C	Floppy disk write protected. This error code appears only during the dump operation and indicates that the floppy disk has a write protect tab in place. Check: The floppy disk
1D-1E	Reserved.
1F	Abnormal termination of command. The floppy disk drive controller reported abnormal termination of a command without reporting the cause. Check: The dual floppy controller (WD1793)
20-22	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
23	Timeout waiting for an interrupt. The hard disk controller did not interrupt the CPU after being issued a command. Check: 1 The Floppy/Hard Disk Module connection to the F-Bus 2 The Hard Disk Controller board 3 The CPU board (Processor Module)
24-25	Reserved.
26	DMA not done. The Word Count register of the 8237 DMA Channel 3 never decreased to 0FFFFh, which means that the DMA operation never finished. Check: 1 The CPU board (Processor Module) 2 The hard disk controller (8254s, WD1010)
27	No valid volume home block. No volume home block could be found within the first track of the disk. Check: That the disk was initialized by the IVOLUME utility
28	No file. No System Image or Crash Dump file exists. Check: That the disk was initialized by the IVOLUME utility

Status Code (hexadecimal)	Meaning/Possible Causes
29	Run file checksum error. The System Image file on the hard disk failed a checksum test. Check: 1 That a valid run file was copied to the System Image file 2 The Memory board and Memory Expansion Cartridges (Processor Module) 3 The CPU board (Processor Module) 4 The Floppy/Hard Disk Module
2A	File header invalid. The System Image file on the hard disk does not contain a valid run file. Since the IVOLUME utility does not automatically copy a System Image onto the volume it is initializing, the user must copy a valid System Image onto the volume. Check: The hard disk System Image file
2B	Hard disk Status register inconsistent. The status register was polled until it became ready. The Status register was then polled again and it was not ready. Check: The Hard Disk Controller board (WD1010)
2C	No seek complete. The seek complete status was not set after an implied seek. Check: 1 The cable from the hard disk drive to the hard disk controller motherboard 2 The hard disk drive 3 The hard disk controller (WD1010)

Status Code (hexadecimal)	Meaning/Possible Causes
2D-30	Reserved.
31	Drive not ready. The hard disk drive was not ready during an operation. Check: 1 The cable from the hard disk drive to the hard disk controller motherboard 2 The hard disk drive 3 The hard disk controller (WD1010).
32	Reserved.
33	Hard disk controller was not ready. The hard disk controller remained in a busy state after a write or read operation should have completed. Check: 1 The hard disk controller (WD1010) 2 The hard disk drive
34	Reserved.
35	Sector not found. The hard disk controller could not locate a particular sector on a track. Check: 1 That the hard disk drive has been formatted 2 The cables between the hard disk drive and hard disk controller 3 The hard disk controller (WD1010) 4 The hard disk drive

Status Code (hexadecimal)	Meaning/Possible Causes
36	Data error (data field). The hard disk controller could not read data from the hard disk drive correctly. Check: 1 That the hard disk drive has been formatted 2 The cables between the hard disk drive and hard disk controller 3 The hard disk controller (WD1010) 4 The hard disk drive
37	Reserved.
38	Data late. The hard disk drive controller did not get service from the 8237 DMA controller in time. Check: 1 The seating of the CPU board on the Processor Module motherboard 2 The CPU board (Processor Module) 3 The hard disk controller (WD1010) 4 The Floppy/Hard Disk Module connection to the F-Bus
39-3B	Reserved.
3C	Hard disk write fault. This error code appears only during the dump operation. Check: 1 The cables from the hard disk drive to the motherboard 2 The hard disk controller (WD1010) 3 The hard disk drive
3D-3E	Reserved.

Status Code (hexadecimal)	Meaning/Possible Causes
3F	Abnormal termination of command. The hard disk drive controller reported abnormal termination of a command without reporting the cause. Check: The hard disk controller (WD1010)
A1	Comm Dump Wait UA No UA was received to acknowledge a sector sent to the master. Check: 1 The I/O board 2 The master workstation 3 The communication cable 4 The master operating system, which may have crashed
A2	Comm Init SRP down. Work station was never polled. No frames are being sent by the master. Check: 1 The I/O board 2 The master workstation 3 The communication cable 4 The master operating system, which may have crashed

Status Code (hexadecimal)	Meaning/Possible Causes
A3	Comm Init Sio Error. The communication line is always busy. The workstation cannot send without causing a collision. Check: 1 The I/O board 2 The master workstation 3 The communication cable 4 The master operating system, which may have crashed
A4	8254 error. The clock initialization routine detected an error in the 8254 programmable counter/timer chip. Check: The CPU board (Processor Module)
A5	No SIM. RIM was sent to the master workstation, but no SIM was received. This indicates that the workstation is able to receive but not transmit, or that the master workstation is able to transmit but not receive. Check 1 The I/O board (Processor Module) (cluster communications logic) 2 The master workstation 3 The communications cable 4 The master operating system of the master workstation, which may have crashed

