Bring Up Driver User’s Guide

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1.0 SYSTEM REQUIREMENTS

The minimum hardware requirements for test are a machine for test, an ASCII terminal with serial cable, a floppy drive, and 16 megabytes of memory. The user may also test remotely via a motif interface, which requires a RS/6000−AIX based system and a serial cable to hook the RISC system to the machine under test. User interaction to the machine under test must be via one of the afore mentioned methods.

The ASCII terminal Setup will describe how to set up the ASCII display so that the Bring Up Driver (BUD) screens will be displayed correctly. The Motif Setup will describe what is required to run motif BUD.

Obtaining an Executable

The user may make an executable diskette of BUD from the Mosaic page at (URL: http://w3.austin.ibm.com/afs/austin/depts/clys/public_html/bud−disk_menu.html).

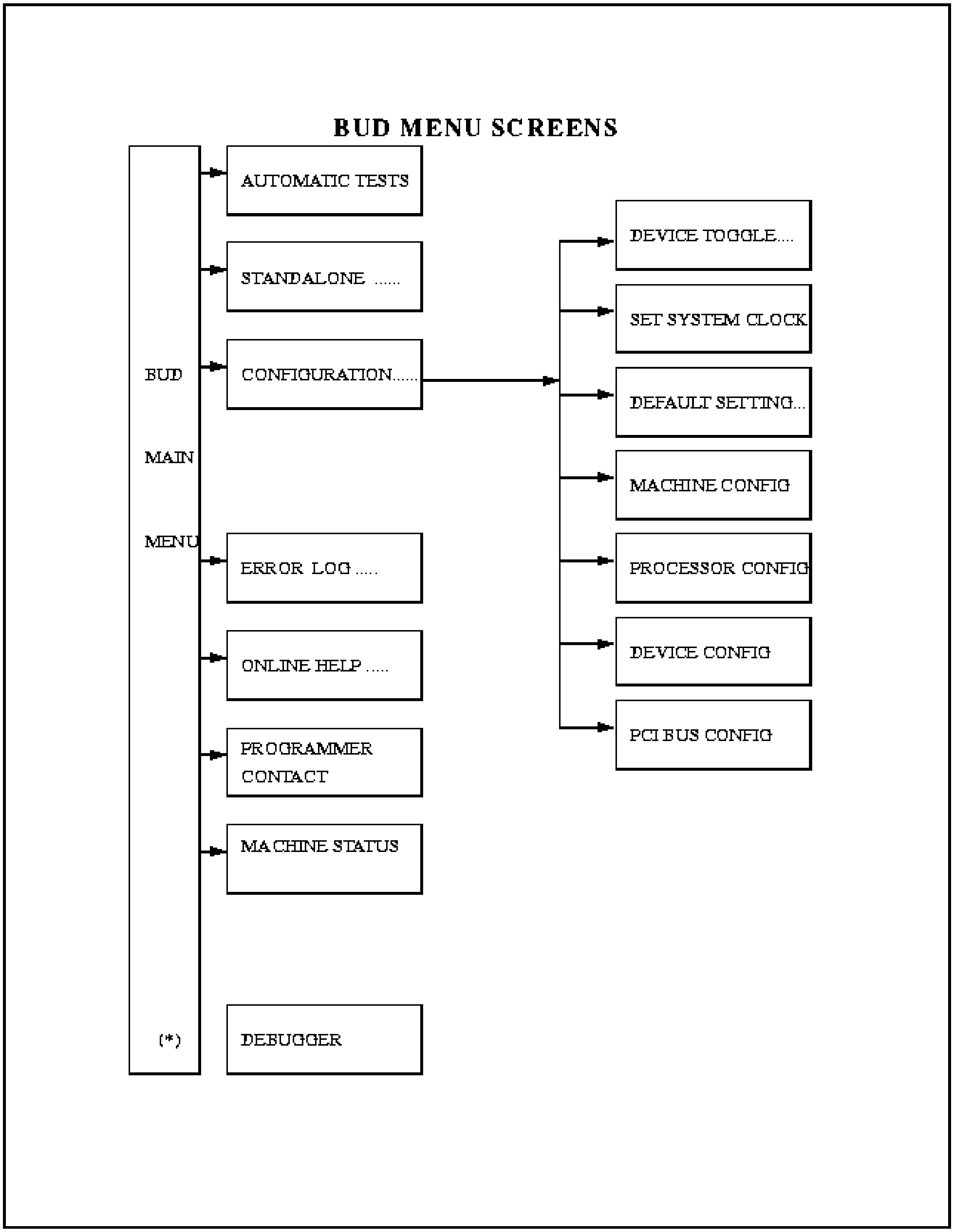
2.0 BOOTING THE BRING UP DRIVER

Once the system has been set up, insert the BUD diskette into the diskette drive and turn the system on. The boot ROM will automatically load the BUD software into memory and transfer control (to BUD). Within a few seconds after the diskette light goes off (from loading the diskette) the BUD "main menu" should appear.

User interaction with the BUD program will begin from the BUD main menu. This menu will appear via the ASCII monitor or the motif window on the RS/6000−AIX system that is connected to the machine under test.

3.0 BRING UP DRIVER MENUS

The main menu items can be best described by the online help that is available from the main menu. A pictorial view of the menu organization is presented here.



The menu descriptions, for the main menu are detailed here in the following paragraphs.

Stress Interrupting Test:

To run any of the Automatic tests the user must have selected which devices are to be run by first using the "DEVICE TOGGLE" option via the **Configuration Menu.** This toggle option will present the user with a list of all devices detected in the system and allow the user to toggle the device "ON"or"OFF". When the Stress Interrupting Test is run, ALL selected devices will be initialized and all selected interrupt−capable devices will be kicked−off. Kicking off a device means that the device has been given a command to perform a task. Upon completion of this task the device will interrupt, which the processor will service and kick−off another task before exiting the interrupt handler. Therefore, all selected interrupt−capable devices are essentially running in the background only getting processor time when in their interrupt handler, while the selected non−interrupting devices are running in the foreground (the processor's main loop).

