

User's Manual
Best Source Selector
Graphical User Interface

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Best Source Selector Graphical User Interface

1 Introduction

This manual describes the Best Source Selector's GUI (Graphical User Interface). The GUI controls system setup, file storage and recall, system configuration/monitoring, status generation, and self-tests. Typical data input is through menus or on-screen button selections made with mouse and keyboard entries.

The two main screens which you will become most familiar are the Main Configuration/Status Screen and the BSS/FSU Configuration Screen which are discussed at length in this manual.

Special notes:

1. Mouse operations usually use a click of the left mouse button, unless noted.
2. BSS/FSU implies the combination of FSU into a group under a designated BSS Channel.
3. Sometimes single actions can result in many things happening within the program.
4. There is a flow to building a configuration, and if followed you are assured of repeatable, optimum, and complete results.

Important Note

The BSS (Best Source Selector) contains an Ethernet card to tie the unit to the network. Operation of this card during the Best Source Selector execution could have an impact on the timing of the system. We recommend that all network operations be performed when the Best Source Selector is not in Operate Mode.

2 Main Screen

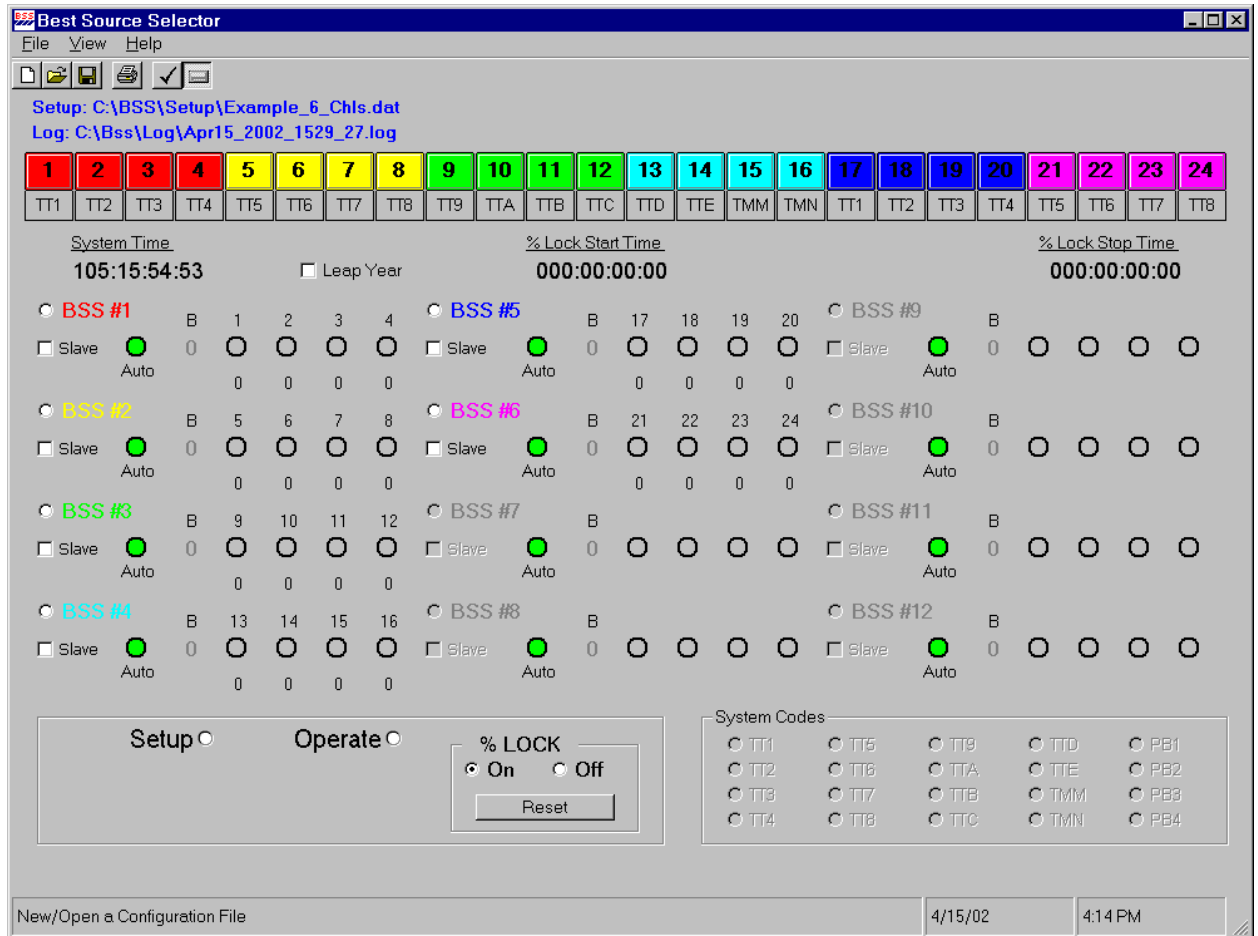


Figure 1 - Main Screen

This is an example of a full configuration/status main screen for the BSS GUI. The elements will be described in detail in the following sections. This is the principal display screen. As shown here, the FSU assignments to the BSS Channels and BSS/FSU configuration combinations have been completed and the unit is ready to go into Operate.

Note: The different shades of gray actually represent various colors that will be seen on the monitor of the actual BSS system. The lighter gray controls represent elements that are disabled.

2.1 Menu Bar

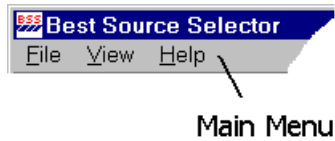


Figure 2 - Main Menu Bar

At the top of the main screen is the main menu, which contains the following functions:

2.1.1 File Menu

The File Menu has several selections to choose from:

New

Generates a new configuration file. It invokes a screen where you can select the drive, the directory, and enter the file name.

Open

This opens an existing configuration file. The form opens with the setup directory and current drive. Select a file in the listing to open or load.

Save and Save As

This is used to either save the current configuration file or save the configuration file under a different name. ***Save As*** will change the current setup file to the saved path and filename.

Print

This will print the current screen to the designated printer.

Exit

This terminates the program.

2.1.2 View Menu

This menu selection controls the Toolbar and the Status Bar, which contain the following items.

Toolbar

This enables and disables the Toolbar.

Status Bar

This enables and disables the Status bar.

2.1.3 Help Menu

This is the on-line help for the BSS GUI program and operations. Contains several items that assist you in performing the various functions and operations of the BSS GUI software.

2.2 Tool Bar

This mirrors several of the normal operations found in the main menu as described below:

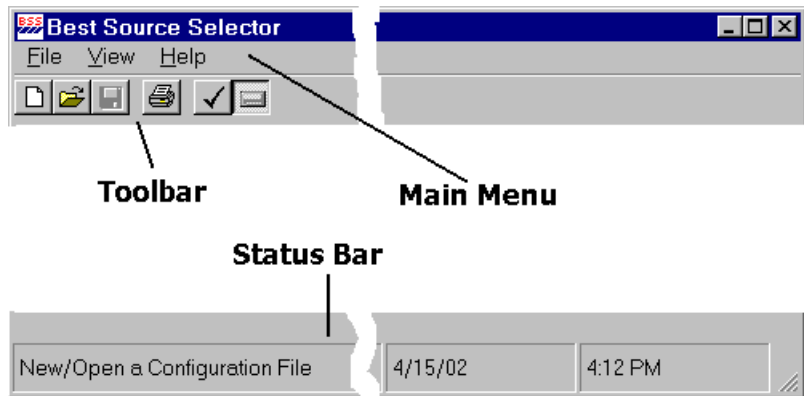


Figure 3 - Main Screen Bars

Icons are described below left to right as they appear in the toolbar.

2.2.1 New

Use this to generate a new configuration file. It invokes a screen where you can select the drive, directory and enter the file name.

2.2.2 Open

Use this to open an existing configuration file. The form opens with the setup directory and current drive. You then select a file in the listing to be opened and loaded.

2.2.3 Save

Use this to save the current configuration file as described by the Setup Name on the Main Screen.

2.2.4 Print

This will print the current screen to the designated printer.

2.2.5 Health

This invokes a complete health check of the FSU and BSS channels, determining if there are missing or inoperable FSU in the BSS system. This information prevents the attempted usage of these FSUs or warns the operator when used as part of a downloaded configuration.

Health checks are automatically executed at the beginning of the program after the BSS server is established. This control is only enabled when the system is in the Setup mode.

2.2.6 Logging

This button toggles the log file enable. Each time you start the BSS GUI, it generates a unique log file name based on the current date and time. You cannot change the log file's name. By default, the logging feature is always enabled, but you can disable it by releasing this button. When you "Operate" the BSS with logging enabled, the system will append the channel setups, changes in FSU statuses, and best source selections to the log file.

2.3 Setup and Log Files

The GUI displays the path and filename of your setup and log files as a reminder. You select the Setup file using the Open or New command in the file menu, or on the toolbar. You cannot select the log file name. The GUI generates it automatically based on the date and time so that it will be unique, and stores all log files in the C:\BSS\Log directory. The GUI appends all logging information from when you start until you exit in the same file. You can disable logging by releasing the Logging button on the toolbar. When disabled, the GUI displays the log file as "Off", as shown in Figure 22.

2.4 FSU Display and Input Notations

The twenty-four Frame Sync Units (FSU) are displayed and numbered in this row of controls. You select an FSU by clicking the mouse over the FSU number. Below the FSU number is the location of the Input Notations. As FSUs are assigned to a BSS Channel, the BSS Channel color will appear in that FSU. This color-coding permits you to see what FSUs are grouped together under a single BSS Channel.

2.5 Time Line

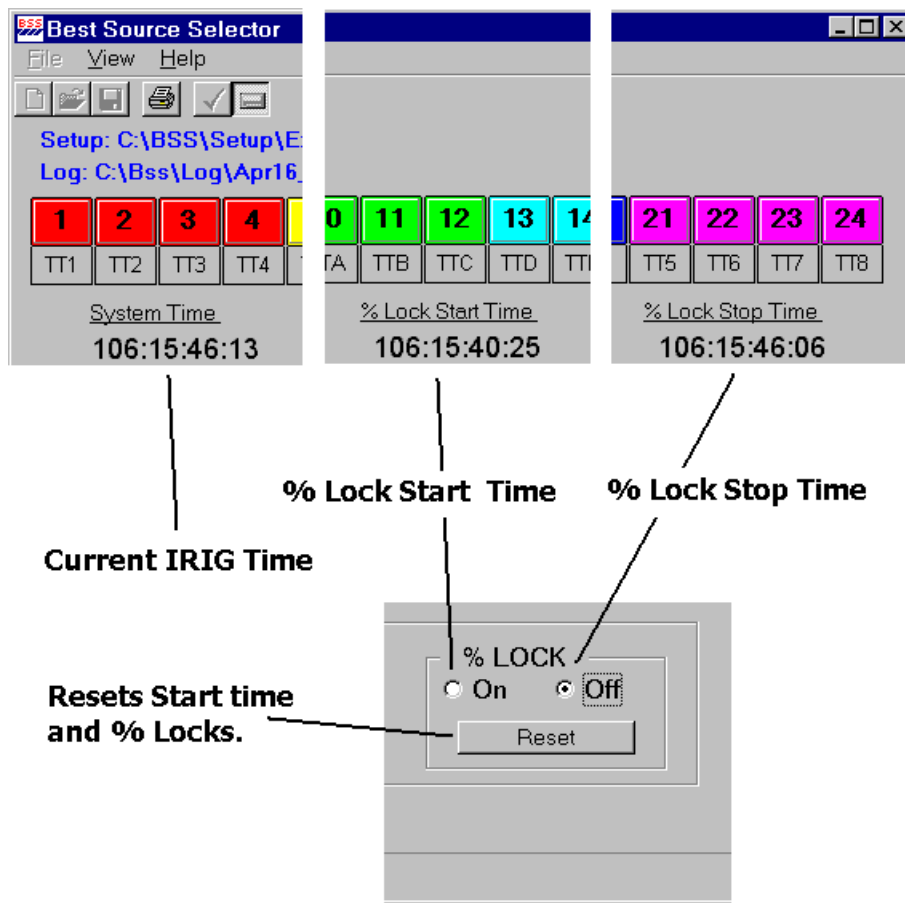


Figure 4 - Time Line and % Lock

2.5.1 IRIG System Time

The IRIG B clock usually provides the current system time of the BSS system. In the event that the IRIG B signal is lost, the time is indicated in red.

2.5.2 % Lock Start

This indicates when the % Lock On control was selected during Operate mode. Use the RESET ALL control in the % Lock Frame Controls to reset this.

2.5.3 % Lock Stop

This indicates when the % Lock Off control was selected during Operate mode. Use the RESET ALL control in the % Lock Frame Controls to reset this.

