

DN 6000421
USERS MANUAL
FOR THE ACROAMATICS
FRAME VALIDATION SYSTEM
MODEL 2618P

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February 12, 2008

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ACROAMATICS DOCUMENT HISTORY

The following table indicates major changes made to Users Manual for the Acroamatics Frame Validation System Model 2618P, Acroamatics Document Number 6000421, released on February 12, 2008 and contains a record of all revisions made since that date.

DOCUMENT CHANGE HISTORY			
Rev	Date	Action	Name
A	02-12-08	Original Issue	TR

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CHAPTER 1 INTRODUCTION

The Frame Validation Wizard program is used to produce setup files that control the Acroamatics Model 2618P Frame Validation System. The software that runs on the Model 2618P reads setup files from USB flash memory sticks plugged into its USB connector. These setup files must be produced with the Frame Validation Wizard program running on some other computer.

Model 2618P Frame Validation System

The *Model 2618P Frame Validation System (FVS)* is a compact, integrated PCI system in a 1U rack mount package. The FVS is built as a standard PCI chassis, accepting a single PCI card, the Acroamatics Model 1650P Frame Synchronization Verifier. It contains a standard miniature PC motherboard with a Pentium processor.

The Model 2618P FVS is a system that can receive data and clock outputs from several PCM Bit Synchronizers, verify that the received data is a PCM stream matching the expected minor frame length and synchronization pattern and display that so that system operators can quickly verify that the received data corresponds to the expected data stream. The display is maintained on the unit's front panel frame sync status lights. At the same time, the PCM stream can be retransmitted to other data acquisition processing stations in a form that a bit synchronizer in the processing station can decode and track reliably.

The *Model 1650P FSVU (Frame Synchronization Verification Unit)* inside the *Model 2618P* contains eight PCM Decommutators that are designed for PCM stream quality verification rather than data processing. Each decommutator contains a minor frame synchronizer with a 64 bit pattern correlator, a 16 bit counter that counts the number of bits per frame, and programmable synchronizer strategy providing Search, Verify, and Lock states. A programmable watchdog timer returns a decommutator to Search if the input clock is lost. You can read the status of each of the eight decommutators over the PCI bus to determine the quality of the input data to each channel. In the Model 2618P the status of each of the decommutators is displayed on the unit's front panel frame sync status lights.

The 1650P synchronizes PCM data by first locating a fixed pattern and then determining that the pattern repeats at fixed intervals. The pattern is recognized by a digital correlator that accepts 64 sequential bits and compares them to a programmed reference pattern using a programmable mask that excludes *don't-care* bit positions. Because telemetry data is often transmitted or stored imperfectly due to system noise constraints, absolute correlation is not always possible. When determining the sync pattern location, you must often allow a programmable number of conflicts to occur in an otherwise acceptable pattern. This number is referred to as the *sync pattern tolerance*. The Model 650 provides sync pattern tolerances from zero to fifteen bits.

In addition to the Model 2618P front panel frame sync status lights, there are three status lights to indicate the unit's operational status. There is the "Ready" light, the "Active" light, and the "Error" light. The "Ready" light indicates that the unit is ready to respond to a command that can be given by using one of the three front panel command keys. The "Active" light is used to indicate that the unit is busy processing a command. The "Error" light indicates that an error occurred while processing the previous command.

Model 2618P Operation

The Model 2618P requires mission programming to set up the frame synchronizers for the various PCM formats. The programming concept is to program the units using USB flash memory sticks that contain a setup file that has a conventionalized name. Also, each 2618P unit must be given an identifier, (this is the FVS unit name, also referred to as its personality elsewhere in this document and in the Frame Validation Wizard program). The mission programming and personality are transferred to the Model 2618P using files stored on a USB flash memory stick. The Model 2618P has front panel command buttons that are used to make it read or write files on the USB flash memory stick. There is a button labeled "ID" that causes the unit to read the personality file from the USB drive. Another command button, labeled "SET" is used to make the unit read a mission setup file from the USB drive. The third command button is labeled "UPL" and is used for making the Model 2618P upload a log file onto the USB drive.