Status Code (hexadecimal)	Meaning/Possible Causes
A6	No UP in initialization (SNRM). A UA or XID was sent to acknowledge the SIM sent by the master workstation, but the master workstation sent back an SNRM instead of a UP. The master workstation probably timed out, while waiting for the UA or XID. Check: 1 The I/O board (Processor Module) 2 The master workstation 3 The communications cable 4 The operating system of the master workstation, which may have crashed
A7	No UP in initialization (DISC). A UA or XID was sent to acknowledge the SIM sent by the master workstation. The master workstation sent back a DISC instead of an UP. Check: 1 The I/O board (Processor Module) 2 The master workstation, 3 The communications cable 4 The operating system of the master workstation, which may have crashed
A9	No identification available. The initialization routine monitored the cluster communications line but did not find a free identification number. This is usually caused by attaching more workstations to a cluster communications line than the operating system of the master workstation is designed to accept. Check: The operating system of the master workstation, which may have crashed

Status Code (hexadecimal)	Meaning/Possible Causes
AA	Identification failure. The initialization routine found free workstation identification numbers by monitoring the communications line, but errors were detected when it tried to use one. This is usually caused by a failure of the collision recovery algorithm and can be overcome by pressing the reset button on the back panels of each workstation that collided.
AB	Read identification timeout. The initialization routine timed out after waiting 10 seconds while monitoring the communications line for a workstation identification number. This error code is generated only after a number of unsuccessful reads. Check: 1 The I/O board (Processor Module) 2 The master workstation, 3 The communications cable 4 The operating system of the master workstation, which may have crashed
AC	Bad address (dump routine). The workstation identification number sent in a frame by the master workstation did not match the one expected. Check: 1 The communications cable 2 The I/O board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
AD	Disconnected (dump routine). The master workstation sent a DISC because of excessive line or protocol errors or because of a conflict with the crash/dump file at the master workstation. Check: 1 That either the file [Sys]<Sys>WSnnn>CrashDump.Sys or [Sys]<Sys>WS>CrashDump.Sys at the master workstation exists 2 That the file is not in use by another workstation that is dumping 3 That the file is large enough 4 The communication cable 5 The I/O board (Processor Module)
AE	No UP - SNRM. Check: 1 The I/O board (Processor Module) 2 The master workstation
AF	No UP - REJ. Check: 1 The I/O board (Processor Module) 2 The master workstation
B0	No UP. After transmitting a dump block, an unexpected response was received from the master workstation. Check: 1 Whether a cluster workstation is using the fixed identification mode 2 The I/O board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
B1	Read UI error. A bootstrap block (frame type UI) was expected, but another frame type was received. Check: The I/O board (Processor Module)
B2	Read SNRM error. A bootstrap block (frame type UI) was expected, but a SNRM was received. Check: The I/O board (Processor Module)
B3	Disconnected. The master workstation chose to send a DISC because of a conflict with the System Image file, or possibly because of excessive errors during transmission. Trying to bootstrap a nonexistent operating system can cause this error to occur. Operating system number 127 is used for a workstation with no mass storage, number 126 is used for a workstation with floppy disk storage only, and number 125 is used for a workstation with both floppy and hard disk storage.

Status Code (hexadecimal)	Meaning/Possible Causes
	Check: 1 That there is a [Sys]<Sys>WSnnn>SysImage.Sys file at the master workstation for the workstation type selected (nnn). The master workstation does not have the operating system requested. If [Sys]<Sys>WSnnn>SysImage.Sys cannot be found, the default System Image file [Sys]<Sys>WS>SysImage.Sys is loaded. 2 The cluster communications cables 3 The I/O board (Processor Module)
B4	Bad checksum of System Image. The System Image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 Whether the operating system of the cluster workstation is invalid 2 The I/O board (Processor Module) 3 The CPU board (Processor Module) 4 The Memory board (Processor Module)
B5	Read error. Excessive input/output errors occurred while the bootstrap interface block was being read. Check: 1 The I/O board (Processor Module) 2 The cluster communications cables

Status Code (hexadecimal)	Meaning/Possible Causes
B6	Read timeout. During a read operation, no response was received from the master workstation. Check: The operating system of the master workstation, which may have failed
B7	Write DMA count is bad. After completion of a write operation, the bootstrap ROM determined that the entire block was not sent. Check: 1 The I/O board (Processor Module) 2 The CPU board (Processor Module)
B8	Write timeout. A write operation did not properly complete. Check: The I/O board (Processor Module)
B9	Bad bootstrap block format. A bootstrap block of an invalid length was received. Check: Whether the format of the bootstrap file is correct
BA	DMA error. After initializing the DMA channel for a read or write operation, the DMA controller did not contain the same information that was written to it. Check: The CPU board (Processor Module)

Status Code (hexadecimal)	Meaning/Possible Causes
BB-DF	Reserved.
E0	ROM checksum error. There is a bad ROM on the CPU board. This error is displayed on the keyboard LEDs, not the screen. (Refer to Interpreting Keyboard and Speaker Codes.) Check: The CPU board (Processor Module)
E1	RAM error. There is a failure in the Bootstrap ROM's RAM work area. The Bootstrap ROM uses this work area to compose error codes. If a failure occurs, the error appears on the keyboard LEDs, not on the screen. (Refer to Interpreting Keyboard and Speaker Codes.) Check: The CPU board (Processor Module)
E2	RAM read and write 0's error. See E4.
E3	RAM read and write 1's error. See E4.