2.6 BSS Channels and Control Settings

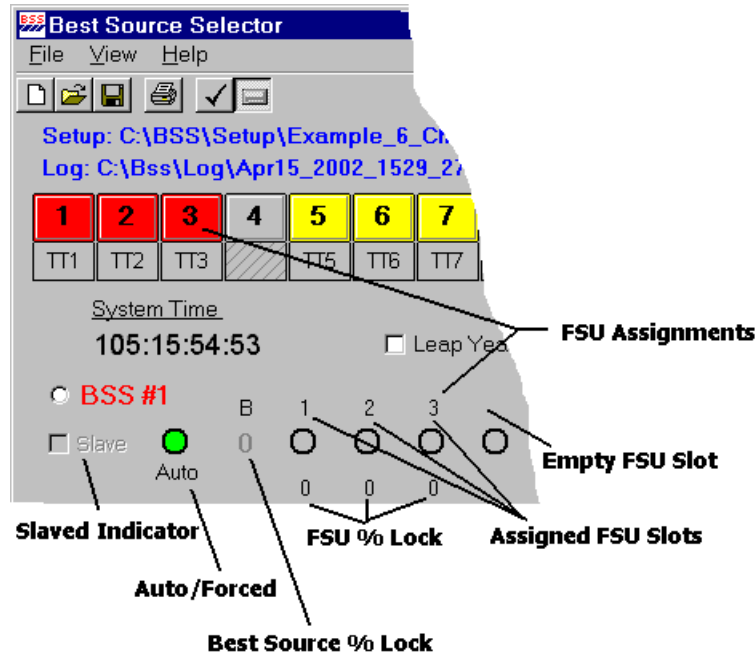


Figure 5 - BSS Channel and Relationships

2.6.1 Slave Select

This checkbox allows you to slave the channel's best source selection to another channel, called the master. During operation, the slave's best source selection and FSU statuses will follow those of its master.

When you check this box, the GUI presents you with the list of eligible master channels. A master channel must have the same number of FSUs, and cannot be a slave itself. Since the BSS GUI presumes that a slaved channel's data is not PCM, you are not required to enter an FSU configuration for the channel. If you need to enter an FSU configuration for a slaved channel, you must first uncheck its "Slave" checkbox, enter the FSU configuration, and then re-check the "Slave" checkbox.

When you select a channel to be a slave, the GUI changes its BSS channel notation to show the slave's channel number followed the master's.

2.6.2 Auto/Forced Select

This sets either the Auto or Forced mode of best source FSU selection within a BSS channel.

Under the AUTO mode, the output of each BSS channel is determined by the FSU priority and frame sync status.

In FORCE mode, you must select one of the FSUs within a BSS Channel as the forced output. This selected FSU is the only clock and data that will be used by the channel until altered by the operator. You select the desired FSU in this mode by clicking on the FSU number.

2.6.3 FSU & B(est) Lock Percentage

The Best Source percentage is the accumulative time the Channel was in Locked from all functional FSUs in the group. This number should be greater than or equal to the lowest individual FSU's percentage.

2.6.4 Grouping

The four circles (FSU Status Indicator) next to the Best percentage form the group of FSUs assigned to this BSS Channel. When an FSU is assigned to the channel, the FSU number will appear above the FSU Status indicator, and the percentage of lock for this FSU will appear below. The FSU Status indicator will appear red for an unlock condition, green for a locked condition, and gray when unselected or unused. A yellow ring will appear around the best source.

2.6.5 Operational Modes

Setup

This option displays and controls BSS channel setup. The Setup option is enabled once a BSS channel has a FSU assigned. The BSS Configuration status is then displayed. This configuration status is color-coded as the BSS Channels are configured. For details see Paragraph 3.9.

Operate

This option loads the current configuration into the BSS system, and then receives the status of the BSS channels and lock/unlock status. If you select the % Lock On, the percentages will appear below each of the FSUs in the BSS Channel. For details see Paragraph 3.9.

2.6.6 % Lock Frame Controls

Off

Selecting this control pauses the percent lock computation.

On

This control activates the percent lock computation.

Reset

Resets all the FSU's individual percentages, start-lock and stop-lock times.

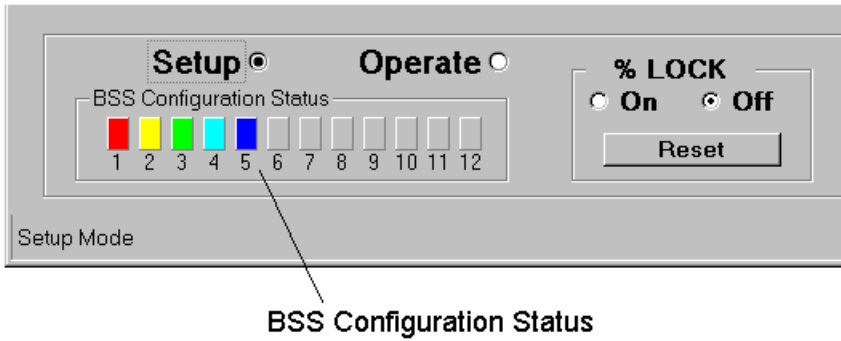


Figure 6 - BSS Configuration Status & % Lock Controls

2.6.7 System Codes

Contains sixteen code-indicated systems used by the BSS as inputs, plus four playback inputs. These codes are used to annotate an FSU on the main screen, remote display units, and the log file. They are used for notational purposes only. The process of assigning system codes is described in more detail later.

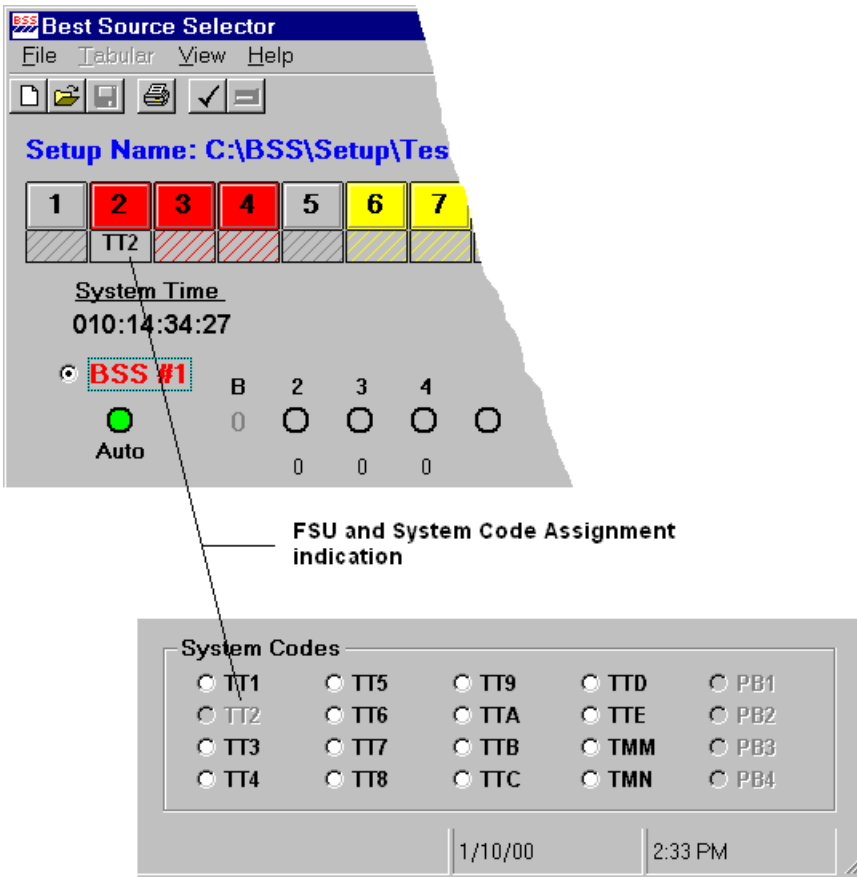


Figure 7 - System Codes Controls

2.6.8 Status Bar

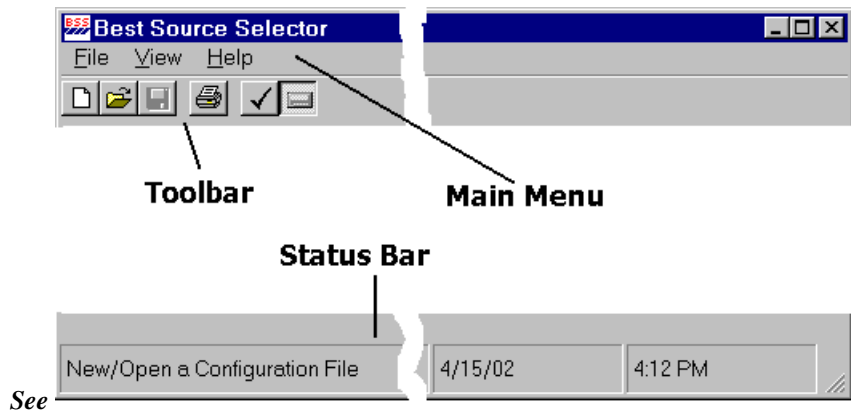


Figure 3 - Main Screen Bars

Message Panel

This displays operational messages or current functional status.

Date Panel

This displays the current system date.

Time Panel

This displays the current system time.

2.7 BSS/FSU Configuration Screen

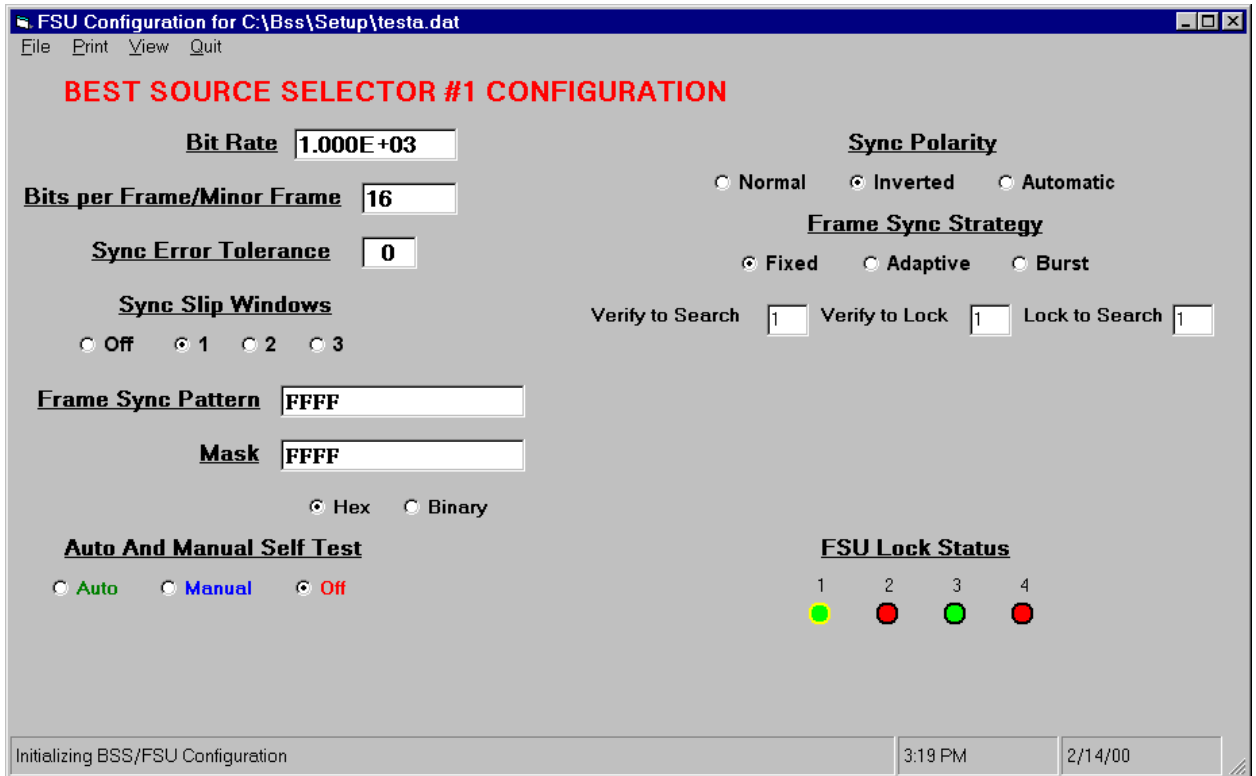


Figure 8 - BSS/FSU Configuration Screen

2.8 FSU Menu Bar

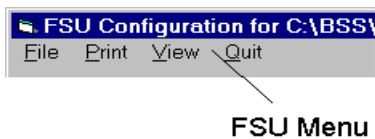


Figure 9 - BSS/FSU Menu Bar

2.8.1 File Menu

Open

This opens an existing BSS/FSU channel configuration (.veh file) that was previously stored. Once this file is open, the current channel controls and inputs will change to those of the file.

Save

This saves a BSS/FSU channel configuration that can be recalled later for quick setup of a BSS channel. You are prompted for a file name and the default extension attached is '.veh'.

2.8.2 Print Selection

This will print out the current BSS/FSU Channel configuration to the designated printer.

2.8.3 View Menu

This is used to control the status bar of the BSS/FSU configuration screen.