When the Model 2618P is powered on it initializes the eight decommutator channels with the setup that was programmed the last time it ran.

Loading Mission Setups

To modify the Model 2618P mission programming you must use the Frame Validation Wizard to create a mission setup file. This mission setup file can contain setups for any number of Model 2618P units. All setups in the mission file are marked with the personality name of the unit to which they are to be loaded. You must copy the mission setup file onto a USB flash memory stick for the purpose of delivering the setup to the Frame Validation System unit. When you plug the stick into the 2618P USB connector and press the front panel command key labeled "SET", the USB drive is searched for the setup file. The mission setup file is scanned and setups that are intended for this particular 2618P are extracted and used for programming the 8 decommutators. Once the unit has programmed the new formats into the 1650P card, the system will be operating.

Setting Unit Personality

The Model 2618P personality name is used by the unit to identify setup sections in mission setup files. To modify the Model 2618P personality name, or unit ID, you must use the Frame Validation Wizard to create a personality file. A personality file can contain only one personality name or unit ID. You must copy the personality file onto a USB flash memory stick to rename the Frame Validation System unit. When you plug the stick into the 2618P USB connector and press the front panel command key labeled "ID", the USB drive is searched for the personality file. The personality setup file is read and the personality name found there becomes the unit's name.

Uploading Log File

When the Model 2618P starts up, it programs the eight decommutators with its saved setups. After that it starts up a status logging program. The status logging program reads the status of the decommutators ten times per second. The status logger updates a log file the first time it reads status, and subsequently each time it reads status that differs from the last status posted. Updates to the log file are always appended to the current working log file. The log file accrues updates

until a command is given to upload the log file. To upload the log file you must place a USB flash memory stick into the Model 2618P and then press the front panel button labeled "UPL". The unit will then temporarily suspend status logging operations until the log file is moved to the USB drive. After the log file has been copied onto the USB drive a new log file is started on the Model 2618P and status logging operations are restarted.

If the status log file is never uploaded the size of the log file will not be allowed to exceed 2 gigabytes in size. When the log file grows beyond this size a large number of the oldest status posts are discarded. This will be enough to bring the size of the log file down to approximately 1 gigabyte.

CHAPTER 2

FRAME VALIDATION WIZARD PROGRAM

The Frame Validation Wizard programs the USB memory sticks used to manage the Model 2618P system and it runs on any available PC computer. The program presents any number of tab pages to represent your mission. You will create a separate tab page for each Model 2618P in your system

The screenshot displays the FrameValidationWizard application window. The interface is organized into tabs: 'Data Recorders' (selected) and 'Bit Syncs'. Under 'Data Recorders', there is a section for 'Enable Data Recorders' with a checked checkbox and a 'Time Source' dropdown set to 'System Time'. Below this are 'Copy Unit' and 'Paste Unit' buttons. The main area contains eight channel configuration sections, labeled 'Channel 1' through 'Channel 8'. Each channel section includes an 'Enable' checkbox, a 'Pattern' text field, a 'Bits:Frame' numeric field, a 'Polarity' dropdown menu, 'Slip' and 'Errs' numeric fields, 'Copy' and 'Paste' buttons, a 'Mask' text field, a 'Hex' checkbox, and 'Strategy: VS', 'VL', and 'LS' dropdown menus. Channel 1 is enabled with pattern 'faf320' and 1536 bits/frame. Channels 2-8 are also enabled with pattern 'eb90' and 1024 bits/frame. Channel 4 has 'Hex' checked, while others have it unchecked.

Each tab page includes eight channel setup controls, one for each decommutator in the Frame Validation System unit. Each channel control allows you to set up the sync pattern and mask, and declare the number of bits in the frame. There is an input control you use to define the data polarity setting. Another control is used for setting the slip window length within which the correlator can detect the sync pattern. The input control labeled “Errs” is used for setting the allowable number of erroneous bits in the sync pattern. The “VS” control is used to set the “VERIFY to SEARCH” count: the stream sync status will change from VERIFY to SEARCH after this number of missed sync patterns. Use the “VL” input control to set the “VERIFY to LOCK” count: the number of matched sync patterns required

to go from VERIFY to LOCK. The “LS” command is used to set the “LOCK to SEARCH” count: the number of missed sync patterns required to go from LOCK to SEARCH status.

