grass valley

8960DEC

NTSC/PAL TO SDI ADAPTIVE DECODER

Instruction Manual

SOFTWARE VERSION 5.2.0

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JUNE 2007

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Contents

Preface

About This Manual

This manual describes the features of a specific 8900 module in the Gecko and GeckoFlex Signal Processing System families. As part of this module family, it is subject to Safety and Regulatory Compliance described in the Gecko 8900 Series frame and power supply documentation (see the *Gecko 8900 Frames* and the *GeckoFlex Frames Instruction Manuals).*

8960DEC NTSC/PAL to SDI Decoder Module

Introduction

The 8960DEC module is a low cost, high density decoder for converting multi-standard composite video signals into a component 4:2:2 serial digital video signal. Featuring 12-bit A-to-D and full-adaptive decoding, the 8960DEC provides transition from analog to broadcast quality serial component digital video. Adding the 8900FSS Frame Sync submodule option provides a full-frame synchronizer or a frame delay when no reference signal is present.

The 8960DEC features:

- 12-bit A-to-D quantization for high quality digital video,
- Adaptive filters for optimal 2D decoding,
- Processing amplifier controls to adjust remote analog feeds (luma, black level, chroma, and hue),
- Error Detection and Handling (EDH) to track signal errors,
- Dual reference inputs for multi-format applications,
- 8900FSS Frame Sync/delay submodule (option) for low cost system timing,
- Vertical Blanking Interval (VBI and data line) processing,
- Built-in test signal generator,
- Audio delay control signal to drive Grass Valley auto-tracking audio delay DAs,
- Up to ten 8960DEC decoders in a 2 RU Gecko™ 8900 frame (capacity varies with frame type), and
- Remote control and monitoring using the 8900NET GUI (graphical user interface) in Gecko 8900TF/TFN and GeckoFlex 8900FFN frame versions.

Installation

The 8960DEC can be installed in either an 8900 Gecko or a GeckoFlex frame. An 8900V-R rear module is required for use in the GeckoFlex frame.

Gecko 8900 Frame

Installation of the 8960DEC module in a Gecko 8900 frame is a process of:

1. Placing the module in the proper frame slot, and
2. Cabling and terminating signal ports.

The 8960DEC module can be plugged in and removed from a Gecko 8900 frame with power on. When power is applied to the module, LED indicators reflect the initialization process (see *Power Up* on page 16).

Frame Capacity

The 8960DEC module can be installed in all Gecko 8900 frames but with varying maximum quantities determined by frame cooling capacity. Table 1 provides the power capacity, cooling capacity, and maximum module count for each frame type.

Table 1. Power, Cooling, and Module Capacity of Gecko 8900 Frames

Capacity Calculated	8900T2 Frame	8900T2-F Frame	8900TX Frame	8900TF Frame	8900TFN Frame
Power (W)	60	60	100	100	100
Recommended Module Cooling (W)	30	60	30	90	90
8960DEC Modules	5	8	5	10	10
8960DEC Modules with 8900FSS	X	6	X	10	10

Note Module capacity figures assume no other modules are in the frame.
X = Not recommended without forced air cooling.

If you are using an 8900NET module running software version 4.0.0 or later, you may link to the 8900 Frame Status web page (Figure 9 on page 28) then select the link to the Power Supply/Demand web page for determining the power capacity for the frame. Using this function, the 8900NET module will determine how much power is being consumed and report back when power has been exceeded.

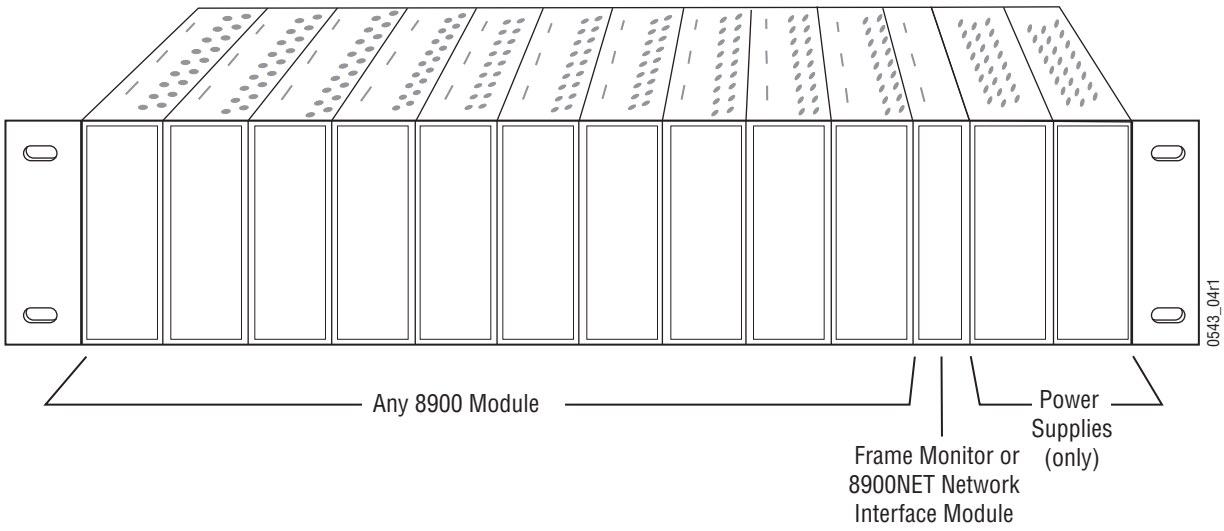
Module Placement in the 8900 Frame

There are ten slot locations in the frame to accommodate either analog or digital modules. These are the left ten locations. Refer to Figure 1.

The two slots on the right are allocated for the power supplies. For additional information concerning the Power Supply module, refer to the *Gecko 8900 Frames Instruction Manual*.

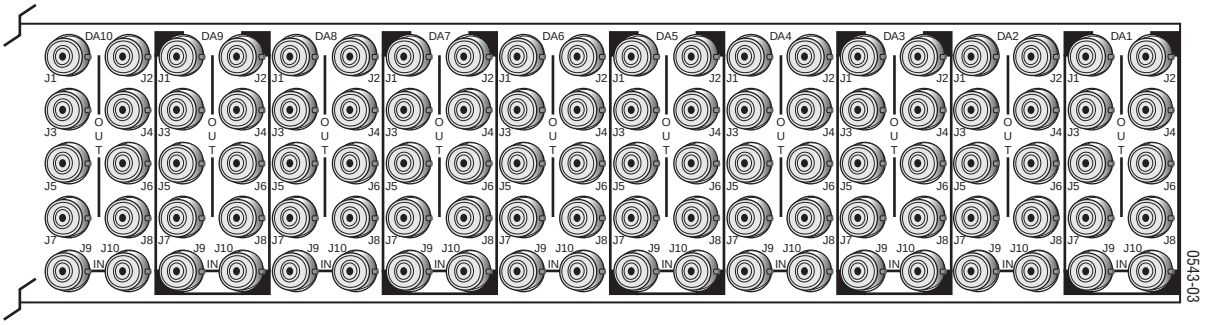
The third slot from the right is allocated for the controller module—either a Frame Monitor Module or a 8900NET Network Interface Module. For additional information concerning the controller module options, refer to the *8900NET Network Interface Module Instruction Manual*

Figure 1. 8900 Series Frame



8900 module slots are interchangeable within the frame. There are 10 BNC connectors in each slot's I/O group. The functional assignment of each connector in a group is determined by the module that is placed in that slot. The maximum number of modules a Gecko 8900 frame can accept is ten. Figure 2 illustrates the rear connector plate for a Gecko 8900 frame.