Status Code (hexadecimal)	Meaning/Possible Causes
E4	RAM read and write address error. This explanation applies to codes E2, E3, and E4. An error occurred during the read and write RAM test. All 1's, all 0's, or an address pattern are written, read, and compared. The comparison showed that the data written and read were not identical. The likely source of the failure can be derived from the high-order byte of the failed addresses. The high-order addresses in the Processor Module are: 0-7 Memory board 8F RAM Expansion Cartridge The error display for E2, E3, E4, and E5 (below) is: E: E2 1000:675C 0000 0002 where E: E2 is the error code 1000:675C is the hexadecimal address 0000 is the expected value 0002 is the received value Check: 1 The Memory board (Processor Module, includes expansion) 2 The CPU board (Processor Module) 3 The motherboard for any module connected on the X-Bus

Status Code (hexadecimal)	Meaning/Possible Causes
E5	RAM test error. This error can be caused by a short or a shorted address line allowing different RAM locations to respond to the same CPU. It may also be caused by memory that picks up or drops bits when idle. Check: 1 The memory board (Processor Module) 2 The RAM expansion cartridges (Processor Module)
E6	RAM parity error. A parity error occurred during a memory read. Check: The memory board and the memory expansion module
E7	Bad parity controller. The parity controller cannot detect parity errors and/or indicates errors when none exist. Check: The memory board
E8	Bad 8251 keyboard USART. The 8251 keyboard USART is never ready to transmit. Check: The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
E9	Bad 8259 interrupt controller. There are no external interrupts generated. Check: The CPU board
EA	Keyboard timeout. Nothing was received from the keyboard during initialization. Check: 1 The I/O board 2 The video board 3 The keyboard 4 The monitor
EB	Bad video RAM. A data error occurred during the video RAM test Check: 1 The video board 2 The CPU board 3 The motherboard
EC	Keyboard loop back failure The data received in loop back mode is incorrect Check: 1 The I/O board 2 The video board 3 The keyboard 4 The monitor

Status Code (hexadecimal)	Meaning/Possible Causes
ED	Bad Font RAM A data error occurred during the RAM test Check: 1 The I/O board 2 The motherboard 3 The video board
EE	No F-Bus time out There was no bus time out or no NMI was generated by the time out Check: 1 The memory board 2 The I/O board
EF	Bad 8254 timer The 8254 is not counting Check: The CPU board
F1-F3	Reserved
F4	DMA data error The data transferred by 8237 DMA controller is incorrect Check: 1 The motherboard 2 The memory board 3 The CPU board
F5	MA status error The status of the 8237 DMA controller after transfer is incorrect Check: 1 The memory board 2 The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
F6-F9	Reserved
FA	Bad video horizontal retrace There is no indication of horizontal retrace occurring Check: 1 The video board 2 The CPU board
FB	Bad video vertical retrace There is no indication of vertical retrace occurring Check: 1 The video board 2 The CPU board
FC	Bad video blanking There is no indication of blanking occurring Check 1 The video board 2 The CPU board
FD	Bad video pixel The pixel pattern is incorrect Check: 1 The video board 2 The CPU board
FE	Bad real time clock The real time clock is not counting Check: The CPU board

Status Code (hexadecimal)	Meaning/Possible Causes
FF	No real time clock interrupt There are no interrupts generated by the real time clock Check: The CPU board

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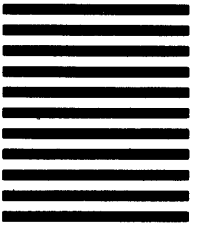

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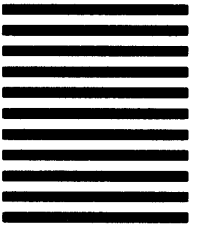

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Date	Form - PCN Number
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BTOS Status Codes Reference Manual (February 1987)

Description

This PCN updates the manual to reflect changes to the 8.0 release.

Replace this page	Add these pages
ix	iii
	10-1 thru 10-17

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Affected Pages

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Title	Original
ii	Original
iii	PCN-001
iv	Blank
v	Original
vi	Blank
vii thru viii	Original
ix	PCN-001
x	Blank
1-1 thru 1-5	Original
1-6	Blank
2-1 thru 2-95	Original
2-96	Blank
3-1 thru 3-3	Original
3-4	Blank
4-1 thru 4-10	Original
5-1 thru 5-10	Original
6-1 thru 6-19	Original
6-20	Blank
7-1 thru 7-30	Original
8-1 thru 8-21	Original
8-22	Blank
9-1 thru 9-26	Original
10-1 thru 10-17	PCN-001
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EF 9000 Workstation (Bootstrap Status Codes)

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears on the motherboard LEDs and on the screen (if the screen has already been tested and found to be working.)