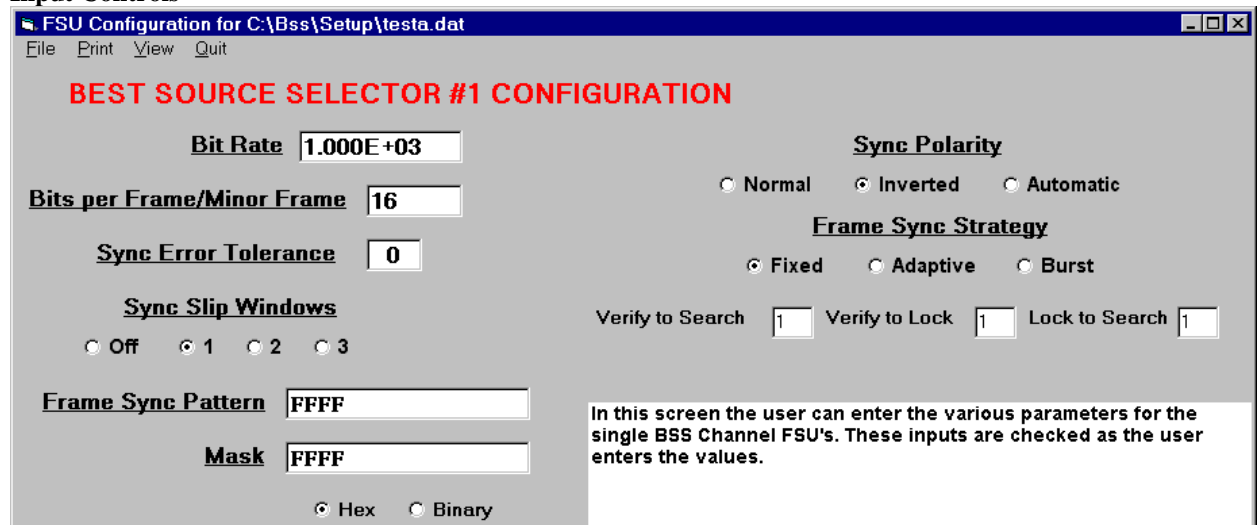
2.8.4 Quit Selection

This terminates the configuration of the BSS channel. It will set a change flag as an indication to update the main configuration file. To save the main configuration you must invoke the save controls on the main screen.

2.8.5 Best Source Channel

This indicates the current BSS channel being configured.

Input Controls



BEST SOURCE SELECTOR #1 CONFIGURATION

Bit Rate

Bits per Frame/Minor Frame

Sync Error Tolerance

Sync Slip Windows

Off 1 2 3

Frame Sync Pattern

Mask

Hex Binary

Sync Polarity

Normal Inverted Automatic

Frame Sync Strategy

Fixed Adaptive Burst

Verify to Search Verify to Lock Lock to Search

In this screen the user can enter the various parameters for the single BSS Channel FSU's. These inputs are checked as the user enters the values.

Figure 10 - BSS/FSU Input Controls

Bit Rate

This sets the signal data/clock rate from 1 kBits/sec to 20 Mbits/sec. The default value is 1 kBits/sec.

Bits per Frame/Minor Frame

This sets the frame/minor frame length from 16 bits to 65,536 bits. The default is 16 bits.

Sync Error Tolerance

This sets the frame sync error tolerance from 0 to 15 errors. The default is 0.

Frame Sync Pattern

This contains a programmable value of up to 64 bits.

Mask

This contains a mask of up to 64-bits for the frame sync pattern. A zero in this word represents 'don't care' in the sync pattern bit.

Sync Slip Windows

This sets the sync slip window to Off, ± 1 , ± 2 , or ± 3 bits. The default is Off (0).

Sync Polarity

This sets the polarity to normal, inverted or automatic detection. The default is normal.

Frame Sync Strategy

This sets the frame sync strategy to Fixed, Adaptive or Burst.

Fixed

This sets the Frame Sync Strategy for Fixed.

Verify to Search

This sets the counters for Verify to Search. Acceptable values 1 to 15. Default is set to 1.

Verify to Lock

This sets the counters for Verify to Lock. Acceptable values 0 to 15. Default is set to 1 except in Burst mode.

Lock to Search

This sets the counters for Lock to Verify. Acceptable values 1 to 15. Default is set to 1.

Adaptive

This sets the Frame Sync Strategy for Adaptive. 'Verify to Search', 'Verify to Lock', and 'Lock to Search' parameters are the same as Fixed.

Burst

This sets the Frame Sync Strategy for Burst.

Verify to Search

This sets the counters for Verify to Search. Acceptable values 1 to 15. Default is set to 1.

Verify to Lock

This sets the counters for Verify to Lock. Set to value of 0.

Lock to Verify

This sets the counters for Lock to Search. Set to value of 1.

2.8.6 Self Test Modes

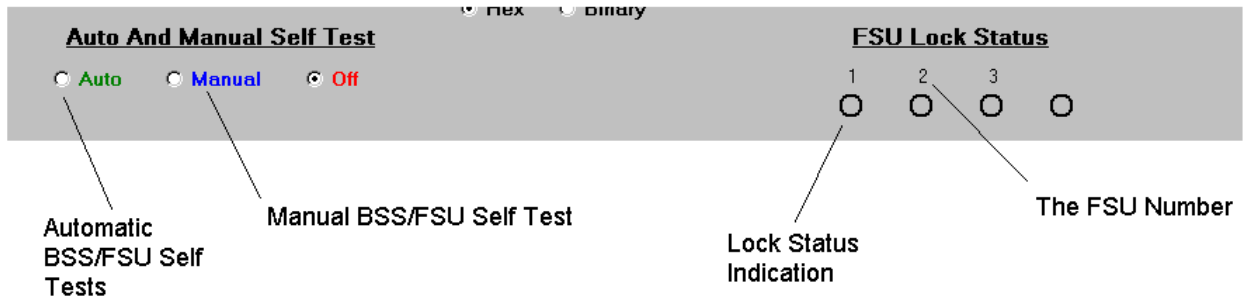


Figure 11 - Self-Test Controls

Auto

Automatic self-test checks the BSS switching strategy for all FSUs within the particular BSS channel under test, then displays pass/fail indications. Test progress appears on the BSS/FSU screen under the FSU Lock Status indication. The test will check the different combinations of lock (green), unlock (red), and best source (golden/yellow colored circle around the lock/unlock indicator). The entire test takes less than one minute from start to finish.

Manual

In the Manual controlled testing mode, you can toggle the test signals on and off to each FSU within the BSS Channel. Locked FSUs are indicated by green, and unlocked FSUs by red. You select an FSU by moving the mouse over the indicator under the desired FSU Lock Status on the BSS/FSU Configuration screen.

Off

This will shut off the simulator inputs to the FSUs and restore the designated input signals.

2.8.7 Indications

FSU Lock Status

These are the four circles that appear under the FSU Lock Status header. The FSU number appears above the circle, and the circle is colored green (lock), red (unlock) or gray (unused). You select these circles, when in the Manual Test mode, to select or de-select a particular FSU.

Test Results and Status

When the Auto self-test has completed, this displays the results. It will indicate a Pass if everything checked out as it should, or a Fail and the first item that caused the failure.

2.9 New/Open File Screens

2.9.1 New File

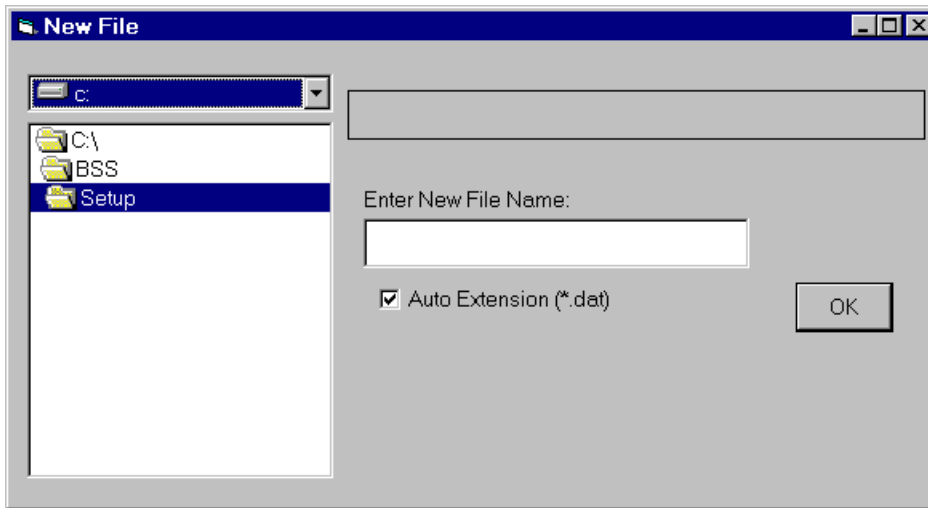


Figure 12 - New File Window

Use this screen when creating a new main configuration file. The selections are based on the requirements of the system and the program.

Drive Selection

Your setups may be stored on some other drive. This input box allows you to select other drives. The C drive is the default .

Directory Selection

This is for selecting the directory folder where the setup files will be stored. The default directory will be the 'BSS\Setups' directory, but you can also designate an existing directory.

File Name

Use this box to enter the file name. The input text can be any alphanumeric, spaces, dash, ampersand, and underscore characters, not to exceed 32 characters in length.

Auto Extension

This check box sets the default three-character extension to '.dat' which the recall file routines will check for. You can insert a designated three-character extension by disabling this control, otherwise the program will automatically attach the default extension.

OK control

Once the you have completed your selections, the full path and file name appears in the area above the file name input box. Selecting the OK button generates the file.

2.9.2 Open File

Use this screen when you want to recall an existing file. The path and directory are defaulted to 'BSS\Setups' and the files display will all have the extension '.dat'.

Default File Type

The default file extension is '.dat'.

Directory Selected

The default directory is 'BSS\Setups' which appears in the 'Look in:' box.

Files

The files should be main configuration files from previous operations that were saved.

File Name Input

Select the file of choice by using the mouse or typing in the File name box.

Open Control

This opens and loads the selected file before returning to the main screen..

Cancel Control

This cancels all operations and returns to the main screen.

3 Operations and Procedures

3.1 Introduction

You use the BSS GUI to program and update the operations of the BSS system. These operations are straightforward and, if followed carefully, will provide satisfactory results. The controls and screens have been laid out to effectively and completely program the BSS system. The GUI also doubles as the status monitor during Operate mode.

3.2 Installation

You install the Best Source Selector software on your computer using the Setup Program. The Setup program installs the Best Source Selector GUI itself, the Help system, the BSS Server, and BSS Interface software.

3.3 Setting Up the Best Source Selector

When you run the Setup Program, a directory is created for the BSS and two subdirectories, setup and help. The BSS Server and BSS Interface programs are all located in the main BSS directory.

To setup from CD

1. Insert the Installation CD into the appropriate drive.
2. Select and install Best Source Selector software
3. This will install the required PCI driver, BssServer and BSS GUI.

Note: You will need to shut down and restart your Windows NT or Windows 2000 operating system in order to invoke the BSS Server program. This must be done prior to running the BSS GUI.

3.4 Uninstall the Best Source Selector Software

If you wish to remove the Best Source Selector software from your computer, there are 2 methods to accomplish this task.

Uninstalling from Control Panel

1. Navigate to the Control Panel
2. Open *Add/Remove Programs*
3. Acroamatics *Best Source Selector* will be listed among other software packages installed on your system.
4. Select *Acroamatics Best Source Selector* and click “**Remove**” under Windows 2000 and “**Add\Remove**” under Windows NT
5. The Installshield Wizard will guide you through the uninstallation process.

Uninstalling from CD

1. Insert the installation CD
2. The *autorun* menu should start
3. Select, *Install Acroamatics Best Source Selector Software* from the menu.
4. The installation will sense the presence of your existing installation and display a dialog which will allow you to remove the software.
5. The **Installshield Wizard** will guide you through the uninstallation process.

Important: The setup installs the program files and generates an uninstall log of these files. Any files that are added or created after the installation is done are not part of the uninstall log and therefore will not be removed by the uninstall function.

3.5 Getting Started ...

The installation package contains the software for the BSS GUI and associated DLL routines used by the program. It will insert an icon for the BSS program with the name ‘BSS’. Select this program from the Startup Programs menu as you would any other application to be executed.

3.5.1 Initial System Health Checks

As the BSS software is executing, the program will check the BSS system in its entirety. It will apply the simulator to all the FSUs and verify that they are working properly. Any FSU found missing or inoperable will be noted and disabled for the remainder of the session, or until another health check is performed. For a complete description of the Health Checks, *See Appendix F – Health Checks*.

3.6 Initialization ...

The first time you use the system, very little is configured. There are no existing main configuration files or BSS/FSU configuration files. You will start by generating these files. The initial screen is the main screen with a main menu and tool bar.

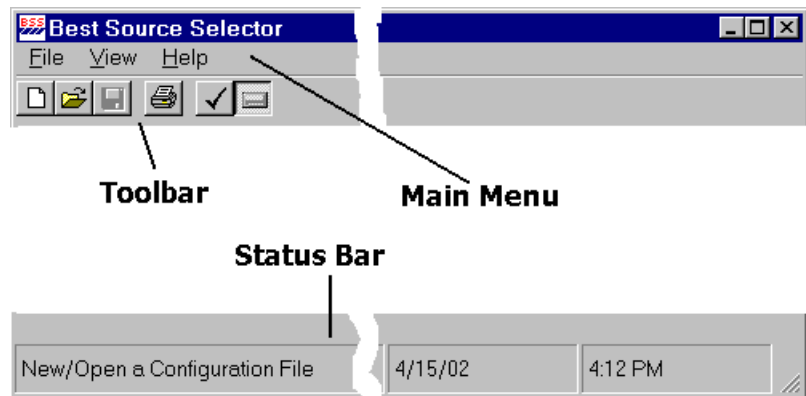


Figure 13 - Main Menu, Toolbar & Status Bar

3.6.1 Creating a New BSS Configuration

Select **File** in the Main menu. This will drop down additional selections.