Figure 2. 8900 Series Frame Rear Connector



To install a module in the Gecko 8900 frame:

1. Insert the module, connector end first, with the component side of the module facing to the right and the ejector tab to the top.
2. Verify that the module connector seats properly against the backplane.
3. Press in the ejector tab to seat the module.

GeckoFlex Frame

Installation of the 8960DEC module in a GeckoFlex frame is a process of:

1. Installing the 8900V-R rear module into the rear of the frame,
2. Placing the 8960DEC module in the corresponding front frame slot, and
3. Cabling and terminating signal ports.

Rear Module Installation

To install a rear module into the frame, follow these steps:

1. Each 8900V-R rear module or blank rear adapter cover is held in place by two retainer strips as shown in Figure 3. Loosen (but do not remove completely) the two screws holding each retainer strip to the frame with a 2 mm (5/64") hex screwdriver. Pull up on the retainer to remove it, leaving the screws in place.

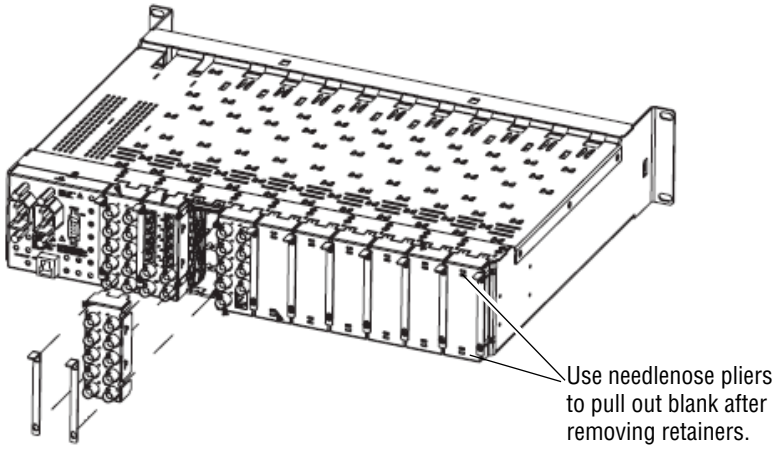
CAUTION Be careful to leave the screws in place as they can be easily lost or fall into equipment below the frame creating a shorting hazard.

2. Remove the blank rear adapter cover by inserting needlenose pliers into the slots in the top and bottom of the blank and pulling it off.

Note To remove a rear module already installed, follow the same steps. It is helpful to first remove the front module so the rear can be pulled out more easily.

3. Insert the rear module into the empty slot.
4. Replace each retainer strip over the two screws on both sides of the module and push down to seat the retainer.
5. Tighten the screws for each retainer just until they are snug. Do not force or torque the screws too tightly.

Figure 3. Installing Rear Module

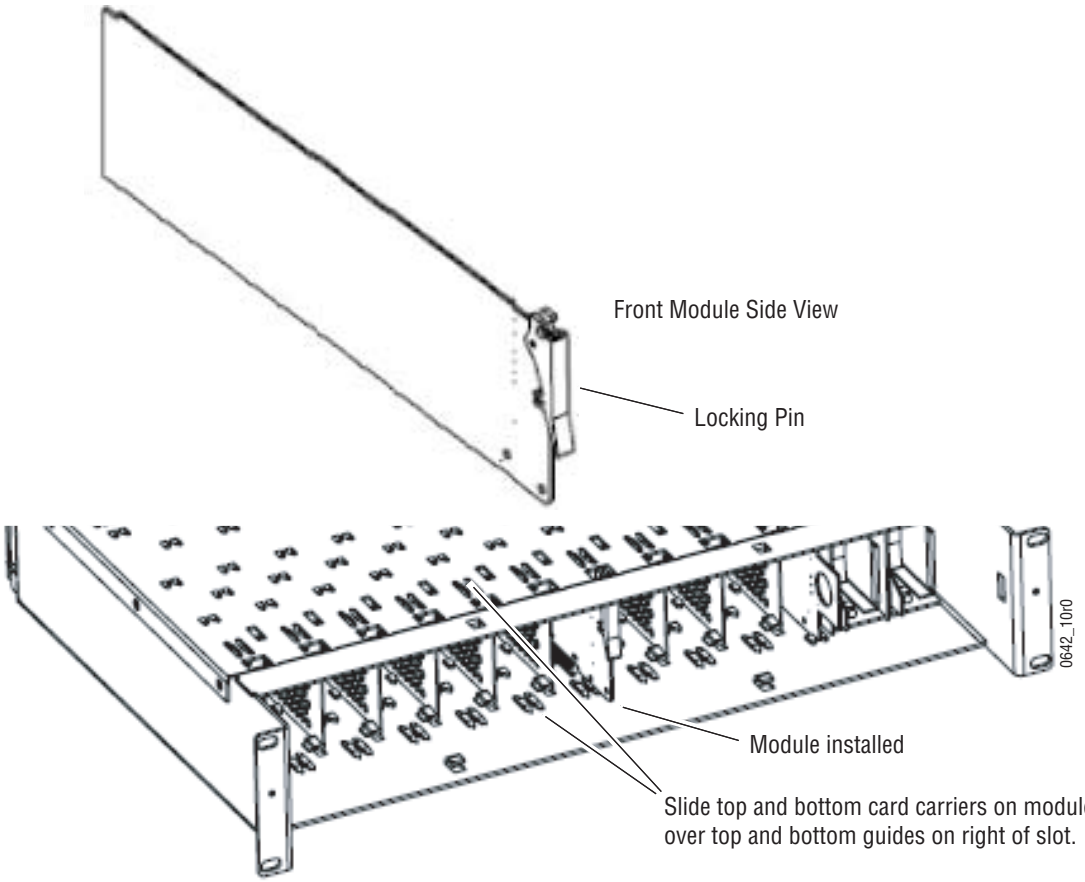


Front Module Installation

After installing the rear module, install the front module as follows:

1. Remove the front cover of the frame if required.
2. Locate the corresponding front slot.
3. Insert the front module so that the plastic card guides on the module top and bottom edges go over the upper and lower raised rail guides on the right of the top and bottom of the slot(Figure 4).
4. Carefully slide the module into the rear connector.
5. Lock the front module ejector tab into the locking pin.