Errors During Bootstrap

The communications bootstrap routines report all errors found on the screen. Soft errors (bad frame received, disconnected in boot, etc.) cause the communications to be restarted from the beginning. Successful loading of the operating system can be detected by the presence of periods on the screen. A period is printed for every sector successfully transferred. Hard errors (SIO failure) cause the bootstrap ROM to halt operation.

Interpreting Motherboard LEDs

During the hardware tests and bootstrap, the motherboard LEDs display a code which indicates which test is being performed. The following are these codes.

LEDs (1=on, 0=off)	Tests Being Performed
1 1 1 1	Start of microprocessor initialization
1 1 1 0	Start of firmware memory test
1 1 0 1	Start of ROM checksum test
1 1 0 0	Start of video memory and controller test
1 0 1 1	Start of MM 58274 RTC test
1 0 1 0	Start of 8259A interrupt controller test
1 0 0 1	Start of 2681 USART I-Bus/S-Bus test
1 0 0 0	Start of Keyboard/I-Bus test
0 1 1 1	Start of NVM test
0 1 1 0	Start of 8254 timer test
0 1 0 1	Start of RS 232C (A & B) 7201 USART test
0 1 0 0	Start of RS 232C (C & D) 2681 USART test
0 0 1 1	Start of low RAM test
0 0 1 0	Start of high RAM test
0 0 0 1	Start of security module test
0 0 0 0	Menu mode and boot

Code Listing

In addition to the 4-bit LED codes displayed on the motherboard, once the screen has been tested and found to be working, an 8-bit error code will be displayed for each error found. These 8-bit codes are displayed as 2 hexadecimal digits.

Note: There is a list of possible causes for most of the following error codes. The most likely cause is listed first.

The following are interpretations of these codes.

Status Code (hexadecimal)	Meaning/Possible Causes
00-A1	Reserved
A2	Communications initialization error. The workstation was never polled. No frames are being sent by the master. Check: 1 The motherboard 2 The master workstation 3 The communications cable 4 The master operating system, which may have crashed
A3	SIO communications error. The communications line is always busy. The workstation cannot send without causing a collision. Check: 1 The motherboard 2 The master workstation 3 The communications cable 4 The master operating system, which may have crashed
A4-A8	Reserved

Status Code (hexadecimal)	Meaning/Possible Causes
A9	No identification number available. The initialization routine monitored the cluster communications line, but was not able to find a free identification number. This is usually caused by attaching more workstations to a cluster communications line than the operating system of the master is designed to accept. Check: The master operating system, which may have crashed
AA	Identification failure. The initialization routine found free workstation identification numbers by monitoring the communications line, but errors were detected when it tried to use one. This is usually caused by a failure of the collision retry algorithm and can be overcome by resetting each machine involved in the collisions.
AB-AF	Reserved
B0	No UP frame. After transmitting a frame, the master didn't respond with a UP. A different frame type, or a bad frame was detected. Check: 1 Whether a cluster workstation is using the fixed identification mode 2 The motherboard
B1	Read UI error. A bootstrap block (frame type UI) was expected, but another type was received. Check: The motherboard
B2	Reserved

Status Code (hexadecimal)	Meaning/Possible Causes
B3	Disconnect during boot. The master workstation chose to send a DISC frame because of a conflict with the system image file or because of extensive errors during transmission. Trying to bootstrap a nonexistent operating system can cause this error to occur. Operating system number 200 is used for the EF 9000. Check: 1 [Sys]<Sys> WS200>SysImage.sys file at the master workstation 2 The communication cable 3 The motherboard
B4	Bad checksum of system image. The system image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 The operating system of the cluster workstation to see if it is valid 2 The motherboard 3 The communication cable
B5	Read error. Excessive I/O errors occurred while the bootstrap interface block was being read. Check: 1 The motherboard 2 The communication cable
B6	Read time out. During a read operation, no response was received from the master workstation. Check: The master OS, which may have crashed

Status Code (hexadecimal)	Meaning/Possible Causes
B7	DMA write count bad. After completion of a write operation, the bootstrap ROM determined that the block was not sent entirely. Check: The motherboard
B8	Write time out. A write operation did not complete properly. Check: The motherboard
B9	Bad boot block format. A bootstrap block of invalid length was received. Check: Format of bootstrap file

2681 Error Codes (CO-CB)

These error codes come in pairs. The listed codes are for the 2681 controlling the I and S buses. This listed code plus 1 is for the 2681 controlling RS 232 ports C and D.