Each device may run many different tests over the duration of the Stress Interrupting Test. A pass count is recorded for each individual device. If a test fails, a device specific fail code, fail time and date, along with an incremented fail count will be reported to the screen as well as the error log.

The Stress Tests may be more stressful than the EMC tests.

EMC Interrupting Test:

The EMC Interrupting Test is essentially the same as the Stress Interrupting Test except for two factors:

1. The EMC tests may include special tests or data patterns which are designed specifically for EMC testing. (For example, video−scrolling H's.)
2. The EMC tests may be shorter, due to time constraints of EMC testing.

Stress Non−Interrupting:

To run any of the Automatic tests the user must have selected which devices are to be run by first using the DEVICE TOGGLE option via the **Configuration Menu.** When the Stress Non−Interrupting test is run, ALL selected devices will be initialized. Then the test will run the first selected device's test suite (i.e. all stress tests for Keyboard) then run the next device's test suite, continuing in a sequential fashion (one after another) until all the devices have been run. Then the sequence will repeat until the user stops the test.

Each device may run many different tests over the duration of the Stress Non−Interrupting Test. A pass count is recorded for each individual device. If a test fails, a device specific fail code, fail time and date, along with an incremented fail count will be reported to the screen as well as the error log.

The noninterrupting Stress Tests may be more stressful than the noninterrupting EMC tests.

EMC Non−Interrupting:

The EMC Non−Interrupting Test is essentially the same as the Stress Non−Interrupting Test except for two factors:

1. The EMC tests may include special tests or data patterns which are designed specifically for EMC testing. For example, video−scrolling H's.
2. The EMC tests may be shorter, due to time constraints of EMC testing.

Standalone:

The Standalone Menu will present the user with a list of detected devices from which to choose. Once a device has been chosen the device specific standalone menus will be presented detailing most, if not all available tests written for a particular device. Each device will have a unique set of individual tests for the user to choose from. Each test will provide the user with the option to run the selected test just once, or to continually loop on the selected test. Full status will be presented for each test. If a failure occurs, detailed status information will be available on the screen and/or the device error log.