Figure 4. Front Module Installation



Cabling

Cable the module as described below for either frame type.

Loop-through Input

Connect an input source to one of the loop-through input connectors, J9 or J10 (see Figure 5). The 8960DEC input will accept either NTSC or PAL component analog video. Terminate the unused connector into 75 ohm if the signal is not looped to other equipment.

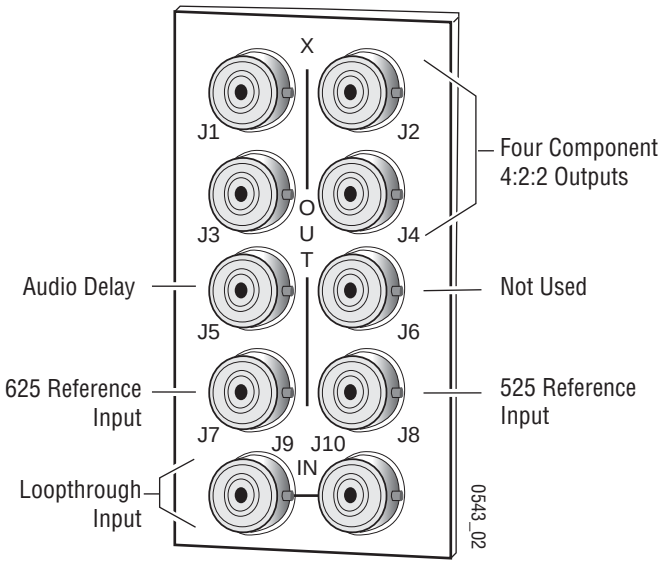
Outputs

The 8960DEC has four serial digital video outputs—J1 through J4. J5 is an AES Audio Delay RS-232 data output conforming to 118AS documentation.

Reference Inputs

Separate input BNCs are provided for either 525-line (J8) or 625-line (J7) black burst reference signals. The reference inputs are functional only when the 8900FSS Frame Sync submodule (option) is present. When the submodule is present the inputs provide internal 75 ohm termination.

Figure 5. 8960 Input/Output Connectors



Power Up

The front LED indicators and configuration switches are illustrated in Figure 6. Upon power-up, the green PWR LED should light and the yellow CONF LED should illuminate for the duration of module initialization.

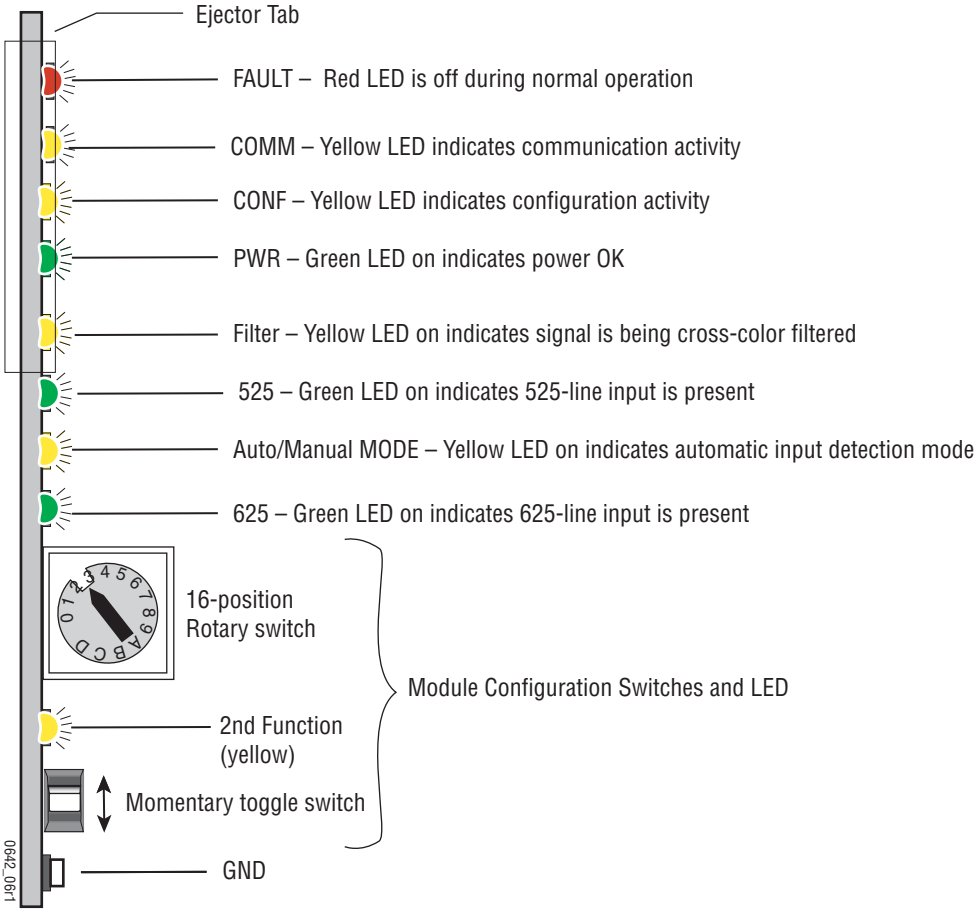
Note When a media module is first plugged into a Gecko or GeckoFlex frame, the 8900NET module (if present) may report a momentary fault. This will clear once the media module has booted up.

Operation Indicator LEDs

With factory default configuration and a valid input signal connected, the green PWR LED and one of the green signal standard LEDs (525 or 625) should illuminate (refer to Table 2 on page 17 to see the possible operating indicator combinations).

Video input presence is indicated by the 525 or 625 LED (indicating a 525-line or 625-line input signal has been detected). Line standard must be set manually, there is no auto detection.

Figure 6. LEDs and Configuration Switches



A red FAULT LED indicates an error situation and, with the previously described LEDs, can indicate the operational conditions presented in Table 2. The table describes LED indications and the signal input/output conditions and user settings that are indicated.

Table 2. LED Indications for Input Conditions and Resulting Output Signals

Fault (red)	525 (green)	625 (green)	Input Condition	Output Signal
OFF	ON	OFF	Normal operation; 525 input signal and reference present.	Correct decoded signal with correct timing.
Flashing	ON	OFF	Input signal does not match forced 525 standard or video input signal present with mismatched reference signal.	Same standard as input
Flashing	Flashing	OFF	525 signal present; corresponding reference missing.	Correct decoded output; timing forced to delay mode.
OFF	OFF	ON	Normal operation; 625 input signal and reference present.	Correct decoded signal with correct timing.
Flashing	OFF	ON	Input signal does not match forced 625 standard or video input signal present with mismatched reference signal.	Same standard as input
Flashing	OFF	Flashing	625 signal present; corresponding reference missing.	Correct decoded output; timing forced to delay mode.
Flashing	OFF	OFF	Missing input signal.	Switched to black by default.

Table 3 describes the outputs that will be seen for the input conditions listed.