Status Code (hexadecimal)	Meaning/Possible Causes
CO	TxRDY error. During the test of the 2681, the TxRDY bit did not reflect the expected status. Check: The motherboard
C2	TxEMT error. During the test of the 2681, the TxEMT bit did not activate when expected. Check: The motherboard

Status Code (hexadecimal)	Meaning/Possible Causes
C4	RxRDY error. During the test of the 2681, the RxRDY bit did not reflect the expected status. Check: The motherboard
C6	Bad character. During the test of the 2681, a bad character was received during the internal loopback. Check: The motherboard
C8	RxOver set. During the test of the 2681, the RxOver bit did not reflect the expected status. Check: The motherboard
CA	No interrupt generated. During the test of the 2681, no TxEMT interrupt was generated. Check: The motherboard

Keyboard Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
CC	Keyboard didn't answer. During the test of the keyboard, no answer was received. Check: 1 The motherboard 2 The keyboard 3 The monitor

Status Code (hexadecimal)	Meaning/Possible Causes
CD	Bad Echo. During the echo test of the keyboard, a character was sent and a different character was received. Check: 1 The motherboard 2 The keyboard 3 The monitor
CE	Bad ROM checksum. During the keyboard checksum test, an incorrect answer was returned. This can be caused by hitting a key during the test. Check: 1 The motherboard 2 The keyboard 3 The monitor
CF	Write timeout. During the keyboard test, an error occurred when writing. Check: 1 The motherboard 2 The keyboard 3 The monitor
D0	No keyboard found. During initialization, no keyboard was found connected to the system. **Note:** This does not necessarily reflect an error. Check: 1 The motherboard 2 The keyboard 3 The monitor

ROM Checksum Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D1	ROM checksum error. A bad checksum was calculated for the CPU ROMs. Check: 1 The motherboard 2 The ROM chips

RTC Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D2	Bad status. During the test of the RTC, the status flags (interrupt occurred and data changed) did not accurately reflect the status of the RTC. The flags were always detected set. Check: 1 The motherboard 2 The battery supplying the RTC
D3	Bad status. During the test of the RTC, the status flags (interrupt occurred and data changed) did not accurately reflect the status of the RTC. The flags were always detected reset. Check: 1 The motherboard 2 The battery supplying the RTC
D4	Bad value. During the test of the RTC, no change was detected in the 1/10 second register value. Check: 1 The motherboard 2 The battery supplying the RTC

Interrupt Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D5	No interrupt. During the interrupt test, the 8259 didn't generate an interrupt. Check: The motherboard

VSDD Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D6	Bad ATAC. During the VSDD test, the ATAC did not change values. Check: 1 The motherboard 2 The monitor

Timer Test Error Codes

The listed error code gives an indication of which timer was found to be faulty. The possible errors are bad status, bad counter values, or bad output signals.

Status Code (hexadecimal)	Meaning/Possible Causes
D7	Timer 0 error. During the timer test, timer 0 of the 8254 did not pass one of the three mentioned tests. Check: The motherboard
D8	Timer 1 error. During the timer test, timer 1 of the 8254 did not pass one of the three mentioned tests. Check: The motherboard

Status Code (hexadecimal)	Meaning/Possible Causes
D9	Timer 2 error. During the timer test, timer 2 of the 8254 did not pass one of the three mentioned tests. Check: The motherboard

7201 MPSC Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
DA	TxEMT error. The TxEMT bit did not accurately reflect the state of the chip, during the test of the 7201. **Note:** This error can be caused by a nonworking 8254, since the 8254 is used to provide a clock for the 7201. Check: The motherboard
DB	No interrupt. During the test of the 7201, no TxEMT interrupt was generated. **Note:** This error can be caused by a nonworking 8254, since the 8254 is used to provide a clock for the 7201. Check: The motherboard

Optional 2681

Status Code (hexadecimal)	Meaning/Possible Causes
DC	Optional 2681 doesn't exist. During initialization, the optional 2681 was not found. **Note:** This is not necessarily an error.

Communications Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
DD	Channel A loopback error. During the external loopback test of 7201, channel A did not receive the same character which was sent. Check: 1 The motherboard 2 The communication loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.
DE	Channel B loopback error. During the external loopback test of the 7201, channel B did not receive the same character which was sent. Check: 1 The motherboard 2 The communications loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.
DF	Channel C loopback error. During the external loopback test of the 2681, channel C did not receive the same character which was sent. Check: 1 The motherboard 2 The communications loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.

Status Code (hexadecimal)	Meaning/Possible Causes
E0	Channel D loopback error. During the external loopback test of the 2681, channel D did not receive the same character which was sent. Check: 1 The motherboard 2 The communication loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.
E1	Cluster communications loopback error. During the loopback test of the cluster communications channel, the received frame did not match that which was sent. Check: 1 The motherboard 2 The cluster communications line **Note:** The EF 9000 must be disconnected from the cluster line for successful completion of this test.