Configuration Menu:

The Configuration Menu allows the user to select options for the Automatic Tests and/or the Standalone tests or view various types of information. This includes such activities as: selecting which devices are to be run during any Automatic Test, setting the system clock, selecting specific options for a device when it is run in any Automatic Test, or viewing various configuration information. See **Appendix B CONFIGURATION INFORMATION** for more details on this menu and submenus.

Error Log:

The Error Log menu presents a menu of all devices with error log capability. If an error has been recorded for a device in any of the Automatic Tests, then the error will have been logged and the user will be able to view any of these errors and get more specific details.

Online Help:

The online description of the main menu options is very useful at runtime for the user. It's contents is reflected here in this section of the User's Guide.

Programmer Contact

This online list contains a list of active devices and who the code developer is for each device. This is here to provide the user with a direct link to individuals who know the most about the specific device tests. Please use this if there are any questions.

Machine Status

This option reflects :

- the URL's to BUD documents
- current machine name
- BUD planar ID
- processor type and speed
- bus speed

3.1 Standalone tests vs. automatic tests

Standalone tests give the user access to a particular device. While running tests under the standalone menu, the selected device has complete control of the system. There is no other system activity or test running. The standalone tests for each device provide feedback to the user, and are intended to be used during system debug.

The automatic tests are used when multiple devices need to be run and/or when the user would like to run one or more tests for extended periods. They do not provide the same level of feedback as the standalone tests and do not provide the same degree of user control. The automatic tests, for most devices, provide the same amount of test coverage as running all of the standalone tests for a given device.

3.2 Automatic: stress tests vs. EMC tests

The automatic stress tests were designed to include, for a given device, as many of the standalone test cases as possible. Therefore the stress tests are the more strenuous of the two tests. A majority of users will want to run their tests in the automatic stress mode.

The automatic EMC tests were designed to meet all of the system EMC requirements. System EMC testing for example, requires scrolling H's to the video screen, special data patterns to be transferred to/from certain devices, or any number of other requirements.

4.0 TO START A TEST

4.1 Standalone

To start a standalone test from the BUD "main menu", choose the "standalone menu" option. Choose a device from the list displayed. The standalone tests available for the selected device will appear, and one of the listed tests may be chosen. The user is cautioned that many of the device tests will require additional hardware to be attached to the system planar for these tests to pass. For example, the serial port requires a serial wrap plug to be attached.

4.2 Automatic tests

Prior to starting the automatic test there are two sub−menus the user will need to review from via the **Configuration Menu.** The first menu is the "device toggle menu". From this menu any detected device is displayed can be enabled or disabled for use in any automatic test. For example, if the user wishes to test only the keyboard and memory tests, the keyboard and memory toggles need to be changed to display "ON" adjacent to those devices, while all other devices should display "OFF".

The second menu, which is optional, is to select the "default settings menu" which contains default settings for certain devices. For example, the user may change the size of the scratch floppy diskette from 1 to 2 megabytes. If the user does not understand what effect changing a parameter will have (most are obvious) the user should be cautious in doing so. This is an optional menu and need not be modified to run any automatic test. There are default settings for all options for all devices so that the automatic tests can be started with a minimum amount of interaction. A reference for what a system may need for running sucessful tests is outlined in **Appendix D DEVICE TEST REQUIREMENTS.**

Please note that the options selected in the "configuration menu" will have effects on the standalone tests and the automatic tests.

Once the user has configured BUD for the desired test, return to the "main menu" and choose one of the automatic tests.

All automatic test screens look similar. There will be feedback for the current time, the time the test was started, which test mode is currently being run, and the version number of the BUD. To the left of each active device will be an asterisk(*). To the right of each active device will be five columns of information: pass count, fail count, error code, time of most recent failure, and date of most recent failure.