Table 3. Operating Mode, Input Conditions and Resulting Outputs

Mode	Standard Selection	Video Input	Reference Input	Output
Frame Sync Submodule Present — Module In Sync Mode	Manual 525-line	Video present	Valid reference present	Correct output signal with correct timing.
		No signal present	Valid reference present	Correct black signal with correct timing, or last field if autofreeze is on.
		Video present	Reference not present	Correct output signal with free run timing.
		Video present	Invalid reference input	Corrupted output signal.
		Invalid Video present	Valid reference present	Corrupted output signal.
		Invalid Video present	Invalid reference input	Corrupted output signal.
	Manual 625-line	Video present	Valid reference present	Correct output signal with correct timing.
		No video signal present	Valid reference present	Correct black signal with correct timing, or last field if autofreeze is on.
		Video present	Reference not present	Correct output signal with free run timing.
		Video present	Invalid reference input	Corrupted output signal.
		Invalid Video present	Valid reference present	Corrupted output signal.
		Invalid Video present	Invalid reference input	Corrupted output signal.

Table 3. Operating Mode, Input Conditions and Resulting Outputs - (continued)

Mode	Standard Selection	Video Input	Reference Input	Output
Frame Sync Submodule Present Module In Delay Mode	Manual 525-line	Video present	Not needed	Correct output signal with correct timing.
		No video signal present	Not needed	Correct black signal with correct timing, or last field if autofreeze is on.
		Invalid Video input	Not needed	Corrupted output signal.
	Manual 625-line	Video present	Not needed	Correct output signal with correct timing.
		No video signal present	Not needed	Correct black signal with correct timing, or last field if autofreeze is on.
		Invalid Video input	Not needed	Corrupted output signal.
No Frame Sync Submodule	Manual 525-line	Video present	Not needed	Correct output signal.
		No video signal present	Not needed	Correct black signal.
		Invalid Video input	Not needed	Corrupted output signal.
	Manual 625-line	Video present	Not needed	Correct output signal.
		No video signal present	Not needed	Correct black signal.
		Invalid Video input	Not needed	Corrupted output signal.

Configuration

The 8960DEC can be configured locally using onboard switches or remotely using the 8900NET network interface or a networked Newton Control Panel.

Configuration establishes:

- Input video and line standard,
- Level adjustments of the composite video signal input to the decoder,
- Video processing, including adaptive decoding and picture position,
- Vertical blanking interval parameters such as SAV and VBI filtering and data line configuration, and
- Optional Frame Sync submodule setup and timing, including H and V phase adjustments and freeze parameters.

Refer to the following sections for configuration instructions:

- Video Path Processing Overview (page 20)
- Configuration Summary (page 20)
- Onboard Module Configuration (page 23)
- Remote Control and Monitoring (page 26)

Video Path Processing Overview

The 8960DEC provides video processing controls for the decoding process. How the video data is processed depends on what line the video is on. The following groups of lines have controls on the 8960DEC:

- All Lines
- Active Picture Lines
- Active Picture and VBI Lines
- VBI Lines
- Data Lines

An important feature of the 8960DEC is the ability to define the start of active video (SAV). The 8960DEC allows you to define the line number for SAV then use the unused lines of active video for external data insertion. The active video lines (SAV1–SAV4) on the 8960DEC that can be defined as the start of active picture and made available for data insertion in both 525 and 625 modes are given in Table 6 on page 25.

Configuration Summary

The 8960DEC module can be configured using the following controls:

- Onboard module controls consisting of a Function rotary switch with a first (2nd LED off) and second bank (2nd LED on) of settings and a paddle switch,
- The remote control and monitoring web page interface, and/or
- An external control panel (not all configuration controls are available).

Using each of these control types is explained in detail in their respective sections of this manual.

Table 4 provides a complete summary of the 8960DEC parameters and a comparison of the functionality available with each control type along with the ranges and default values for each parameter. The table is organized to provide a breakdown of the video path processing adjustments by specific grouping of line type in the video signal.

Table 4 provides a complete summary of the 8960DEC functions and a comparison of the functionality available with each control type along with the ranges and default values for each parameter.

Table 4. Summary of 8960DEC Configuration Functions By Function

Function	Default Value	Range/Choices	Web Page Function Name	Rotary Switch Bank/Setting	Newton Control Panel	Notes/Conditions
Miscellaneous Settings						
Line Standard	525	525 or 625	Standard Selection/ Line Standard	1/1	Lines	Select line standard of input signal.
NTSC or PAL-M Select (525 only)	NTSC	NTSC or PAL-M[1]	Standard Selection/ NTSC/PAL-M Select	1/3	525 Std	Set for NTSC or PAL-M subcarrier format.
User Adjustments or Calibrate	Calibrate	User or Calibrate	Levels/ User Adjustments	1/5	Levels	Set to User to enable adjustments or Calibrate to use factory values.
Active Picture Start	22/285 (NTSC) or 25/338 (PAL)	Table 6 on page 25	VBI/Data Line Processing/ Active Picture Start	2/9 or 2/A	ActPicSP	Set the start of active picture (SAV).
Recall Defaults	–	See Default Values Column	Recall Factory Defaults/ Factory Defaults	1/F	N/A	Recall factory defaults for all parameters.
Video Path Processing						
All Lines						
Input Video Gain	100%	50–150% (step size 0.4%)	Levels/ Input Video Gain	1/4	Video	Adjust percentage of input video gain relative to 1 V p-p.
Black Level	0	± 7.5% (step size 0.1%)	Levels/ Black Level	1/7	Black	Adjust percentage of black relative to white.
Picture Position Offset	0	– 222 to 296 ns (step size 37 ns)	Video Processing/ Picture Pos Offset	2/1	picpos	Adjust horizontal picture offset.
SuperBlack (525 only)	Enable	Enable or Disable	Standard Selection/ SuperBlack	2/E	SuprBlak	Enable or Disable (clip) super black signal (lower than black).
Active Picture Lines						
Decode Adaptation Threshold	Low	High or Low	Video Processing/ Decoding Adaptation	1/A	AdptThrs	Select High to minimize comb decoding artifacts or Low for decoding with more movement.
Ramp Test Signal	Disable	Enable or Disable	Video Processing/ Test Signal	1/E	N/A	Enable/Disable a luminance range ramp test signal output.
Active Picture and VBI Lines						
Chroma Gain	100%	90–110% (step size 0.6%)	Levels/ Chroma Gain (% Satrn)	1/8	Chroma	Adjust percentage of chroma relative to 100% saturation.
Hue (525 only)	0	± 180° (step size 0.5°)	Levels/ Hue	1/9	Hue	Adjust the hue ± 180 degrees.
Luminance Gain	100%	90–110% (step size 0.6%)	Levels/ Luma Gain (% White)	1/6	Luma	Adjust percentage of luminance relative to white.
Input Video Setup (525 only)	Yes	Setup or No Setup	Standard Selection/ Input Video Setup	1/2	Setup	Select Setup if setup is present on input signal (NTSC) or No Setup for no setup present (Japanese NTSC).