Security Module Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
E2	Security module not present. During initialization, no security module was detected. **Note:** This is not necessarily an error. Check: 1 The motherboard 2 The security module

Status Code (hexadecimal)	Meaning/Possible Causes
E3	Security module didn't respond. During initialization a security module was detected, but communication with it was not possible. Check: 1 The motherboard 2 The security module
E4	Security module CPU error. During initialization, the security module's CTR reported a problem with its CPU or ROM. Check: 1 The motherboard 2 The security module
E5	Security module RAM error. During initialization, the security module's CTR reported a problem with its RAM. Check: 1 The motherboard 2 The security module
E6	Security module data cipher processor (DCP) error. During initialization, the security module's CTR reported a problem with its DCP. Check: 1 The motherboard 2 The security module
E7	Security module FIFO error. During the test of the security module, the FIFO buffer did not function correctly. Check: 1 The motherboard 2 The security module

Status Code (hexadecimal)	Meaning/Possible Causes
E8	Security module encryption error. During the test of the security module, a text was encrypted incorrectly. Check: 1 The motherboard 2 The security module
E9	S-bus loopback error. During the loopback test of the S-bus, the character that was received didn't match the character that was sent. Check: 1 The motherboard 2 The S-bus loopback plug **Note:** The S-bus loopback plug is necessary for successful completion of this test.

NVM Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
EA	APF line is always active. During the test of the CMOS RAM, the advanced power fail line was always active. Check: 1 The motherboard 2 The battery power for the CMOS RAM

RAM Test Error Code

Status Code (hexadecimal)	Meaning/Possible Causes
EB	Bad address line. During a memory test, an address line was found to be inoperative. Check: The motherboard
EC	Couldn't verify all 1's. See error code EF for explanation.
ED	Couldn't verify word address. See error code EF for explanation.
EE	Couldn't verify all 0's. See error code EF for explanation.
EF	Bad memory location. This explanation applies to errors EC,ED,EE and EF. During the memory test, the verification of read and write data was not successful. The comparison showed that the data written and read back were not identical. The location of the bad RAM may be determined from the segment value of the error. The following are the various RAM locations: 0000-7FFF Basic RAM 8000-EBFF Expansion RAM EC00-EFFF CMOS RAM F000-F7FF Video RAM

Status Code (hexadecimal)	Meaning/Possible Causes
EF (cont.)	The following display is for these memory errors: Failure: VV WWWW: XXXX YYYY ZZZZ where: VV is the error code WWWW is the segment value of the error XXXX is the offset of the error YYYY is the data written to the memory location ZZZZ is the data read back Check: The motherboard
F0	Parity error during memory test. An unexpected NMI was generated as a result of reading from or writing to memory. Check: The motherboard

UNISYS Publication Change Notice (PCN)

Date	Form - PCN Number
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Title

BTOS Status Codes Reference Manual (February 1987)

Description

This PCN updates the manual to reflect changes to the 8.0 release, and includes technical updates to PCN-001.

Replace this page

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B 24 Workstation (Bootstrap Status Codes)

Introduction

When the workstation is bootstrapped, it goes through diagnostic and bootstrapping routines which are resident in the ROM of the CPU. When the bootstrap ROM detects an error, the error code appears on the motherboard LEDs and on the screen (if the screen has already been tested and found to be working.)

Errors During Bootstrap

The communications bootstrap routines report all errors found on the screen. Soft errors (bad frame received, disconnected in boot, etc.) cause the communications to be restarted from the beginning. Successful loading of the operating system can be detected by the presence of periods on the screen. A period is printed for every sector successfully transferred. Hard errors (SIO failure) cause the bootstrap ROM to halt operation.

Interpreting Motherboard LEDs

During the hardware tests and bootstrap, the motherboard LEDs display a code which indicates which test is being performed. The following are these codes.

LEDs	Tests Being Performed
(1=on, 0=off)	
1 1 1 1	Start of microprocessor initialization
1 1 1 0	Start of firmware memory test
1 1 0 1	Start of ROM checksum test
1 1 0 0	Start of video memory and controller test
1 0 1 1	Start of MM 58274 RTC test
1 0 1 0	Start of 8259A interrupt controller test
1 0 0 1	Start of 2681 USART I-Bus/S-Bus test
1 0 0 0	Start of Keyboard/I-Bus test
0 1 1 1	Start of NVM test
0 1 1 0	Start of 8254 timer test
0 1 0 1	Start of RS 232C (A & B) 7201 USART test
0 1 0 0	Start of RS 232C (C & D) 2681 USART test
0 0 1 1	Start of low RAM test
0 0 1 0	Start of high RAM test
0 0 0 1	Start of security module test
0 0 0 0	Menu mode and boot

Code Listing

In addition to the 4-bit LED codes displayed on the motherboard, once the screen has been tested and found to be working, an 8-bit error code will be displayed for each error found. These 8-bit codes are displayed as 2 hexadecimal digits.

Note: There is a list of possible causes for most of the following error codes. The most likely cause is listed first.

The following are interpretations of these codes.