4.3 Device Test Descriptions

Device details and test descriptions for all supported devices are in the BUD DEVICE DESCRIPTION document.
(URL:
http://w3.austin.ibm.com/afs/austin/depts/clys/public_html/devdoc/devdoc.html)

5.0 DEBUGGER

The BUD debugger provides basic debugger capabilities. The debugger may be accessed by the user from any menu via the "*" key.(asterisk) If a condition occurs that results in a processor exception, the system will trap to the debugger. The debugger will allow the user to utilize any one of the following debugger utilities:

- Set an instruction break point

- Set a data address break point
- View the memory map
- Write memory space
- View a subset of the processor's registers

A complete discussion of the features of the debugger is found in the Debugger Manual.
(URL: http://w3.austin.ibm.com/afs/austin/depts/clys/public_html/Dbg/Dbg.book_1.html)

6.0 FAILURES

Any one of the following conditions constitute a failure in automatic mode:

- An error code generated by any enabled device.
- Pass and/or fail counts not being updated in any automatic mode for an enabled device.

A list of error codes maybe referenced in BUD error code listing.
(URL: http://w3.austin.ibm.com/afs/austin/depts/clys/public_html/bud−error_codes.html)

The device error log can be accessed to view detailed information about the generated error. If the user exits the automatic test and returns to the main menu, the option to "view error logs" may be chosen. The device list will appear for each device that has error log capability. A single device should be chosen for which a list of current errors will be displayed. Each individual error may then be viewed by the user.

APPENDIX A SETTING UP THE ASCII TERMINAL

The ASCII terminal must be connected to the machine by serial port 1. The following table lists the parameters used to set up an IBM 3151 ASCII terminal so that it may be used to run BUD software.

TABLE 1. Parameters to setup ASCII Terminal

Parameter	Value	Parameter	Value	Parameter	Value
General		Communications		Keyboard	
Row Column	25 x 80	Operating Mode	Echo	Enter	Return
Scroll	Jump	Line Speed (bps)	9600	Return	Field
Auto LF	OFF	Word Length (bits)	8	New Line	CR
CRT Saver	ON	Parity	NO	Send	Page
Line Wrap	ON	Stop Bit	1	Insert Char	Space
Forcing Insert	OFF	Turnaround	CR		

```
                          Character
Tab                 Field|  Line Control     IPRTS |
                            Break Signal     500
                         |  (ms)                   |
                            Send Null Sup    ON
                         |  press                  |
---------------------------------------------------------------------
```

APPENDIX B CONFIGURATION INFORMATION

DEVICE TOGGLE MENU:

This option will display all devices that are either standard or optional devices detected by the BUD code. The user may toggle devices "ON"or"OFF" so that certain devices may be run in any of the automatic modes. This toggle is accomplished by selecting the number associated with a device. There is an active field that will indicate "ON"or"OFF" for each device.

SET SYSTEM CLOCK

This option will allow the user to set the date and/or time of the system clock.

DEFAULT SETTING MENU:

This will display a menu of devices which have defaults that may be modified for any of the automatic tests. The defaults are specific for each device and do apply to the automatic tests and/or the standalone tests.

MACHINE CONFIGURATION:

This option will display information about the machine such as, name of the planar, planar ID, BUD ID, and processor and bus speeds. There are two other activities in this menu.

Reinitialize BUD

This simply restarts the BUD code.

Change Machine Type and Reinitialize BUD

A menu is presented listing all of the supported systems. The user may choose a different machine type and restart BUD. This should be used with caution, machine definitions vary the subtlest details. (e.g. different machine definitions have different interrupt levels for the same device)

PROCESSOR CONFIGURATION

This option will display the processor type. (e.g. PowerPC 604) In a table of number of processors that are present in the system, the processor number, PID, state, and rank are listed. As and example table:

```
#   PID   State  Rank
-----------------------
1   0     Busy   Master
2   1     Idle   Slave
```

DEVICE CONFIGURATION

This will display a table of devices that are active in the system. The information displayed may include the following: system buffer address, interrupt level, and DMA level used. There are two options from this menu to choose from for more information and they are:

Processor Usage

This will display by device, the percentage of time spent on each processor in the system.