Table 4. Summary of 8960DEC Configuration Functions By Function

Function	Default Value	Range/Choices	Web Page Function Name	Rotary Switch Bank/Setting	Newton Control Panel	Notes/Conditions
VBI Line Processing						
VBI Processing	Notch Decode	Delete, Notch Decode or Video to Luma	VBI/Data Line Processing/ VBI Processing	1/C	vbiproc	Select Notch Decode or Video to Luma filtering or Delete to remove content (lines 10-20 NTSC, lines 6-25 PAL-B).
Data Line Processing (Active Picture lines available for use as data lines determined by SAV setting)						
Data Line Processing	Notch Decode	Delete or Notch Decode	VBI/Data Line Processing/ Data Line Processing	2/C	dataproc	Select Notch Decode to apply U/V filtering or Delete to remove content (blank).
Setup on Data Lines (525 only)	No Setup	Setup or No Setup	VBI/Data Line Processing/ Data Line Processing	2/D	datsetup	Select Setup if Setup is present on data lines or No Setup for no setup present.
Video Timing and Freeze Controls (available only when Frame Sync Submodule option is installed)						
Lock Source	Reference	Video Input or Reference	Timing/ Lock Source	2/0	Lock To	Choose a lock source.
Horizontal Phase	0	0–63418 ns (525) 0–63862 ns (625) (step size 37 ns)	Timing/ Horizontal Delay	2/2	H Phase	Adjust horizontal delay in clock increments.
Vertical Phase	0	0–524 lines (525) 0–624 lines (625) (step size 1 line)	Timing/ Vertical Delay	2/3	V Phase	Adjust vertical delay in line increments.
Freeze Recognition	Manual	Manual or Auto	Timing/ Freeze Recognition	2/4	FrzRec	Select Manual or Auto. Auto stores the last field in the frame synchronizer to use if the input video is lost or corrupted.
Manual Freeze	Off	On or Off	Timing/ Freeze Button	2/5	N/A	Perform a manual freeze according to selected freeze parameters.
Freeze Mode	Frame	Field or Frame	Timing/ Freeze Mode	2/6	FrzMode	Select freeze mode as Frame or Field.
Freeze Field	Field 1	Field 1 or Field 2	Timing/ Freeze Field	2/7	FrzField	Select freeze field as Field 1 or Field 2.
Freeze Signal	Last Field	Black or Last Field	Timing/ Freeze Signal	2/8	FrzSig	Select the freeze output signal if Auto or Manual Freeze is activated.

[1] Grass Valley no longer supports PAL-M in any of its modular products. Although this setting may work in certain applications, Grass Valley will not warrant that it works or provide support if problems are encountered using this product with PAL-M signals. This product has not been modified to eliminate support for PAL-M. If this product has been used with PAL-M in the past without problems, there shouldn't be any issues using it for the same application. However, it is not recommended that customers use it in any new PAL-M applications.

Onboard Module Configuration

The 8960DEC module can be configured locally using the rotary and paddle switches shown in Figure 7. Two LEDs are used to indicate status of the configuration process.

These four components perform the following:

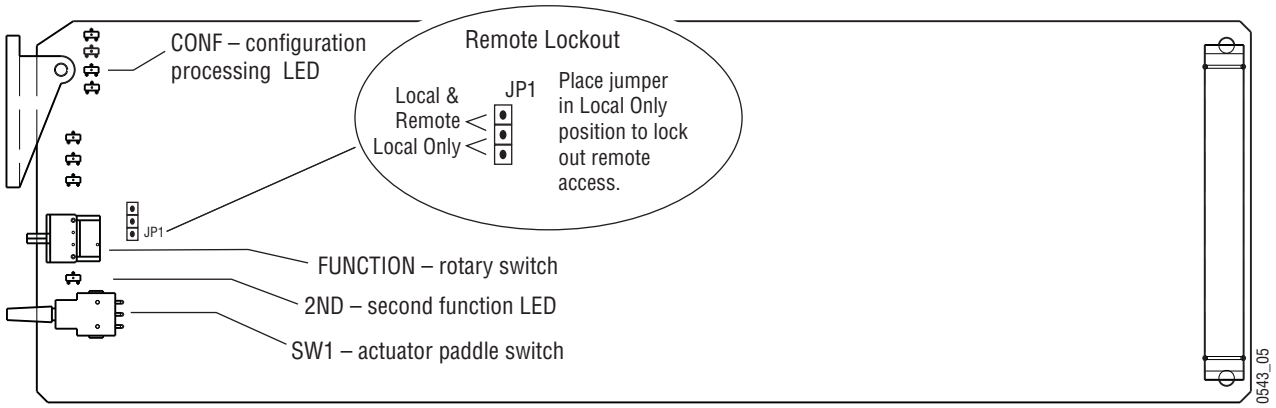
- Function (rotary) switch — This switch is used to access a desired function for configuration. The switch addresses two banks of functions; each bank has 16 possible positions (0 through 9 and A through F). Not all positions are used (see Table 5). The alternate bank of functions is accessed each time the Function switch makes a complete revolution past zero: While in bank 1, a complete revolution past zero accesses bank 2; while in bank 2, a complete revolution past zero accesses bank 1. The 2ND LED indicates which bank is currently being accessed.

Note The Function switch should be kept in the position for the selected mode (1 through 7) or in position B when not in use to avoid any inadvertent change in configuration. B is an inactive position.

- 2ND (second function) LED – when on, indicates that the rotary switch is addressing the second bank of functions.
- SW1 (paddle) switch – actuates or selects the desired setting for the selected function when the switch is held momentarily in either the up or down position.
- CONF (configuring) LED – when on, indicates the module is initializing or processing configuration information.
- Jumper JP1 can be set to allow or lock out remote control.

Note Function switch position F (Recall) in the First Bank can be used to return module configuration to the factory default.

Figure 7. Module Configuration Switches and LEDs



8960DEC Module Onboard Configuration Settings

To make a configuration setting:

1. Rotate the Function switch to the First Bank (2ND LED off) or Second Bank (2ND LED on) and to the desired function within that bank.

2. Move the paddle switch to the up or down position and hold momentarily to set the desired function. Refer to Table 5 for specific paddle switch settings.

   Refer to the Configuration Summary in Table 4 on page 21 for a summary of what video lines are affected by each control, all parameters, step sizes, default values, etc.