Status Code (hexadecimal)	Meaning/Possible Causes
00-A1	Reserved
A2	Communications initialization error. The workstation was never polled. No frames are being sent by the master. Check: 1 The motherboard 2 The master workstation 3 The communications cable 4 The master operating system, which may have crashed
A3	SIO communications error. The communications line is always busy. The workstation cannot send without causing a collision. Check: 1 The motherboard 2 The master workstation 3 The communications cable 4 The master operating system, which may have crashed
A4-A8	Reserved

Status Code (hexadecimal)	Meaning/Possible Causes
A9	No identification number available. The initialization routine monitored the cluster communications line, but was not able to find a free identification number. This is usually caused by attaching more workstations to a cluster communications line than the operating system of the master is designed to accept. Check: The master operating system, which may have crashed
AA	Identification failure. The initialization routine found free workstation identification numbers by monitoring the communications line, but errors were detected when it tried to use one. This is usually caused by a failure of the collision retry algorithm and can be overcome by resetting each machine involved in the collisions.
AB-AF	Reserved
B0	No UP frame. After transmitting a frame, the master didn't respond with a UP. A different frame type, or a bad frame was detected. Check: 1 Whether a cluster workstation is using the fixed identification mode 2 The motherboard
B1	Read UI error. A bootstrap block (frame type UI) was expected, but another type was received. Check: The motherboard
B2	Reserved

Status Code (hexadecimal)	Meaning/Possible Causes
B3	Disconnect during boot. The master workstation chose to send a DISC frame because of a conflict with the system image file or because of extensive errors during transmission. Trying to bootstrap a nonexistent operating system can cause this error to occur. Operating system number 200 is used for the B 24. Check: 1 [Sys]<Sys> WS200>SysImage.sys file at the master workstation 2 The communication cable 3 The motherboard
B4	Bad checksum of system image. The system image transferred from the master workstation is not a valid run file. Either the file is invalid, or the transmission was faulty or incomplete. Check: 1 The operating system of the cluster workstation to see if it is valid 2 The motherboard 3 The communication cable
B5	Read error. Excessive I/O errors occurred while the bootstrap interface block was being read. Check: 1 The motherboard 2 The communication cable
B6	Read time out. During a read operation, no response was received from the master workstation. Check: The master OS, which may have crashed

Status Code (hexadecimal)	Meaning/Possible Causes
B7	DMA write count bad. After completion of a write operation, the bootstrap ROM determined that the block was not sent entirely. Check: The motherboard
B8	Write time out. A write operation did not complete properly. Check: The motherboard
B9	Bad boot block format. A bootstrap block of invalid length was received. Check: Format of bootstrap file

2681 Error Codes (CO-CB)

These error codes come in pairs. The listed codes are for the 2681 controlling the I and S buses. This listed code plus 1 is for the 2681 controlling RS 232 ports C and D.

Status Code (hexadecimal)	Meaning/Possible Causes
CO	TxRDY error. During the test of the 2681, the TxRDY bit did not reflect the expected status. Check: The motherboard
C2	TxEMT error. During the test of the 2681, the TxEMT bit did not activate when expected. Check: The motherboard

Status Code (hexadecimal)	Meaning/Possible Causes
C4	RxRDY error. During the test of the 2681, the RxRDY bit did not reflect the expected status. Check: The motherboard
C6	Bad character. During the test of the 2681, a bad character was received during the internal loopback. Check: The motherboard
C8	RxOver set. During the test of the 2681, the RxOver bit did not reflect the expected status. Check: The motherboard
CA	No interrupt generated. During the test of the 2681, no TxEMT interrupt was generated. Check: The motherboard

Keyboard Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
CC	Keyboard didn't answer. During the test of the keyboard, no answer was received. Check: 1 The motherboard 2 The keyboard 3 The monitor

Status Code (hexadecimal)	Meaning/Possible Causes
CD	Bad Echo. During the echo test of the keyboard, a character was sent and a different character was received. Check: 1 The motherboard 2 The keyboard 3 The monitor
CE	Bad ROM checksum. During the keyboard checksum test, an incorrect answer was returned. This can be caused by hitting a key during the test. Check: 1 The motherboard 2 The keyboard 3 The monitor
CF	Write timeout. During the keyboard test, an error occurred when writing. Check: 1 The motherboard 2 The keyboard 3 The monitor
D0	No keyboard found. During initialization, no keyboard was found connected to the system. **Note:** This does not necessarily reflect an error. Check: 1 The motherboard 2 The keyboard 3 The monitor

ROM Checksum Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D1	ROM checksum error. A bad checksum was calculated for the CPU ROMs. Check: 1 The motherboard 2 The ROM chips

RTC Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D2	Bad status. During the test of the RTC, the status flags (interrupt occurred and data changed) did not accurately reflect the status of the RTC. The flags were always detected set. Check: 1 The motherboard 2 The battery supplying the RTC
D3	Bad status. During the test of the RTC, the status flags (interrupt occurred and data changed) did not accurately reflect the status of the RTC. The flags were always detected reset. Check: 1 The motherboard 2 The battery supplying the RTC
D4	Bad value. During the test of the RTC, no change was detected in the 1/10 second register value. Check: 1 The motherboard 2 The battery supplying the RTC

Interrupt Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D5	No interrupt. During the interrupt test, the 8259 didn't generate an interrupt. Check: The motherboard

VSDD Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
D6	Bad ATAC. During the VSDD test, the ATAC did not change values. Check: 1 The motherboard 2 The monitor

Timer Test Error Codes

The listed error code gives an indication of which timer was found to be faulty. The possible errors are bad status, bad counter values, or bad output signals.