Creating a New File

Select **New** under the File Menu. This will open a screen to designate a new file, as described above in paragraph 2.9.1.

New Configuration Main Screen

When the program returns to this screen, you will see a main configuration screen. Most of the items appear to be grayed out. Note the Setup Name to verify that the path and file name is correct. Next, start assigning the enabled FSUs to a BSS Channel.

3.6.2 Assigning An FSU

Assigning an FSU to a BSS channel

Use the following procedure to assign an FSU to a BSS channel.

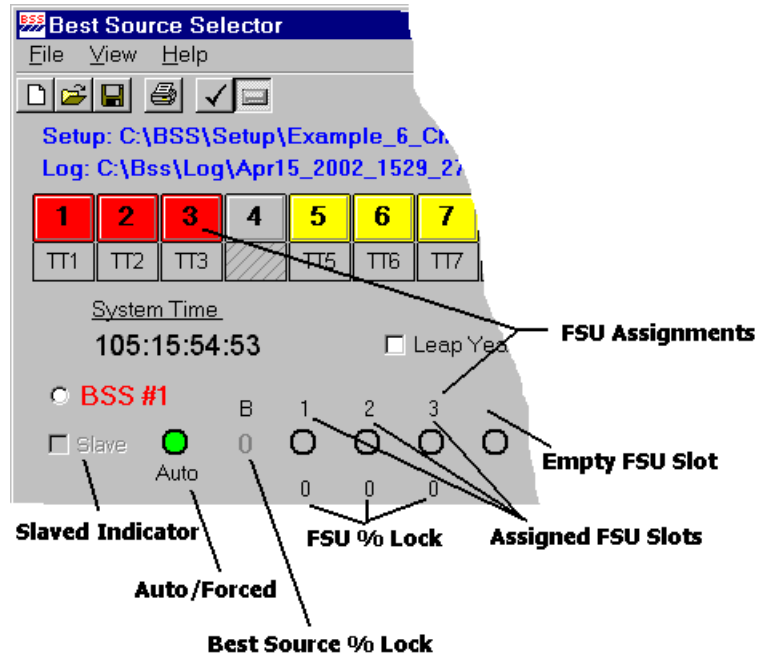


Figure 14 - Assigning FSU to BSS Channel

1. Select an FSU by moving the mouse to the FSU rectangle and clicking the left mouse button.
2. Move the mouse to the BSS Channel and the first blank FSU circle and click the left mouse button to complete the assignment.
3. The FSU number will appear over the circle and the FSU rectangle will show the BSS channel color.
4. Repeat steps 1-3 for up to four FSU assignments to a single BSS channel.
5. Assign a System Code to a FSU as follows:
6. Select the FSU status indicator within a BSS channel by placing the mouse over the FSU circle and clicking the left mouse button. This will force the FSU to change color and appear depressed. This action enables the System Code listing in the lower right corner of the screen.
7. Select the System Code option button using the mouse and clicking the left mouse button.
8. This action will add the 3-character listing to the FSU indication at the top of the screen. It will reset the FSU status indicator and FSU number. Once a System Code is used, it is disabled from the listing for the same BSS channel.
9. Repeat these steps until all BSS/FSU channel assignments are complete. When all BSS/FSU combinations have been assigned, the SETUP mode is enabled and the OPERATE mode disabled.

3.6.3 Deleting an FSU

Deleting an FSU from a BSS channel Group

Perform the following when you want to delete an FSU from a BSS channel.

1. Position the mouse pointer over the FSU Status Indication as shown below, and *click the right mouse button* to delete.
2. If this change is meant to become the recall configuration, 'Save' the setup.
3. Check that the FSU assignment has been freed and the system codes for the BSS channel have been updated to verify that the change has been made.

3.6.4 BSS Channel Enable and SETUP mode

Once an FSU is assigned to a BSS channel, you can configure the channel. However, we recommend that you assign all FSUs and system codes to the group before going to the BSS/FSU configuration screen.

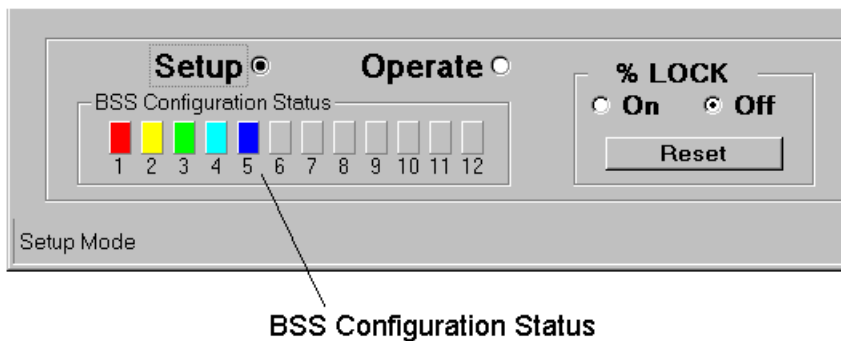


Figure 15 - BSS Channel Status

To configure a BSS channel FSU, first select the SETUP option button, then select any BSS channel that is enabled by moving the mouse over the option button or BSS number and clicking the left mouse button. This opens the BSS/FSU Configuration screen.

3.7 BSS/FSU Configuration

Use the BSS/FSU configuration screen to edit the parameter settings for a BSS channel. Since all FSUs in a channel are processing the same data source (over different receive paths) all FSUs within a BSS Channel are programmed identically, based on the selections made here.

This screen also permits the auto or manual self-testing of the FSUs within the designated BSS channel.

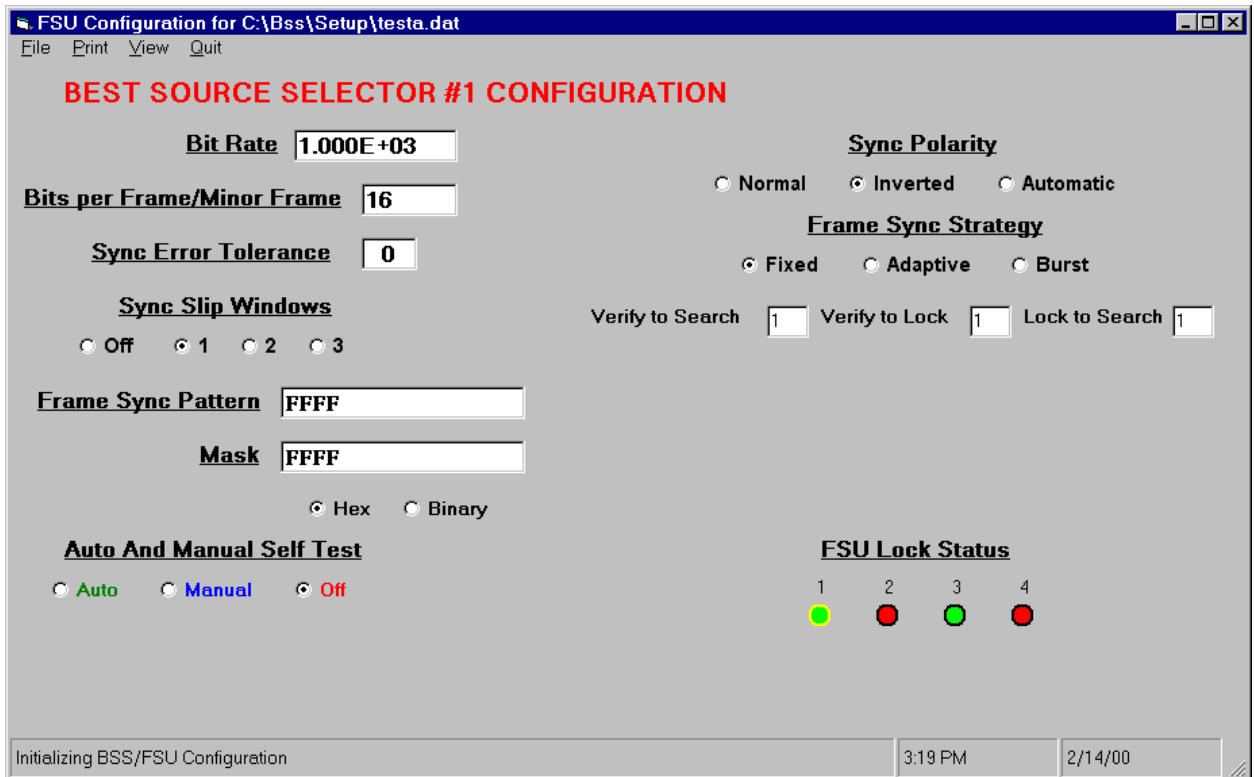


Figure 16 - BSS/FSU Configuration Screen

3.7.1 Opening a Vehicle File

Under the File menu, you can choose to either Open or Save the individual channel settings. Only previously saved files (*.veh) can be recalled using Open. Opening a file from here will automatically load the file parameters.

If you want, you can enter parameters at this point. The parameter values will be checked for boundary limits if applicable. Once the parameters are set you can select one of the self-test modes, save the parameters as a file, or quit.

3.7.2 Print What You See

The Print function, found on the menu bar, will print a hardcopy of the BSS/FSU Configuration settings as they currently appear on the screen.

3.7.3 Self-testing the Current Channel

The two self-test modes are Auto and Manual.

In *Manual* test mode, you can toggle the test signals on and off to each FSU. The system will set the simulator to unlock (red) condition to all the FSUs within the group. Select the FSU by placing the mouse over the FSU status indicator and left clicking the mouse. This will place the FSU in a lock (green) condition using the simulator signal. If the same FSU is selected again, the lock condition will switch (toggles) to unlock.

In *Auto* test mode, the software will perform the BSS switching strategy for all FSUs within the BSS under test and display a pass/fail indication. A pass indication will occur when the test completes without a failure. Any failure will cause the test to abort and display the reason for the failure. This test takes less than a minute.

Quit – Updates the Main Configuration Save Flag

This control closes the BSS/FSU configuration screen and loads the channel parameters to the BSS system hardware. The main configuration file is not updated with the current parameters for the BSS channel, and the configuration change flag is set.

3.8 Using Existing Files ...

3.8.1 Using An Existing BSS Configuration

1. Select **File** in the Main menu. This will drop down additional selections.
2. Select **Open** under the File Menu. This will open a screen to designate a file as described above in paragraph 2.9.1.

3.8.2 Configuration Main Screen

The program will return to the main configuration screen after loading the main configuration contained in the selected file. You should note the Setup Name to verify that the path and file names are correct.

You can go straight into Operate if all BSS/FSU channels were previously configured, or select Setup to modify existing BSS channels. When you add a new BSS channel, the Setup and Operate options are disabled until the FSUs are assigned to a BSS channel and you have designated system codes.

3.8.3 Observe the Operational Modes

The Operational Option buttons SETUP & OPERATE indicate the status of the BSS system and what is required. The following describes the various status indications:

1. If both Option buttons are disabled after a load has been performed, at least one FSU is assigned to a group that has not been assigned an input signal. Once all FSUs within all BSS channels are assigned input signals, the SETUP option will be enabled.
2. If the SETUP option is enabled while the OPERATE option is disabled, then one or more of the BSS channels require configuration. The BSS Configuration Status will appear and the missing BSS channels will be apparent.
3. If both SETUP and OPERATE options are enabled, then the loaded configure file is complete and you can go directly to Operate. If you want to add an FSU to an existing BSS channel, the SETUP option must be selected prior to the assignment. If you want to assign FSUs to an unused BSS channel, follow the procedure described in paragraph 3.6.2.

3.8.4 Assigning an FSU to an Unused BSS Channel

Follow the procedures described in paragraphs 3.6.2 steps 1 to 9.

3.8.5 Deleting an FSU from a used BSS Channel

Follow the procedures described in paragraph 3.6.3.

3.8.6 Assigning an FSU to a Used BSS Channel

This procedure allows you to add an FSU to an existing BSS channel. Select the SETUP option button, which permits the program to insert additional FSUs to those channels downloaded from the file. Once the SETUP option is enabled and selected, follow the procedures described in paragraph 3.6.2 to complete the assignment. Remember to save any of these changes, or the current configuration will contain only those initial settings.