Table 5. Decoder Configuration Functions

	Function Switch	Paddle Switch Up	Paddle Switch Down	Function Description
First Bank - 2ND LED Off	**Input Signal Adjustments**			
	0	–	–	Not used
	1	525	625	Select input video Line Standard selection.
	2	Setup	No Setup	(525 only) Select Setup if setup is present in the input video, No Setup if setup is not present.
	3	NTSC	PAL-M[1]	(525 only) Select NTSC or PAL-M subcarrier format.
	4	Increase	Decrease	Adjust Input Video Gain (% relative to 1 V p-p).
	Signal Processing Adjustments			
	5	User	Calibrate	Set to User to enable processing amplifier functions (6-9) or Calibrate for presets optimized for calibrated video input.
	6	Increase	Decrease	Adjust Luma Gain (% relative to white).
	7	Increase	Decrease	Adjust Black Level (% relative to white).
	8	Increase	Decrease	Adjust Chroma Gain (% relative to 100% saturation).
	9	+	–	(525 only) Rotate Hue ± 180 degrees.
	Signal Filtering Setup			
	A	High	Low	Set adaptive decoding sensitivity
	B	Inactive Position - return here when finished with configuration		
	C	Notch Decode	Delete	Select Notch Decode to process and pass VBI content (set filter type with D below,) or Delete to remove content (lines 10-20 NTSC, lines 6-25 PAL-B) and apply no filtering.
	D	Notch Decode	Video to Luma	Select filter type when Notch Decode is selected above,
	E	Enable	Disable	Enable or Disable Ramp Test Signal output.
	F	No function	Recall Defaults	Recall Factory Default. Refer to Table 4 on page 21 for defaults.

Table 5. Decoder Configuration Functions - (continued)

	Function Switch	Paddle Switch Up	Paddle Switch Down	Function Description
	Lock Source (Frame Sync Submodule option must be present to be active)			
Second Bank - 2ND LED On	0	Video Input	Reference	Select Lock Source.
	Picture Position Offset			
	1	Advance	Delay	Adjust horizontal Picture Position Offset.
	H and V Delay Adjustments (Active when Frame Sync Submodule option is present)			
	2	Advance	Delay	Adjust Horizontal delay.
	3	Advance	Delay	Adjust Vertical delay.
	Freeze Configuration (Frame Sync Submodule option must be present to be active)			
	4	Manual	Auto	Set Freeze Recognition type.
	5	Off	On	Perform manual freeze.
	6	Frame	Field	Select Freeze Mode.
	7	Field 1	Field 2	Select Freeze Field.
	8	Last Field	Black	Select Freeze Signal.
	VBI.Data Line Processing			
	9	SAV4	SAV3	Select line number of Active Picture Start (SAV). See Table 6 for the corresponding values for these controls.
	A	SAV2	SAV1	
	B	–	–	Not used
	C	Notch Decode	Delete	Set type of processing for VBI Data Lines.
	D	Setup	No Setup	Active when Notch Decode is enabled above. Select Yes if setup is present on data lines.
	SuperBlack			
	E	Enable	Disable	(525 only) Enable or Disable (clip) Super Black.
	F	–	–	Not used

[1] Grass Valley no longer supports PAL-M in any of its modular products. Although this setting may work in certain applications, Grass Valley will not warrant that it works or provide support if problems are encountered using this product with PAL-M signals. This product has not been modified to eliminate support for PAL-M. If this product has been used with PAL-M in the past without problems, there shouldn't be any issues using it for the same application. However, it is not recommended that customers use it in any new PAL-M applications.

The start of active video can be set to the Active Picture lines listed in Table 6.

Table 6. 8960DEC VBI Settings

Active Picture Start	525	625
SAV1	21 (Field 1) 284 (Field 2)	24 (Field 1) 337 (Field 2)
SAV2	22 (Field 1) 285 (Field 2)	25 (Field 1) 338 (Field 2)
SAV3	23 (Field 1) 286 (Field 2)	26 (Field 1) 339 (Field 2)
SAV4	24 (Field 1) 287 (Field 2)	27 (Field 1) 340 (Field 2)

Remote Configuration and Monitoring

8960DEC configuration and monitoring can be performed using a web browser GUI interface or a networked Newton Control Panel when the 8900NET Network Interface module is present in the 8900 frame. Each of these interfaces is described below.

Note For remote access, make sure the jumper block on the module is set for both Local and Remote access (Figure 7 on page 23).

8900NET Module Information

Refer to the 8900NET Network Interface Module Instruction Manual for information on the 8900NET Network Interface module and setting up and operating the Gecko 8900 frame network.

Note The 8900NET module in the frame must be running software version 3.2.2 or higher for proper remote and control panel operation. Upgrade software and instructions for the 8900NET can be downloaded from the Grass Valley web site.

Newton Control Panel Configuration

A Newton Control Panel (hard or soft version) can be interfaced to the Gecko 8900 Series frame over the local network. Refer to the documentation that accompanies the Newton Modular Control System for installation, configuration, and operation information.

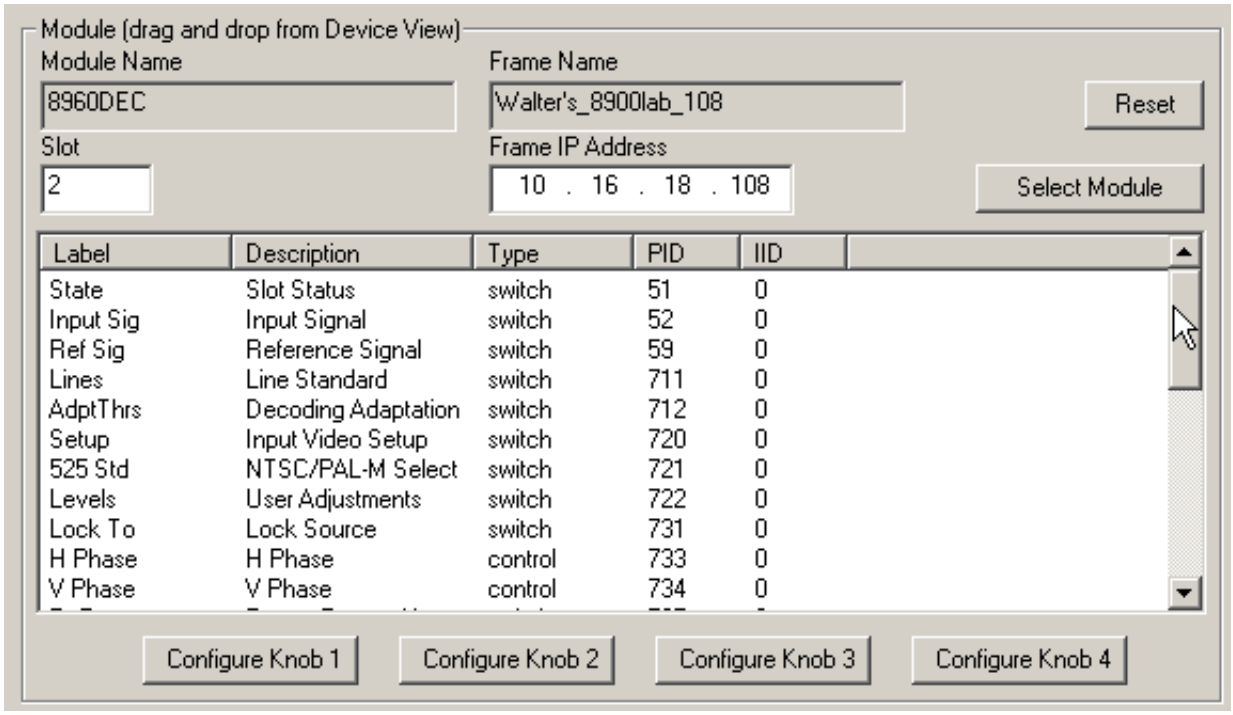
Control panel access offers the following considerations for module configuration and monitoring:

- Ability to separate system level tasks from operation ones, minimizing the potential for on-air mistakes.
- Ability to group modular products—regardless of their physical locations—into logical groups (channels) that you can easily manipulate with user-configured knobs.
- Update software for applicable modules and assign frame and panel IP addresses with the NetConfig Networking application.
- Recommended for real-time control of module configuration parameters, providing the fastest response time.