Mission Configuration

The Frame Validation Wizard provides the programming setup tools for the system. There are two drop down menu selections: *File* and *Validation Unit*. The File menu has three selections.

- **Load Mission** - This opens a file dialog that allows you to load a mission setup program image from any file storage, such as the hard drive or the memory stick that you are using for the mission.
- **Save Mission** – This opens a file dialog that allows you to write the mission setup to file storage or the memory stick. If you are overwriting an existing file the dialog asks you to confirm that you want to do that. Because the Mission setup file has a fixed name, built into the system architecture, if you store them on the disk drive, each mission file must be stored in a separate folder. The file dialog has the Create Folder button so that you can easily create a new folder when you need to,
- **New Mission** – This discards the current mission setup (after allowing you a chance to save it first) and establishes a default mission setup which has one tab page.

The Validation Unit menu allows you to configure the Wizard and to write the Personality File that you need if you want to rename a Validation unit. The menu has four selections.

- **Add Validation Unit** – This creates a new Tab on the Wizard display. A dialog box allows you to name the verifier unit at that time. The names are arbitrary and you may choose them to describe the units according to where you are using them.
- **Write Personality File** – This writes a personality file to file storage or on a USB stick. A file dialog selects the drive that you will write this on, but the file name is set by the system architecture and you cannot alter it.
- **Rename Validation Unit** – This changes the name assigned to the selected Tab of the Wizard display. To change the validation unit itself, you must then write the a Personality File that you will deliver to the Validation unit.
- **Delete Validation Unit** – This deletes the currently selected tab on the wizard display.

The Rename and Delete operations are permanent, and the system requests confirmation before executing them.

The Wizard stores the system configuration and will restart with the current configuration until you change it.

Setting Up The Mission

To set up the Validation Units to support a given mission, you can start with the default setup that will exist when you select “New Mission” from the “File” dropdown menu, or you can load any existing mission setup and modify it as necessary. To set up a particular unit, select its Tab on the Wizard display and click its Enable check box. Any unit whose Enable check box is not checked will

not be setup when you plug the mission setup USB stick into it. Then set-up up to eight channels. Each has an enable check box. If you do not check a channel's enable box, it will not be set up, and its sync status LED on the verifier unit will not be lit. Then enter the particulars for the frame synchronization for the channel. The Copy and Paste buttons allow you to copy a channel's setup to another channel. The Copy button displays as Blue indicating which channel is the current copy source. A copied channel can be pasted to a channel on any tab page. If you use a paste button before selecting a channel as your copy source, a message dialog will appear to warn you that you must first select a copy source

You can also copy an entire unit's setup to another unit. Click the Copy Unit button, select the Tab for the target unit and click the Paste Unit button. The system will request confirmation for this, since recovering from a mistake could be time consuming.

When you have completed the setup, write the setup file on the USB stick dedicated to the particular mission. You may also save the setup file on your hard drive to make it more convenient to reference or modify it.

Programming the Validation Units

Programming the Validation Systems requires nothing more than inserting the appropriate USB memory stick. As soon as a new Validation unit is delivered, you should use the Wizard's *Write Personality File* feature and then load that stick into the unit that it applies to. When you then press the front panel button labeled "ID" the Validation software reads the personality. It then loads it and remembers it indefinitely.

The Mission programming concept is that a separate memory stick will be used for each mission. Only 128K byte memory sticks are needed for the application, so the cost of a supply of memory sticks is nominal. The memory stick must be prepared using the Wizard program, running on any available PC and it should be labeled for the specific mission setup. The stick contains the setup for all of the systems used in a given mission, and to setup the Validation units, you simply move the stick from unit to unit until all are set up. If a given validation unit is not used as part of particular mission, it will not be set up. If it is already setup as part of another mission, it will be left undisturbed. On the other hand, you can force the system to disable an unused unit by enabling its setup but disabling its channels.

Once a mission has been loaded into the validation units, the setup survives power failures and intentional power-down. When power is restored, the setup is reprogrammed into all of the channels without user intervention.