BSS/FSU Configuration

FSU Configuration for C:\Bss\Setup\testa.dat

File Print View Quit

BEST SOURCE SELECTOR #1 CONFIGURATION

Bit Rate

Bits per Frame/Minor Frame

Sync Error Tolerance

Sync Slip Windows

Off 1 2 3

Frame Sync Pattern

Mask

Hex Binary

Auto And Manual Self Test

Auto Manual Off

Sync Polarity

Normal Inverted Automatic

Frame Sync Strategy

Fixed Adaptive Burst

Verify to Search Verify to Lock Lock to Search

FSU Lock Status

1 2 3 4

Initializing BSS/FSU Configuration 3:19 PM 2/14/00

Figure 17 - BSS/FSU Configuration

With the BSS/FSU configuration screen open, you are ready to determine the parameter settings for this BSS channel's FSU. All FSUs within a BSS Channel are programmed the same way based on these inputs and selections, since they all process the same data stream.

This screen also permits you to auto or manual self-test the FSUs within the designated BSS channel.

3.8.7 Self-testing the Current Channel

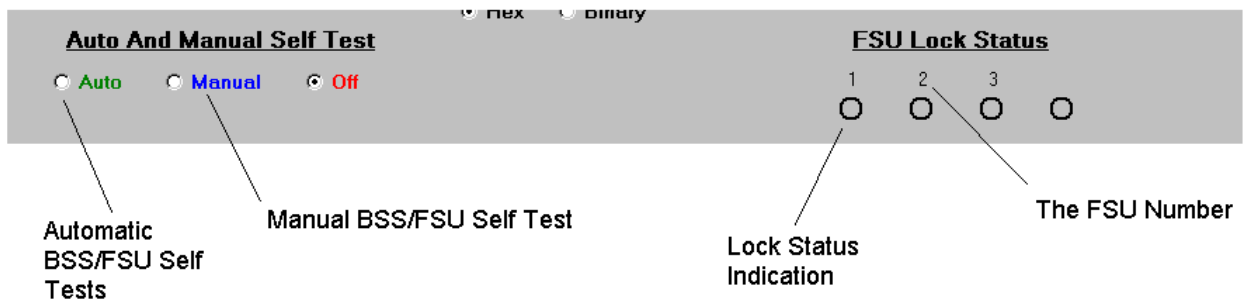


Figure 18 - Self-Test Controls and FSU Status

There are two types of self-test: Auto and Manual.

In *Manual*, you can toggle the test signals on and off to each FSU. The system will set the simulator to unlock (red) condition to all the FSUs within the group. You then select an FSU by placing the mouse over the FSU status indicator and left clicking the mouse. This will place the FSU in a lock (green) condition using the simulator signal. If the same FSU is selected again, the lock condition will switch (toggle) to unlock.

In *Auto*, the software performs the BSS switching strategy for all FSUs within the BSS under test and displays a pass/fail indication. A pass indicates that the test completed without a failure. Any failure will cause the test to abort and display the reason for the failure. This test takes less than a minute.

3.8.8 Quit – Updates the Main Configuration Save Flag

This control terminates the BSS/FSU configuration screen and loads the channel parameters to the BSS system hardware. The main configuration file is not updated with the current parameters for the BSS channel, rather a configuration change flag is set.

3.9 Operational Modes – SETUP and OPERATE

You can determine BSS system status by observing the state of the SETUP and OPERATE controls.

3.9.1 Conditional Flow

The BSS GUI software is based on entries you make in the BSS system. As you select and complete various entries the interface permits other functions to be selected.

3.9.2 SETUP & OPERATE Disabled

This condition indicates one of the following states exist:

1. There are no BSS/FSU combinations, the initial state of a new configuration.
2. An FSU is assigned to a BSS channel, but has not been assigned a System Code.
3. An FSU is assigned to an empty BSS channel.

This condition tells the BSS that there is no complete set of BSS/FSU combinations, and therefore no reason to 'setup' the BSS/FSU channel configuration.

3.9.3 SETUP Enabled, OPERATE Disabled

This indicates the following state:

1. There are complete BSS/FSU *combinations* for all BSS channels, but not all channels have been *configured*.

This condition indicates that the main configuration is incomplete. The FSU configuration for a BSS channel has not been completed. Therefore, the BSS system cannot be programmed with the BSS/FSU channel configurations.

3.9.4 SETUP Disabled, OPERATE Enabled

This indicates the BSS system is operating, and the entire BSS/FSU configuration has been loaded.

This condition means that you have selected the OPERATE mode. When you do this, the BSS/FSU configuration is loaded into the BSS system and the system is placed in operate. The FSU status indications will indicate the unlock/lock conditions, as well as the best source for each of the BSS channels.

3.9.5 SETUP & OPERATE Enabled

This indicates the following state:

1. An open configuration has been loaded and is complete.
2. You have completed a main configuration for a new configuration.
3. You now have a choice to either setup a BSS channel or initialize operations.

This condition indicates that the system is ready to initialize BSS system operations, and that you can modify a BSS/FSU combination configuration. If OPERATE is selected the SETUP changes to OFF. As this implies, the configuration is not changed on an operating system.

Table 1 : Setup & Operate

Setup	Operate	Indicates
Disable	Disable	<ol style="list-style-type: none"> 1. No BSS/FSU combinations, new configuration 2. FSU assignment incomplete 3. Initialize a new BSS channel
Enabled	Disable	<ol style="list-style-type: none"> 1. Complete BSS/FSU combinations but missing channel configurations 2. BSS Configuration Status displaying
Off	Enabled	Configuration loaded and BSS system is operating.
Enabled	Enabled	<ol style="list-style-type: none"> 1. Open Configuration has been loaded 2. Completed a New Configuration 3. Choice to Setup existing BSS channel or Initialize Operations

3.10 Auto or Forced BSS

3.10.1 Auto Operations

Under the Auto mode, the output of each BSS channel is determined by the FSU priority and frame sync status. The lock status of the FSUs comprising a BSS channel is used to control which clock and data signals will be output as the “*best source*”.

The “*best source*” switching strategy for a change from lock to unlock is as follows:

1. A BSS channel’s “*best source*” is switched to a higher priority FSU’s input if a lower priority FSU loses lock and a higher priority FSU has frame sync lock present. If no higher FSU is locked, then the following strategy is used.
2. A BSS channel’s “*best source*” is switched to a lower priority FSU’s input if a higher priority FSU loses lock and a lower priority FSU has a frame sync lock present. If no lower priority FSU has a frame sync lock, no clock and data switching occurs.

3.10.2 Forced Operations

In the FORCED mode, you select one of the FSUs within a BSS channel as the forced output. Once selected, only the clock and data source corresponding to this FSU will be output as the “*best source*” until you change your selection.

Note: Should a locked FSU lose its input clock, the FSU will drop to a “frame sync lost” (unlock) condition.

The procedure to go into a FORCE mode is as follows:

1. Select the BSS Channel Auto/Forced indicator, which will cause the indicator to change color and label. Forced is red, where Auto is green.
2. Next select the FSU by moving the mouse over the desired FSU number above the FSU indicating circle of the BSS channel group. When you left click the mouse button a golden ring will appear as the FSU indicating circle.

3.11 % Lock Controls

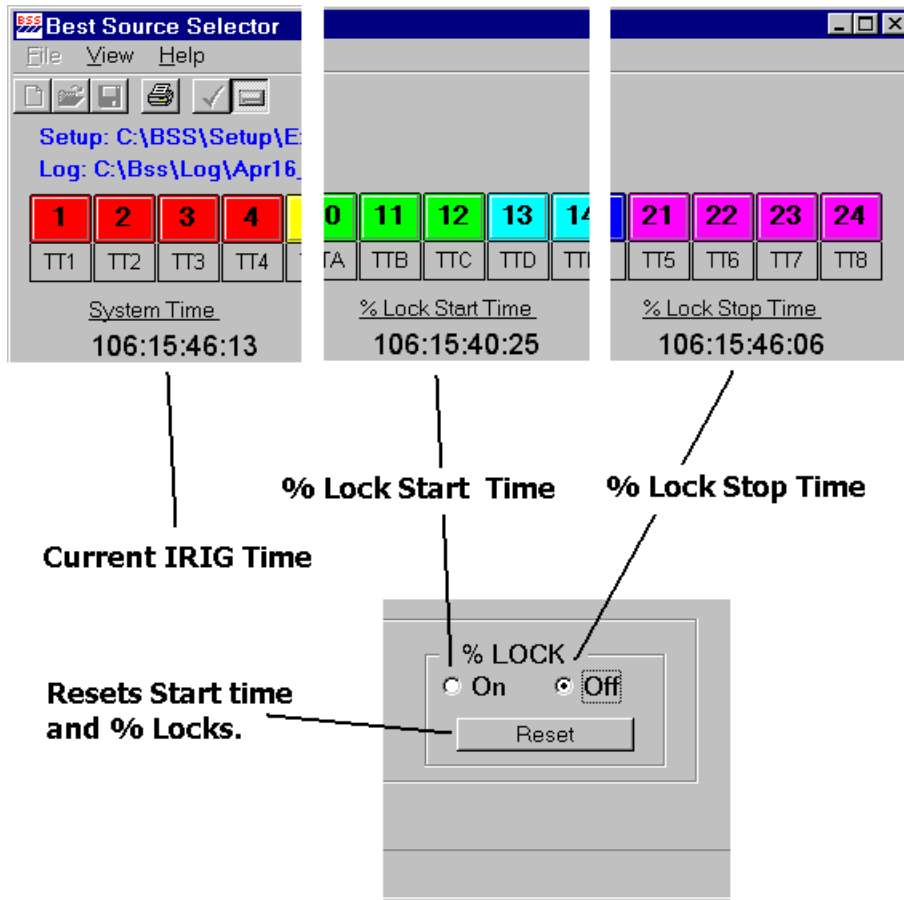


Figure 19 - % Lock Controls

3.11.1 On

This option button starts computation of the percentage calculations. It will capture and set the % Lock Start Time when selected from the OFF condition and reset the % Lock Stop Time to zero. Selecting Reset All after selecting On will force all FSU's percent lock and start time to be refreshed with the current time and computations and the off time is set to zero.

3.11.2 Off

This option button will stop the computation of the percentage calculations. It will capture and set the % Lock Stop Time when selected from the ON condition. Selecting Reset All after selecting Off will force all FSU's percent lock, start time, and off time to zero.

3.11.3 Reset All

This command button forces the start time and all FSU’s percent lock to zero. The results are dependent on the % Lock option that is currently selected.

3.11.4 Details

Several things can happen when you invoke these controls. The following table is based on the Technical Specification Documentation on the state and function:

Table 2 : % Lock Controls

Current State	Next State	Actions
INITIAL		All percentage indications are zero, % Lock Start & Stop Times are zero
Off	On	Starts or restarts % computation and sets % Lock Start Time if zero, reset the % Lock Stop Time to zero.
On	Off	Stops the % computation and sets % Lock Stop Time.
On	Reset	Resets the % computation counter and updates the % Lock Start Time
Off	Reset	Resets everything, all percentage indications and both the % Lock Start 7 Stop Times.

3.12 Channel Slaving

3.12.1 Operations

When the BSS channel is first setup all ‘Slave’ Checkboxes are enabled and cleared, provided the setup file does not declare any channels to be slaved. The following screen is an example of no slaved channels.

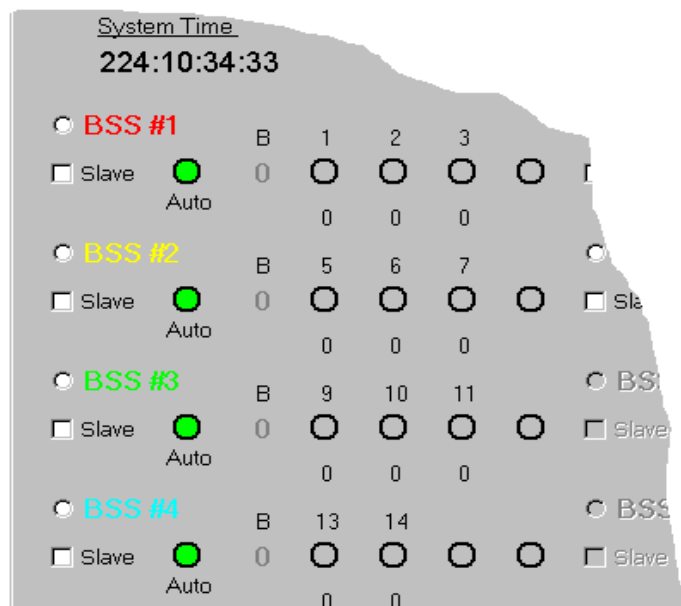


Figure 20 - Pre-Slave Setup

The rules that apply to denoting a master and slave combination are as follows;

1. The number of FSU per BSS Channel must be the same.
2. The BSS Channel to be the master cannot be a slave to another channel.
3. Any number of channels can be slaved to a single master channel provided they meet the first two rules.
4. If want to configure the FSUs of a slave channel, you must do it before checking the slave box.
5. A slave channel does not select its own best source nor report its own FSU statuses. Instead, the slave channel reflects the same best source and FSU statuses as its master.

The BSS system presumes that a slave channel’s data is not PCM. Although the BSS system does setup and run the slave channel’s FSUs, it ignores the lock statuses they report. Instead, the BSS system sets the best source position within the slave channel to be identical to its master. Since the BSS system uses the master’s FSU statuses to choose a slave’s best source, the GUI displays the master’s statuses for each of its slaves.

The following is what the screen will look like when you have selected a slave channel and the associated master channel.