Note Not all module functions are available with the control panel, such as factory default recalls. The available control panel controls for the 8960DEC module are listed in Table 4 on page 21.

An example of the Newton Configurator is shown in Figure 8 on page 27.

Figure 8. Newton Configurator Example



Web Browser Interface

The web browser interface provides a graphical representation of module configuration and monitoring.

Use of the web interface offers the following considerations:

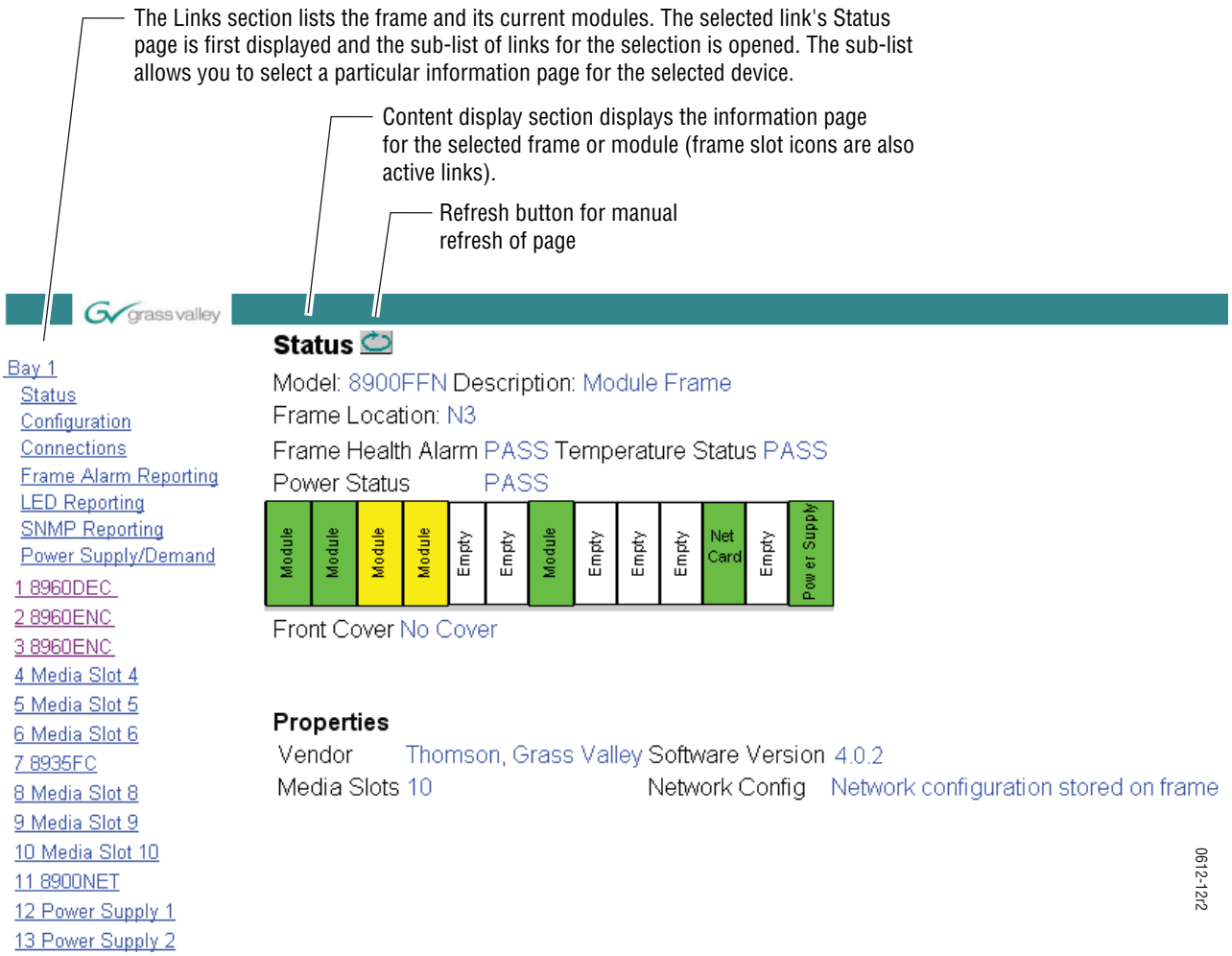
- Provides complete access to all module status and configuration functions, including naming of inputs and outputs, factory parameter and name default recalls, E-MEM functions, slot configuration, and SNMP monitoring controls.
- Web access will require some normal network time delays for processing of information.
- Configuration parameter changes may require pressing **Apply** button or **Enter**, upload processing time, and a manual screen refresh to become effective.
- Web interface recommended for setting up module signal and slot names, E-MEMS, and reporting status for SNMP and monitoring.

Refer to the Frame Status page shown in Figure 9 on page 28. The 8900 modules can be addressed by clicking either on a specific module icon in the frame status web page or on a module name or slot number in the link list on the left.

Note The physical appearance of the graphics on the web pages shown in this manual represent the use of a particular platform, browser and version of 8900NET module software. They are provided for reference only. Web pages will differ depending on the type of platform and browser you are using and the version of the 8900NET software installed in your system. This manual reflects 8900NET software version 4.0.2.

For information on status and fault monitoring and reporting shown on the Status page, refer to *Status Monitoring* on page 48.

Figure 9. Gecko 8900 Frame Status Page



8960DEC Links and Web Pages

The 8900 web interface GUI provides the following links and web pages for the 8960DEC module (Figure 10):

- Status – reports input and reference signal status and module information (page 30),
- Standard Selection – provides controls for setting module line standard and setting output video levels (page 31),
- Levels – provides access to controls for adjusting luma, chroma, hue, and black levels (page 33),
- Timing – provides lock source and fine phase adjustments and horizontal and vertical timing adjustments when the 8900FSS is installed (page 34),
- Video Processing – provides controls for enabling and disabling video functions on the encoded output (page 36),
- VBI/Data Line Processing – provides controls for setting start of active picture and VBI and data line configuration (page 37),
- Recall Factory Defaults – use this web page to recall factory defaults for the module (page 38), and
- Slot Config – provides a Locate Module function, Slot Identification fields, Slot Memory controls, and links to the Frame Alarm and SNMP Trap enables on the 8900NET module web pages (page 39).