Status Code (hexadecimal)	Meaning/Possible Causes
D7	Timer 0 error. During the timer test, timer 0 of the 8254 did not pass one of the three mentioned tests. Check: The motherboard
D8	Timer 1 error. During the timer test, timer 1 of the 8254 did not pass one of the three mentioned tests. Check: The motherboard

Status Code (hexadecimal)	Meaning/Possible Causes
D9	Timer 2 error. During the timer test, timer 2 of the 8254 did not pass one of the three mentioned tests. Check: The motherboard

7201 MPSC Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
DA	TxEMT error. The TxEMT bit did not accurately reflect the state of the chip, during the test of the 7201. **Note:** This error can be caused by a nonworking 8254, since the 8254 is used to provide a clock for the 7201. Check: The motherboard
DB	No interrupt. During the test of the 7201, no TxEMT interrupt was generated. **Note:** This error can be caused by a nonworking 8254, since the 8254 is used to provide a clock for the 7201. Check: The motherboard

Optional 2681

Status Code (hexadecimal)	Meaning/Possible Causes
DC	Optional 2681 doesn't exist. During initialization, the optional 2681 was not found. **Note:** This is not necessarily an error.

Communications Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
DD	Channel A loopback error. During the external loopback test of 7201, channel A did not receive the same character which was sent. Check: 1 The motherboard 2 The communication loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.
DE	Channel B loopback error. During the external loopback test of the 7201, channel B did not receive the same character which was sent. Check: 1 The motherboard 2 The communications loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.
DF	Channel C loopback error. During the external loopback test of the 2681, channel C did not receive the same character which was sent. Check: 1 The motherboard 2 The communications loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.

Status Code (hexadecimal)	Meaning/Possible Causes
E0	Channel D loopback error. During the external loopback test of the 2681, channel D did not receive the same character which was sent. Check: 1 The motherboard 2 The communication loopback plugs **Note:** The external loopback plugs are necessary for successful completion of this test.
E1	Cluster communications loopback error. During the loopback test of the cluster communications channel, the received frame did not match that which was sent. Check: 1 The motherboard 2 The cluster communications line **Note:** The B 24 must be disconnected from the cluster line for successful completion of this test.

Security Module Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
E2	Security module not present. During initialization, no security module was detected. **Note:** This is not necessarily an error. Check: 1 The motherboard 2 The security module

Status Code (hexadecimal)	Meaning/Possible Causes
E3	Security module didn't respond. During initialization a security module was detected, but communication with it was not possible. Check: 1 The motherboard 2 The security module
E4	Security module CPU error. During initialization, the security module's CTR reported a problem with its CPU or ROM. Check: 1 The motherboard 2 The security module
E5	Security module RAM error. During initialization, the security module's CTR reported a problem with its RAM. Check: 1 The motherboard 2 The security module
E6	Security module data cipher processor (DCP) error. During initialization, the security module's CTR reported a problem with its DCP. Check: 1 The motherboard 2 The security module
E7	Security module FIFO error. During the test of the security module, the FIFO buffer did not function correctly. Check: 1 The motherboard 2 The security module

Status Code (hexadecimal)	Meaning/Possible Causes
E8	Security module encryption error. During the test of the security module, a text was encrypted incorrectly. Check: 1 The motherboard 2 The security module
E9	S-bus loopback error. During the loopback test of the S-bus, the character that was received didn't match the character that was sent. Check: 1 The motherboard 2 The S-bus loopback plug **Note:** The S-bus loopback plug is necessary for successful completion of this test.

NVM Test Error Codes

Status Code (hexadecimal)	Meaning/Possible Causes
EA	APF line is always active. During the test of the CMOS RAM, the advanced power fail line was always active. Check: 1 The motherboard 2 The battery power for the CMOS RAM

RAM Test Error Code

Status Code (hexadecimal)	Meaning/Possible Causes
EB	Bad address line. During a memory test, an address line was found to be inoperative. Check: The motherboard
EC	Couldn't verify all 1's. See error code EF for explanation.
ED	Couldn't verify word address. See error code EF for explanation.
EE	Couldn't verify all 0's. See error code EF for explanation.
EF	Bad memory location. This explanation applies to errors EC,ED,EE and EF. During the memory test, the verification of read and write data was not successful. The comparison showed that the data written and read back were not identical. The location of the bad RAM may be determined from the segment value of the error. The following are the various RAM locations: 0000-7FFF Basic RAM 8000-EBFF Expansion RAM EC00-EFFF CMOS RAM F000-F7FF Video RAM

Status Code (hexadecimal)	Meaning/Possible Causes
EF (cont.)	The following display is for these memory errors: Failure: VV WWWW: XXXX YYYY ZZZZ where: VV is the error code WWWW is the segment value of the error XXXX is the offset of the error YYYY is the data written to the memory location ZZZZ is the data read back Check: The motherboard
F0	Parity error during memory test. An unexpected NMI was generated as a result of reading from or writing to memory. Check: The motherboard