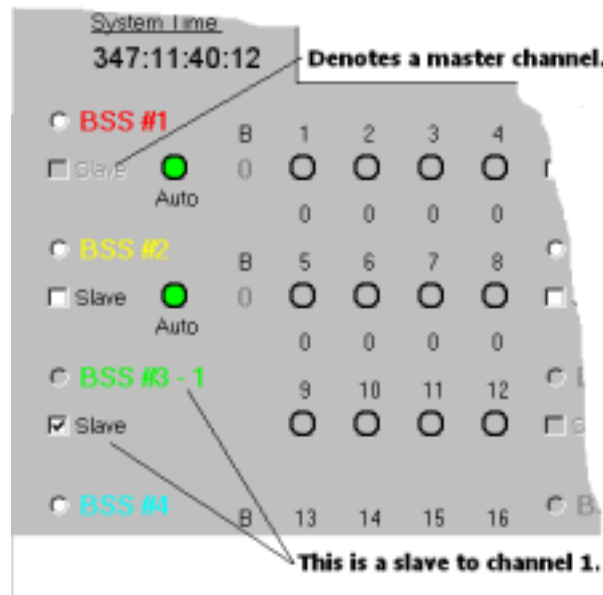


Figure 21 - Master-Slave Combination

The slave channel in the example is BSS #3. Note that the slave check box has been marked, and the BSS channel designation has changed to BSS #3 – 1 [BSS Channel # - BSS Master #]. Note the Best Source indication and the Auto/Force selection has disappeared. This is because a slave channel cannot be force into a selection except by the master channel. The master channel (BSS #1) slave check box has been disabled, hence preventing it from being selected as a slave.

3.12.2 Configuration File

The selection of a slave channel will be reflected in the BSS/FSU Configuration output as shown below.

```
----- BSS/FSU 03 -----  
Slaved To: 1  
Bit Rate: 1.000E+03  
Bits/Frame: 111
```

As you can see the 'Slaved To' is followed by the channel designated master. This is used by the interface to determine how the channel is to be switched. The default for the 'Slaved To' is zero, denoting a master channel. Care should be exercised if you edit the configuration files so as not to 'slave a slave', that is slave a channel that is already a slave channel. The program will issue error messages when the configuration is passed to the hardware interface.

3.13 Using the Simulator

The BSS is equipped with a simulator that you can use to verify proper operation of your system. You can access the 4 simulator outputs on the system's rear panel. The simulator runs all of the time. This section discusses the various ways that you can affect its output format.

3.13.1 Health Check

The simulator is an integral part of the system's health check. The BSS automatically runs a health check at startup, or you can run it manually by clicking the checkmark on the toolbar. This is described in detail in section 2.2.5. The health check's details are described in Appendix F of this manual. During a health check, the system automatically programs the simulator to produce a known PCM frame, and each FSU to receive it. The PCM frame is generated at a rate of 10KBits, is 64 bits in length, and has a sync pattern of EB90. Using the system's switching matrix, the health check switches each FSU between the simulator and ground. If an FSU locks when it receives the simulated data, and unlocks when it receives ground, the health check reports that the FSU passed its check. At the end of the health check, the simulator continues to transmit the frame.

3.13.2 BSS/FSU Configuration Channel Self Test

You can use the simulator from the BSS/FSU Configuration menu by running self tests. This menu and the self tests are described in detail in section 2.8.6. When you run either self test, the system programs the simulator to produce a PCM stream with the channel's frame length and sync pattern. The frame contains the selected sync pattern, and is then padded to the frame length with alternating bits of 1 and 0. The number of bits allocated to the sync pattern is determined by most significant bit set in either the sync pattern or mask. When you run the auto test, the system automatically promotes the bit rate to 10 MBits so that it can complete the test in a tolerable amount of time. When you run the manual test, the simulator uses the selected bit rate. The simulator's output is available on the rear panel, and the simulator continues to run when you dismiss the menu.

3.13.3 Operate Mode Testing

When you put the BSS in Operate mode (section 3.9), you can select a channel's setup to the simulator by clicking its BSS # button. The simulator will produce frames using the channel's bit rate, sync pattern, and frame length. After the sync pattern, each frame is padded to its frame length with alternating bits of 1 and 0. The number of bits allocated to the sync pattern is determined by most significant bit set in either the sync pattern or mask. After selecting a channel's setup to the simulator, you can then, for example, loop one of rear panel's simulator outputs back to an input to verify that the FSU is working properly.

3.14 Getting Help

On-line, context-sensitive help is available by pressing F1. This brings up either the Help Contents or the particular topic or control. For example, when the main screen is currently displayed, pressing F1 will bring up information about the Main Screen.

3.14.1 Contents

This invokes a *help contents* dialog as part of an on-line manual to aid you in performing various operations. It is similar to most Windows' Help files, in that it is not a complete stand-alone description or operations manual such as those provided as part of the System Documentation.

3.14.2 Search For Help On...

This permits you to search on the various topics found within the help file. This is often quicker if you know the name of the procedure you want to perform.

3.14.3 About BSS...

This is a brief description of BSS GUI program generation, and shows the version numbers of the Best Source Selector, Interface, and Server software presently installed .

3.15 Using the Log File

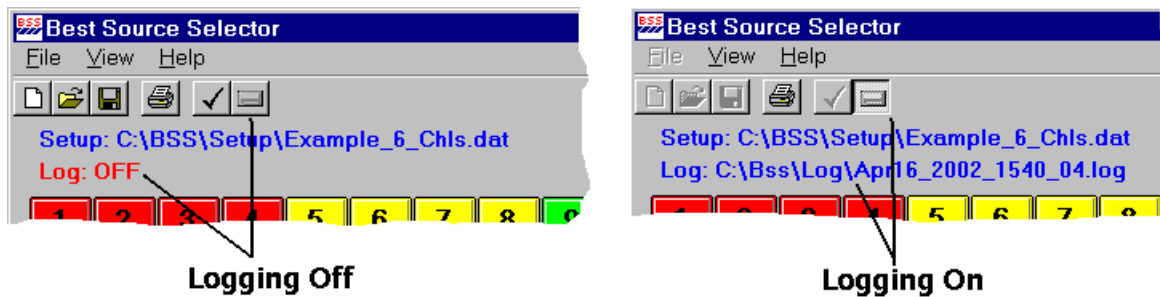


Figure 22: Logging

You can use the log file to record the system's configuration and status during each run. When you start the BSS GUI, it enables the logging function and generates a unique log file name based on the current date and time. All of the logging data for the GUI session (that is, until you exit) will be written to this file. The system records its setup and status to the log file for each run, unless you disable it.

3.15.1 Log File Name

All log files are stored in the C:\BSS\Log directory. The filename has the form of "MMMDD_YYYY_HHMM_SS.log". "MMM" is the month, "DD" is the day, "YYYY" is the year, "HHMM" is the hour and minute, and "SS" is the seconds of the computer's system time when you started the BSS GUI session. The name is generated automatically to be unique, and you cannot change it. The BSS system never deletes a log file. You are responsible for deleting a log file (using, for example, the Windows Explorer) when you are certain that you no longer need it.

3.15.2 Enabling/Disabling Logging

The system enables logging at startup. You can disable it by releasing the "Logging" button on the toolbar, as shown in Figure 22.

3.15.3 Log File Contents

When you "Operate" the BSS with logging on, the system will append to the log file the setup name, the channel setups, the initial FSU lock statuses, and the initial best source for each channel. Then, once per second, the system will compare its current state with the previous, and append to the log file a time tagged message describing any differences. You can find an example of a log file's contents in *Appendix E*.

3.16 Main Configuration Files

The main configuration or setup file contains the various elements of the control and status panel. You use it to program the BSS system from a previous configuration. These files can be edited using a text editor such as Notepad. The following is a detailed description of the main configuration file.

Note: The program will read this file when it is opened and attempt to load it. The position of the data is critical - that is if an item is incomplete the program will react in unpredictable ways. The GUI will write this file out correctly.

An example of this file can be found in *Appendix A*.

3.16.1 Configuration File Details

3.16.1.1 Header

The header contains the configuration file name, the date the file was generated, and the Julian Day. The specification of the file name must be the same as described in the Technical Specifications. The program reads the line titles to locate and know what the line's designation is for. After the line title, there is a colon delimiter, followed by a space. The data follows the space.

3.16.1.2 Input Codes

This contains the Title and all 20 inputs (16 input channels and 4 playback). The title is used in the input code frame within the main display screen. This data should be 15 characters maximum. Each input channel designation is 'INPUT' followed by a two-digit number, with a colon and space delimiter. The data should be three characters maximum. Anything longer is automatically truncated before being passed into the main screen.

3.16.1.3 System Configuration Data

This area contains information about the BSS channel grouping of FSU's. The line title starts with the channel's 'BSS' and two-digit number, followed by a colon and space delimiter. The data format is the FSU number (01 to 24) followed by a space, then the input designation and space. The maximum number of FSU is four designations.

The following is an example of a *fully loaded* BSS channel.

```
BSS 01: 01 TT3 02 TT1 03 TT5 04 TT9
```

An error will occur if you designate a single input for a BSS channel. The BSS Technical Specification states that "*BSS channels with only one FSU shall be selectable using a playback System Code only.*" Putting in an FSU number but no input code will result in unpredictable execution when the GUI attempts to read and place the combination in the main screen as part of the load process.

3.16.1.4 BSS/FSU Channel Settings

This area contains the twelve BSS/FSU channel settings. Each one contains the data for the various parameters for each FSU within a BSS channel grouping. As above, each parameter has its own line, starting with a line title followed by the colon and space delimiter. The data that follows has to be in the correct format and type (characters or numbers). The Sync Pattern and Sync Mask must be in hexadecimal format, representing a 64-bit binary value or less. The Sync Strategy can be designated as 'Fixed', 'Adaptive', or 'Burst'. Sync Slip Windows can be designated as 'Off', '1', '2', or '3'. Sync Polarity can be designated as 'Normal', 'Inverted', or 'Automatic'.

The used channels contain only the line title, but no data. The following is an example of a setup for BSS channel one. All FSU's within this channel will be setup the same way based on the values of these parameters.

```
----- BSS/FSU 01 -----  
Bit Rate: 1.000E+03  
Bits/Frame: 111  
Sync Pattern: 12345678  
Sync Mask: FFFFEEDD  
Sync Strategy: Fixed  
Verify to Lock: 0  
Lock to Verify: 0  
Verify to Search: 0  
Error Tolerance: 1  
Sync Slip Windows: Off  
Sync Polarity: Normal
```

You can save these BSS/FSU channel settings as individual setups that you can recall when you are setting up a BSS system. See the following section for BSS/FSU Setup files.

3.17 BSS/FSU Setup Files

As mentioned in paragraph 3.16.1.4 BSS/FSU Channel Settings, the data can be saved as a 'vehicle' file for use in other setups. Basically the file that is saved is all the associated parameters for a BSS channel configuration of an FSU. These parameters can then be read back and used to configure a BSS channel FSU(s).

An example of this is in *Appendix B*. Note that unlike the main configuration file, this file does not contain a header or any information associated with a particular BSS channel. However it does contain information about the parameters required by the FSU/BSS grouping.

These files can be viewed and edited using a text editor such as NotePad.

4 Operational and Warning Messages

4.1 Runtime DLL Error Messages

There are several programs executing while the BSS GUI is running. Two of these programs are the BSS Server and the Visual Basic Interface Drivers to the BSS System Hardware. Messages from these programs tend to be more detailed in reporting errors that will aid in understanding any sequence of failures and assist in locating any problems. The nature of this type of error can tie you up responding to endless message boxes, so these messages are placed in the Event Log. You will receive an indication of a runtime error in the Main Screen with the appearance of the runtime error button as shown in Figure 23.

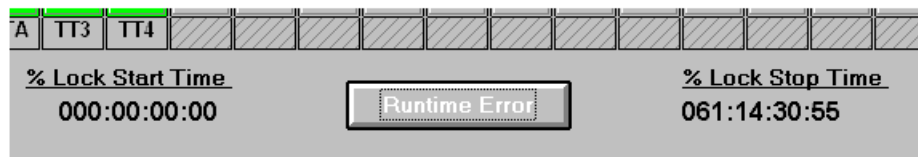


Figure 23 - Main Runtime Error

There is a similar control in the BSS/FSU Configuration screen. See Figure 24, which operates in the same fashion during self-test operations. To clear and acknowledge this message, you must select the runtime control button and then look at the messages posted in the Event Log.



Figure 24 - BSS/FSU Configuration Runtime Error

Whenever there is a new error the runtime error control will reappear. This informs you of an error occurring, while at the same time allowing operations to continue.

4.2 Status Panel Messages

The status panel, when activated, appears at the bottom left of the current screen. This panel displays operations and functions as they are executed. These messages show the process of system execution of your selections. Table 3 in Appendix D contains all the current Status Panel messages including error messages.

4.3 Operational Dialog Messages

There are several messages, appearing as dialog boxes, that inform you of events and problems. These messages require your response before they will clear. Table 4 contains all current Operational messages and what functions they support. These messages can also contain boundaries when they are associated with parameter input. Table 5 in Appendix D contains the current listing of all boundaries within the program.