Error Trigger Information

A table is presented listing by device, the memory trigger address and the I/O trigger data. BUD provides the Error Trigger feature as a method of triggering an analyzer coincident with a device failure. There are two methods of triggering the analyzer:

On a WRITE to a DEVICE−SPECIFIC MEMORY address

With this method, data is written to a device−specific memory address as close as possible following the detection of a device failure. The data written gives more information about the failure (see the BUD programmer who owns the device for specific information about the data). The address of the write is listed on the Error Trigger Info screen under the heading: 'Memory Trigger Addr'.

On a WRITE to a SINGLE I/O address

With this method, data is written to a _single_ I/O address (port 0x680) as close as possible following the detection of a device failure. The data written indicates which device failed. The data written for each device is listed on the Error Trigger Info screen under the heading 'I/O Trigger Data'.

The operator can enable either or both of these trigger mechanisms from the Main Menu >> Configuration Menu >> Default Settings Menu >> Kernel Defaults Menu.

PCI BUS CONFIGURATION

This will list a table describing PCI devices that have been detected in the system. The information displayed will be device name, bus location, memory base address, and I/O base address. The bud location is broken down into, Bus Type(32 or 64 bit), Bus number(1,2,3...), device number, and function number. An example is displayed below:

```
DEVICE   BUS LOCATION   MEMORY ADDR   I/O ADDR
------   ------------   -----------   --------
IDE      00|00|14|00    8000F000      00C02000
SCSI     00|00|16|00    8000C000      00A00000
           |  |  |  |
           |  |  |  function number
```

```
|  |  device number
|  bus number
bus type
```

Show PCI Bus

This will show a table of information about all devices on the PCI bus. The values are PCI bus location,device ID, and vendor ID. There could be devices on the bus that are not active or tested, yet will show up in this option.

APPENDIX C MISCELLANEOUS INFORMATION

Trace log

The error log screen includes an option to clear and view a trace log. This is a code development log and must be initiated by the development programmer. It is not a normal active feature of the BUD package. For more details about the Trace refer to the Programmer's Guide at
(URL:
HREF="http://w3.austin.ibm.com/afs/austin/depts/clys/public_html/ProgGuide/ProgGuide.book_91.html#HEADING288)

APPENDIX D SYSTEM SETUP REQUIREMENTS

DEVICE	OPTIONS	note
SERIAL	serial wrap plug modem(*)	
IR	serial wrap plug	
PARALLEL	parallel wrap plug IBM proprinter(*)	
KEYBOARD	various	PPS,RS6K types
MOUSE	various	PPS,RS6K types
SCSI	SCSI hardfile SCSI CDROM	destructive writes will take place requires an IBM test disk to be loaded
DISKETTE DRIVE 3.5	2 1,4 MB sizes(*)	must be write enabled to do Write
DISKETTE DRIVE 5.25	DSDD - 360KB DSHD - 1.2MB(*)	must be write enabled to do Write

```
               |                        |
IDE-native     |IDE hardfile            |destructive writes will take place
               |IDE CDROM               |requires an IBM test disk to be loaded
               |                        |PN 81FXXXX
               |                        |
IDE-bus master |IDE hardfile            |destructive writes will take place
               |                        |(primary port only)
               |                        |
ENET           |10baseT wrap plug       |PN 00G2380
               |                        |
ENET (mach. to |AUI                     |see BUD programmer or reference
      mach.)   |                        |BUD device description document for details

--------------------------------------------------------------------
(*) - option other than first listed must correspond with device defaults
      main menu >> config menu >> set defaults >> device
```

Change History

Previous versions of this document are held by the document owner for a minimum of two years. All changes are approved by the document owner and are under *sccs* control.

```
Approval Date | Major Changes
--------------|---------------------------------------------------
01/10/96      | Remake of this document
              | Initial release 1.0.
01/25/96      | Corrected minidoc reference
              | to devdoc reference and
              | made grammar and syntax corrections.
```

This document is reviewed at least once per year.

End of Document

This information was last updated on January 26, 1996

The owner of this page is Cheryl Voerman.