Appendixes

Appendix A: Main Configuration File

This is an example of a main configuration file for the BSS system:

```
Configuration File Name: newtst3.dat
Date: 10/11/99
Julian Day: 283
System Codes:
Title: System Codes
INPUT 01: TT1
INPUT 02: TT2
INPUT 03: TT3
INPUT 04: TT4
INPUT 05: TT5
INPUT 06: TT6
INPUT 07: TT7
INPUT 08: TT8
INPUT 09: TT9
INPUT 10: TTA
INPUT 11: TTB
INPUT 12: TTC
INPUT 13: TTD
INPUT 14: TTE
INPUT 15: TMM
INPUT 16: TMN
INPUT 17: PB1
INPUT 18: PB2
INPUT 19: PB3
INPUT 20: PB4
System Configuration:
BSS 01: 01 TT3 02 TT1 03 TT5 04 TT9
BSS 02: 07 TT7 08 TT9 09 TT8
BSS 03: 12 TMM 13 TTB 14 TT7
BSS 04: 16 TT5 17 TT6 18 TTA
BSS 05: 20 TT9 21 TTA
BSS 06:
BSS 07:
BSS 08:
BSS 09:
BSS 10:
BSS 11:
BSS 12:
----- BSS/FSU 01 -----
Slaved To: 0
Bit Rate: 1.000E+03
Bits/Frame: 111
Sync Pattern: 12345678
Sync Mask: FFFFEEDD
Sync Strategy: Fixed
Verify to Lock: 0
Lock to Verify: 0
Verify to Search: 0
Error Tolerance: 1
```

```

Sync Slip Windows: Off
Sync Polarity: Normal
----- BSS/FSU 02 -----
Slaved To: 0
Bit Rate: 2.000E+03
Bits/Frame: 222
Sync Pattern: FFEEDDCC
Sync Mask: FFEFDFC
Sync Strategy: Fixed
Verify to Lock: 0
Lock to Verify: 0
Verify to Search: 0
Error Tolerance: 2
Sync Slip Windows: 1
Sync Polarity: Inverted
----- BSS/FSU 03 -----
Slaved To: 0
Bit Rate: 3.330E+03
Bits/Frame: 333
Sync Pattern: EFFF84A
Sync Mask: FFEFFFF
Sync Strategy: Burst
Verify to Lock: 0
Lock to Verify: 0
Verify to Search: 0
Error Tolerance: 3
Sync Slip Windows: 2
Sync Polarity: Automatic
----- BSS/FSU 04 -----
Slaved To: 0
Bit Rate: 1.000E+03
Bits/Frame: 44
Sync Pattern: FFFFFFFFFFFFFFFF
Sync Mask: FFFFFFFFFFFFFFFF
Sync Strategy: Fixed
Verify to Lock: 0
Lock to Verify: 0
Verify to Search: 0
Error Tolerance: 4
Sync Slip Windows: 2
Sync Polarity: Inverted
----- BSS/FSU 05 -----
Slaved To: 0
Bit Rate: 1.000E+03
Bits/Frame: 555
Sync Pattern: FFFFFFFFFFFFFFFF
Sync Mask: FFFFFFFFFFFFFFFF
Sync Strategy: Burst
Verify to Lock: 0
Lock to Verify: 0
Verify to Search: 0
Error Tolerance: 5
Sync Slip Windows: 1
Sync Polarity: Inverted
----- BSS/FSU 06 -----
Slaved To:

```

Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:
Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:
----- BSS/FSU 07 -----
Slaved To:
Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:
Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:
----- BSS/FSU 08 -----
Slaved To:
Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:
Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:
----- BSS/FSU 09 -----
Slaved To:
Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:
Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:
----- BSS/FSU 10 -----
Slaved To:
Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:

Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:
----- BSS/FSU 11 -----
Slaved To:
Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:
Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:
----- BSS/FSU 12 -----
Slaved To:
Bit Rate:
Bits/Frame:
Sync Pattern:
Sync Mask:
Sync Strategy:
Verify to Lock:
Lock to Verify:
Verify to Search:
Error Tolerance:
Sync Slip Windows:
Sync Polarity:

Important Note: Use caution when editing these configuration files with a text editor. Many of the parameters have limits that are not checked, and can result in program errors and unpredictable operation when used by the BSS GUI.

Appendix B: FSU Vehicle Configuration File

This is an example of a vehicle file for storing the parameters of an FSU group configuration.

```
Slaved To: 0
Bit Rate: 1.000E+03
Bits/Frame: 111
Sync Pattern: 12345678
Sync Mask: FFFFEEDD
Sync Strategy: Fixed
Verify to Lock: 1
Lock to Verify: 2
Verify to Search: 3
Error Tolerance: 1
Sync Slip Windows: Off
Sync Polarity: Normal
```

Important Note: Use caution when editing these configuration files with a text editor. Many of the parameters have limits that are not checked, and can result in program errors and unpredictable operation when used by the BSS GUI.

Appendix C : Package and Deployment Generation

The BSS program was initially developed under Visual Basic 5.0, and the first builds were completed and tested under that environment. When the BSS hardware and system was near completion, Visual Studio 6.0 was installed and the build environment was transferred to Visual Basic 6.0. The final release was done under Visual Studio - Visual Basic 6.0. The following is a description of the steps used to generate the Package and Deployment files.

Building a Package and Deployment Set with Visual Studio - Visual Basic 6.0

When building a setup/installation for the BSS GUI software, there are several differences in how to build the installation files under Visual Studio 6.0 versus Visual Basic 5.0. The location of the BSSVbIf.dll file must be known in order to build the Package and Deployment files for the BSS GUI.

Important: These files are not Visual Basic files, and must be accessible prior to any attempt to build a Package and Deployment file set.

We recommend that you set up an empty build directory that is something other than the source directory. As the Setup program is executed, the program will build up files in the designated build directory. However, it will not replace any files that have the same filename as those being generated.

To Build a Set of Installation Files for Visual Basic 6.0

1. From the **Startup\Programs\Microsoft Visual Studio 6.0** open **Microsoft Visual Studio 6.0 Tools**.
2. Select **Package and Deployment Wizard**.
3. Select **Project**.
4. Enter the working directory and **BSS.vbp** as the project.
5. Select the **Package** button. This will transfer files and ask to recompile if files found are changed or appear older than the last time a build was done. Answer '**Yes**' to generate a freshly compiled program.
6. Under Package Script, enter **BSS** or a name of your choice, then press **Next**.
7. Under Package Type, select **Standard Setup Package**, then press **Next**.
8. Under Package folder, select or set up the folder for the installation cabinet and setup listing.
9. Ensure the following files are included and checked.

BSS.exe	BSS.hlp	BSSVbIf.dll	Default
GLDRNG.bmp	GRN.bmp	GRNRNG.bmp	GRY.bmp
RED.bmp	REDRNG.bmp	three32.ocx	

10. Under Cab option, select **Select Cab**, then press **Next**.
11. Under Installation title, enter **Best Source Selector**, then press **Next**.
12. Under Start Menu Items, verify that there is a Group "Best Source Selector" and it has the following items, "Best Source Selector", before pressing **Next**.
13. Under Install Locations, verify that everything is installed in the \$(AppPath) except for the following

COMCTL32.OCX	-	\$(WinSysPath)
COMDLG32.OCX	-	\$(WinSysPath)
Default	-	\$(AppPath)\setup
BSS.hlp	-	\$(AppPath)\help

Then press **Next**.

14. Under Shared Files, ensure that BSSVbIf.dll is checked.
15. Under Script Name, enter **BSS** , then press **Finished**.
16. The program will finish with a Package Report, select **Close**.

To Edit the Setup.lst File for Visual Basic 6.0

1. Using Explorer, open the deployment directory and folder that now contains a cabinet, setup.exe and setup.lst. Open the *setup.lst* file using a text editor such as NotePad.
2. Find and change the following lines:

No.	Was	Is
1	Under [Setup], DefaultDir = \$(ProgramFiles)\BSS	DefaultDir = c:\BSS

Save the changes as *setup.lst*.

Generate the Deployment package

1. Under the Package and Deployment Wizard main screen, select the **Deploy** button.
2. Under Deployment Script, enter a title for the deployment script, or use the default **Folder Deployment 1**, then press **Next**.
3. Under Package to Deploy, enter or use **BSS** then press **Next**.
4. Under Deployment Method, select **Folder**, then press **Next**.
5. Close the Deployment Report.
6. Close Package and Deployment Wizard.

To Create an Installation & Setup diskette for Visual Basic 6.0

Copy the files from the deployment directory to a media that can hold the entire collection of files. By using the defaults a *BssDeploy* folder was generated that contained a Bss.cab, setup.exe, and setup.lst. These files constitute the package that can be installed with the ADD/REMOVE software found in the Control Panel.

This completes the process to build a Visual Basic Package and Deployment for the BSS GUI.

Appendix D : Error Messages

Table 3 - Status Panel Messages

Message	Function	Error
Bit Rate Input	Entering the current Bit Rate parameter.	
Bit Rate Input Error. Try again.	Error occurred entering the current Bit Rate parameter.	Y
Bits per Frame Error. Try again	Error occurred entering the current Bits per Frame parameter.	Y
Bits per Frame/Minor Frame Input	Entering the Bits per Frame parameter.	
BSS Server Failed to Respond	Best Source Selector Server failed to respond to the current command.	Y
Failed FSU Connection to Input Source	Failed to assign the system code to the selected FSU.	Y
Failed FSU Connection to Simulator	Failed to internally connect the Simulator to the selected FSU.	Y
Failed to Ground FSU Connection	Failed to internally connect ground to the selected FSU.	Y
Failed to Load Channel Setup	Failed to load the selected BSS Channel setup.	Y
Failed to Save FSU setup, Bad Parameters	Failed to save the current BSS/FSU channel configuration, probably due to a bad parameter.	Y
Failure to Reset/Set Leap Year on IRIG Time Card	Failed to invoke the command to set/reset the leap year on the IRIG Time card.	Y
FSU Group Assignment for BSS channel (<i>bss channel number</i>)	Indicates an FSU group assignment to the selected BSS Channel.	
Initializing BSS/FSU Configuration	Indicates the initialization of the BSS/FSU Configuration.	
Initializing the BSS Server	Indicates the initialization of the BSS Server.	
IrigTime Failure	Indicates the IRIG Time has failed.	Y
Load & Initializing the Setup	Indicates a load and initialization of a Main Configuration file.	
Missing Path/Filename	Indicates a missing path or filename.	Y
Mission File Missing Data	Indicates the Main Configuration is missing parameter data.	Y
New/Open a Configuration File	Indicates a Main Configuration file has been opened.	
Opening a FSU Configuration File	Indicates the selected FSU Configuration File has been opened.	
Operate Mode	Indicates the BSS system is in OPERATE.	
Printing Error	Indicates a printing error.	Y
Printing Screen	Indicates a hardcopy dump has been performed.	
Problem with Main Configuration File	Indicates a problem with the Main Configuration file as it is.	Y
Remote Display Unit Failure to Response	Indicates the RDU has failed to respond to the last command.	Y
Saving a Configuration File	Indicates the Main Configuration file has been saved.	
Self-Testing	Indicates the self-test mode has been selected.	
Setup Mode	Indicates the BSS system is in SETUP.	
Start Command Failure	Indicates a failure to start % Lock computations	Y
Stop Command Failure	Indicates a failure to stop % Lock computations.	Y
Switching Matrix Failure	Indicates a failure in the Switching Matrix.	Y
Sync Error Tolerance Error. Try again.	Indicates an input error in the Sync Error Tolerance, and reset the focus to the input box.	Y
Sync Error Tolerance Input	Indicates Sync Error Tolerance input parameter has just been entered.	
System Code Error	Indicates an error in the System Codes.	Y
System Code to FSU Assignment	Indicates a successful System Code assignment to an FSU.	
Tabular Listing Started	Indicates the Tabular Listing has been started.	
Tabular Listing Stopped	Indicates the Tabular Listing has been stopped.	

Table 4 - Operational/Setup Messages

Operation	Message	Type	Limits
Configuration Operation	Changes Have Not Been Saved. Wish to Save Current Configuration?	YesNo	None
Configuration Operation	Configuration File Failure	Critical	None
Configuration/Setup	Need To Assign The FSU's To This BSS	Critical	None
Configuration/Setup	Only A Single FSU For This BSS. Playback Channel Only! Clearing The Input Selection	Critical	None
Configuration/Setup	FSU Already In Use. Select Another One Or Delete Its Usage	Critical	None
FSU Configuration/Setup	This Cannot Be Evaluated As A Number. Boundaries minimum to Boundaries maximum. <i>See the Boundary table below.</i>	Critical	Yes
FSU Configuration/Setup	Outside The Expect Limits. Boundaries minimum to Boundaries maximum. <i>See the Boundary table below.</i>	Critical	Yes
Inoperable/Missing Hardware	Inoperable/Missing Required Hardware Found. FSU # <i>number.</i>	Information	None
New File Input	Auto Extension Enabled. Do You Wish to Use Default?	Exclamation YesNo	None
Operational Mode	You Are About To Shutdown The BSS System And Re-Enter Setup Mode! Is This What You Want To Do?	Exclamation YesNo	None
Print	Form Can Not Be Printed! Check Printer Configuration	Information	None
Remote Display Unit	Remote Display Unit <i>number</i> Failed To Respond	Critical	None
System Configuration	This Is Not A System Configuration File	Critical	None
System Operation	BSS Sever Failed. Aborting Program	Critical	None
System Operation	BSS System is in Operate. Cannot Perform Request!	Information	None
System Operation	Cannot Perform Operation, Missing or Incomplete Data!	Critical	None
System Operation	Failed BSS System Health Checks. Check the System Hardware	Critical	None
Tabular Listing Operation	Tabular Listing Was Terminated and Will Be OverWritten If Restarted	OKCancel	None

Table 5 - Boundary Table

Parameter	Minimum Boundary	Maximum Boundary
Bit Rate	1.000E03	2.000E07
Bits per Frame	16	65536
Frame Sync Error Tolerance	0	15
Frame Sync Pattern (Binary)	1	64
Frame Sync Pattern (Hex)	1	16
Lock to Search	1	15
Mask (Binary)	1	64
Mask (Hex)	1	16
Verify to Lock	0	15
Verify to Search	1	15

Dynamic Link Library Messages:

These are messages received from the dynamic link library routines if a failure occurs. They are passed to the GUI as a parameter and provided for your information.

Appendix E: Log File

Introduction

The BSS system is capable of producing a log file, whose purpose is to document the Best Source channel configurations, and the lock/unlock statuses of each of the frame synchronizer units (FSUs) included in the channels. The purpose of this appendix is to describe the contents of a log file and the algorithm used to determine when it should be updated.

Activating, Deactivating, and Naming a Log File

The procedures for naming, activating, and deactivating the log file are described in sections 2.2.6, 2.3, and 3.15 of this document.

Viewing a Log File

A log file contains ASCII text that is viewable from any text editor. The Lock Status table stored in this file may be quite wide (>80 characters), and therefore we advise that you view this file in an editor that is horizontally scrollable. For example, you can use the *Notepad* application that comes with Windows (located under *Accessories* in the *Start Menu*) to view a log file by first opening the file, and then unchecking the *Word Wrap* option under the *Edit* menu. You must use a fixed width font, such as Courier, to view the log file. If you use a proportional font, such as Arial, the character width varies and the table columns will no longer appear to line up.

An Example Log File

Figure 25 shows an example of a log file. Logging is activated only when the system is running. Each run begins with a preamble, which tells the name of the configuration file that was used to set up the Best Source Selector and the date when the run began. The **System Date** value is obtained from the host computer's system clock, *not from the system's IRIG B time input*. The **IRIG Julian Day** value is the day as reported by the IRIG B time input. There is a star (*) next to it if the IRIG B time translator was extrapolating at the moment the time was read because it was not locked on to its time source.

Following the preamble is a summary of the **System Configuration**. This tells which FSUs are assigned to each best source channel, as well as the system code associated with each of the FSUs. For example, in the first run of Figure 25, best source channel 1 contains three FSUs: FSU01, FSU02, and FSU03. FSU01 has the system code TT1, FSU02 has the system code TT2, and FSU03 has the system code TT3.

Following the **System Configuration** is the Lock Status table. It begins with a table header that labels the columns. The first column, labeled **Time**, gives the time obtained from the IRIG B time translator at the moment a given table line was written. A star (*) next to a time in this column indicates that the IRIG B time translator was extrapolating at the moment the time was read because it was not locked on to its time source. Examples of the time translator being out of lock are at the times **18:09:18** and **18:09:24** in Figure 25. To the right of the time column is one column for each best source channel that is in use. Each channel column is made up of subfields. The first subfield in a channel column indicates the best source of the channel. It is followed by an additional subfield for the lock status of each FSU in the channel. The best source subfield begins with a **B** and is followed by the FSU number of the channel's best source. The FSU lock statuses are specified in the subsequent subfields by giving the FSU number followed by an **L** for "Lock" or a **U** for "Unlock".

There are two types of lines that are written to the table. The first type, called a *table row*, is a line containing columns of information as specified in the table header. A table row contains columns and subfields as described above. The second type of line written to the table is called a *log message*. A log message contains a time stamp in its **Time** column, but the remainder of the line is used to print a message regarding the status of the file or the status of the BSS system. In the table shown in Figure 25, all lines are table rows except for the first entry at time **18:09:08** and the entry at **18:09:27**, which are examples of log messages. Another example of a log message, not shown in Figure 25, would be a message indicating an error condition that occurred in the BSS system.

The second entry at time **18:09:08** in Figure 25 is an example of a table row. The following describes how to interpret it. The first column indicates the time as read from the IRIG B time translator when the data shown in this table row was acquired, 18:09:08. The second column indicates that, in BSS channel 1, FSU01 and FSU03 were locked while FSU02 was unlocked, and that FSU01 was used as the best source. The third column indicates that in BSS channel 2, FSU04 and FSU07 were in lock while FSU05 and FSU06 were unlocked, and that FSU04 was used as the channel's best source.

A log file may contain more than one run. The example in Figure 25 contains two runs: one that uses Configuration File C:\BSS\Setup\Example_2_Chls.dat, and a second that uses C:\BSS\Setup\Example_3_Chls.dat. See section 3.15 for details about how the GUI manages different runs and log files.

Log File Update Algorithm

This section describes the algorithm that the BSS software uses to determine when a new line should be added to the log file's table. When you initiate a log file (via the procedure described sections 2.2.6, 2.3, and 3.15 of this document), the BSS software initializes the file by writing the preamble, System Configuration, and table header. It then writes a log message to indicate that recording started followed by the first table row. The first table row is special in that it is guaranteed to have all of its columns and subfields filled. All subsequent table rows show only differences relative to the previous table row. Once per second, the BSS system's server software obtains a copy of the current channel statistics. It checks for any error conditions that exist currently or at any time since the last log file update. If an error condition exists, the server software prints a log message in the file. If there isn't an error condition in the current channel statistics, then the current statistics are compared to the channel statistics saved from one second previous. If there are any differences, a table row is printed containing entries only in subfields where changes have occurred. If there aren't any differences, no table row is printed. When you terminate a run, the BSS system's server always ends the table with a log message indicating that recording has stopped.

```

Configurati on File: C:\BSS\Setup\Example_2_Ch1 s. dat
System Date: April 17, 2002
IRIG Julian Day: 107
System Configurati on:
BSS 01: 01 TT1 02 TT2 03 TT3
BSS 02: 04 TT4 05 TT5 06 TT6 07 TT7
BSS 03:
BSS 04:
BSS 05:
BSS 06:
BSS 07:
BSS 08:
BSS 09:
BSS 10:
BSS 11:
BSS 12:
    
```

```

Time          BSS01          BSS02
18:09:08      Recording Started
18:09:08      B01 01L 02U 03L   B04 04L 05U 06U 07L
18:09:18*          02L
18:09:22          B07 04U
18:09:24*          05L
18:09:27      Recording Stopped
    
```

```

Configurati on File: C:\BSS\Setup\Example_3_Ch1 s. dat
System Date: April 17, 2002
IRIG Julian Day: 107
System Configurati on:
BSS 01: 01 TT1 02 TT2 03 TT3
BSS 02: 04 TT4 05 TT5 06 TT6 07 TT7
BSS 03: 08 TT8 09 TT9 10 TTA
BSS 04:
BSS 05:
BSS 06:
BSS 07:
BSS 08:
BSS 09:
BSS 10:
BSS 11:
BSS 12:
    
```

```

Time          BSS01          BSS02          BSS03
18:10:16      Recording Started
18:10:16      B01 01L 02L 03L   B05 04U 05L 06U 07L   B08 08L 09L 10U
18:10:21          02U
18:10:24          B07      05U
18:10:30          03U
18:10:34          10L
18:10:37          B09 08U
18:10:38          04L
18:10:48          B10      09U
18:10:52          05L
18:10:54          10U
18:11:00          01U
18:11:09          B08 08L
18:11:16      Recording Stopped
    
```

Figure 25: An Example Log File

Appendix F – Health Checks

Introduction

The BSS system has the capability to perform a self-test on each of its components in order to help you detect and isolate system failures. We call this series of self-tests a system *health check*. The purpose of this appendix is to describe the tests comprising the health check and to describe the potential causes for health check failures.

User Interface Response to a Health Check

The procedure for initiating a health check is described in Section 2.2.5 of this manual. When you initiate the health check, the BSS GUI program makes a Remote Procedure Call (RPC) to the BSS Server (BssServe) program, which in turn carries out the health check. If the RPC fails to find BssServe, then the GUI will present you with a message box indicating that the health check failed because "... BSS Server not found". If the RPC does find BssServe, but BssServe detects an unrecoverable error while it is carrying out the health check, then you will receive a message box indicating that "An irrecoverable error occurred during Health Check". Checking the Application Event Log in the Event Viewer will often provide additional information about the failure. The Event Viewer application is available from Windows' *Start Menu*, under *Programs*→*Administrative Tools (Common)*. If BssServe is able to successfully complete the health check, then the GUI will open a dialog box enumerating the pass/fail status for each of the components tested.

Health Check Component Tests

A health check is a series of tests that test the various components of the BSS system. This section details the test carried out by BssServe on each of the components.

IRIG B Time Translator

BssServe first reads the Time Translator signature register to verify that the Time/Simulator mezzanine card is plugged into the master (card index 0) Eight-Stream PCM (MPCM) card. If the Time card module is found, then BssServe puts it into IRIG B translate mode and waits up to two seconds for it to report that it is locked on to an IRIG B signal. If the Time card locks on to an IRIG B signal, BssServe reports that the Time Translator has passed its health check. Otherwise, BssServe reports that the Time Translator failed its health check.

Note That the Time Translator will fail its health check if there is not a valid IRIG B time source plugged into the "IRIG B IN" BNC located on the system's rear panel.

Switching Matrix

The software interface to the Switching Matrix (SMTX) exists through registers on the first MPCM card. For information about the MPCM register set, refer to the system manual. The first MPCM card communicates with the SMTX over a high-speed serial link. When the MPCM sends data to the SMTX, the SMTX echoes the data back to the MPCM as verification that it is present and receiving data. BssServe tests the SMTX by sending a test data pattern to it via MPCMO, and verifying that echo is the same as the test pattern. If the test pattern and the echo are the same, BssServe reports that the SMTX has passed its health check. Otherwise, BssServe reports that the SMTX has failed its health check. An additional check of the SMTX occurs when the individual Frame Synchronizer Units (FSUs) are tested. See the section **Frame Synchronizer Units** in this appendix for details about that test. All FSUs failing the FSU test could be an indication that the SMTX is malfunctioning, or that it is not connected to the master MPCM card.

Simulator

BssServe first reads the Simulator's signature register to verify that that the Time/Simulator mezzanine card is plugged into the first MPCM card. If the Simulator is found, then BssServe conducts two memory tests on it. The first memory test checks all of the Simulator memory data lines. The second memory test checks all of the Simulator memory address lines. If the Simulator passes these memory tests, then BssServe reports that the Simulator has passed its health check. An additional check of the Simulator occurs when the individual FSUs are tested. See the

section **Frame Synchronizer Units** in this appendix for details about that test. All FSUs failing the FSU test could be an indication that the Simulator is malfunctioning.

Frame Synchronizer Units

Each Frame Synchronizer Unit (FSU) is tested individually. Before testing any FSUs, BssServe initially switches all of the FSU inputs to ground. BssServe then runs the FSU under consideration while its input is switched to ground, and reads its lock status ten times, each time verifying that it is reporting "Search". Next, BssServe switches the FSU input to the Simulator and reads its lock status ten times, each time verifying that the FSU is reporting "Lock". Finally, BssServe switches the FSU's input back to ground, again reads its lock status ten times, this time verifying that the FSU has returned to "Search". If the FSU under test responds correctly to each stimulus, then BssServe reports that it has passed its health check. Otherwise, BssServe reports that the FSU has failed. FSUs 1-8 reside on MPCM card index 0, while FSUs 9-16 reside on MPCM card 1, and FSUs 17-24 reside on MPCM card 2. A failure of any of these blocks of eight FSUs could indicate that a particular MPCM card is absent from the system, it is not connected to the matrix card, or it is malfunctioning. A failure of all 24 FSUs may be an indication that the Simulator or Switching Matrix is malfunctioning. It could also indicate that the master MPCM card is not connected to the Switching Matrix.

Remote Display Units

BssServe tests the Remote Display Units (RDUs) by sending out a test message and waiting to receive an echo from the RDU under test. While the test message is broadcast simultaneously to all of the RDUs, BssServe can receive only one echo at a time; and uses the Switching Matrix to choose which RDU it is listening to. Therefore, BssServe sends out a total of six test messages, one for each RDU. Since an RDU does not know whether or not BssServe is listening for its echo, all RDUs must echo all test messages that they receive. If BssServe receives an echo from the RDU it is listening to, BssServe compares the message it received with the message it sent. If they are identical, BssServe reports that the given RDU has passed its health check. If the echo is not received, or is not identical to the test message, then BssServe reports that the RDU has failed its health check.

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