Figure 10. 8960DEC Web Page Links

On all web pages, click on **Apply** to activate settings in each selection then refresh the web page at the top of the page with the **Refresh** button (both shown at left).

Refer to the Configuration Summary in Table 4 on page 21 for a summary of what video lines are affected by each control, all parameters, step sizes, and default values.

Status Web Page

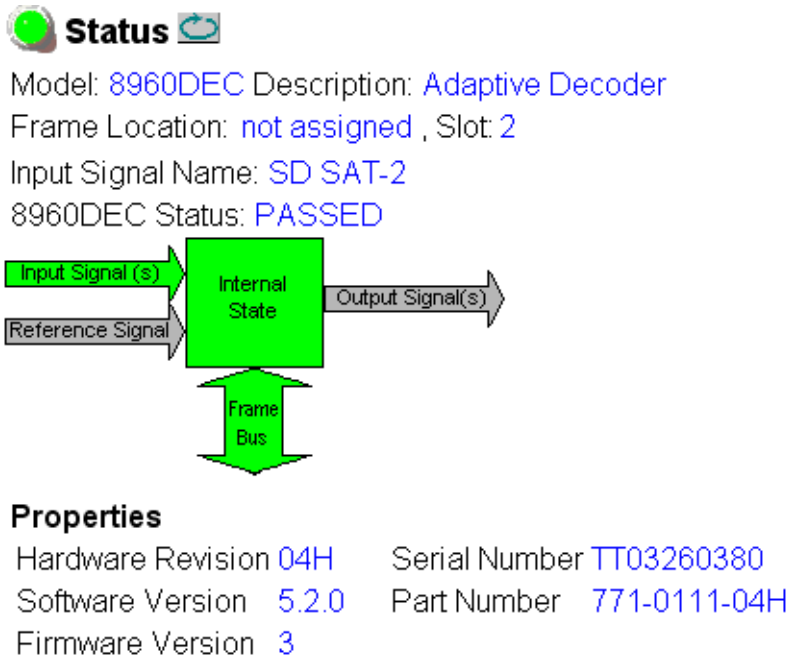
Use this link

2 8960DEC
Status
Standard Selection
Levels
Timing
Video Processing
VBI/Data Line Processing
Recall Factory Defaults
Slot Config

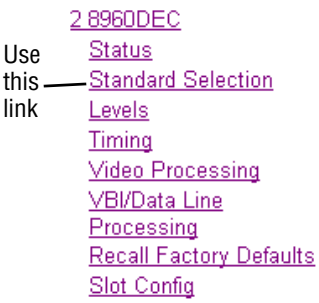
The Status web page (Figure 11) shows the input signal status of the component analog video input. Color coding of the display indicated the signal status. Refer to *Status Monitoring* on page 48 for an explanation of the color coding.

Information about the module, such as part number, serial number, hardware revision and software and firmware versions are given in a read-only section at the bottom of the display.

Figure 11. 8960DEC Status Web Page



Standard Selection Web Page



The Standard Selection web page provides selection of the line standard and controls to define the characteristics of the input video to the module.

Click on **Apply** to activate settings in each selection then refresh the display in the browser.

Note In previous versions of 8960DEC software, a **Standard Recognition** control allowed choosing between **Auto** (for automatic recognition of 525 or 625 mode) or **Manual** (set mode manually). This control is no longer present and the input standard must be selected manually.

Set the following parameters in this display:

- Set the **Line Standard** for either a **525** (Figure 12 on page 32) or **625** (Figure 13 on page 32) line input signal. In 525 mode other setup functions are available as described below.
- The **Input Video Setup** graphic elements appear only when 525 standard is selected. Use this control to describe whether setup is present (or not present) on the input video. For 525-line video, the signal may or may not include 54 mV setup. Select **Setup** for NTSC (setup is present), select **No Setup** for Japanese NTSC (no setup is present). This will affect all active picture lines and VBI lines.

  For 525 standard, select **NTSC** or **PAL-M** subcarrier format with the **NTSC/PAL-M Select** control.

Note Grass Valley no longer supports PAL-M in any of its modular products. Although this setting may work in certain applications, Grass Valley will not warrant that it works or provide support if problems are encountered using this product with PAL-M signals. This product has not been modified to eliminate support for PAL-M. If this product has been used with PAL-M in the past without problems, there shouldn't be any issues using it for the same application. However, it is not recommended that customers use it in any new PAL-M applications.

- **Enable** or **Disable** the **SuperBlack** function in 525 mode only. SuperBlack mode enables a signal lower than blanking level such as Pluge. Disabling the function clips the super black level to standard black.

Figure 12. Standard Selection Web Page – 525 Line Standard

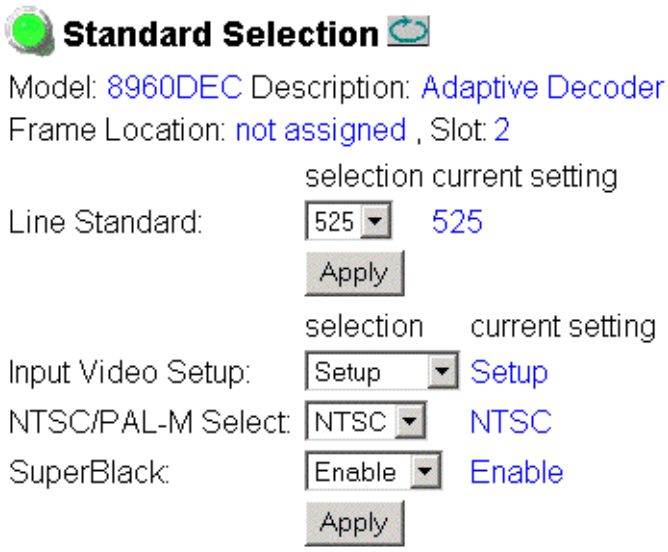
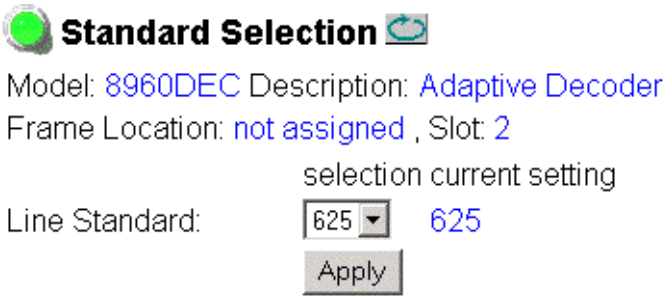
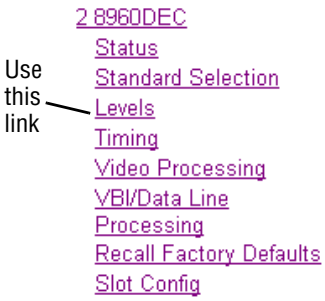


Figure 13. Standard Selection Web Page – 625 Line Standard



Levels Web Page



The Levels web page shown in Figure 14 provides access to processing amplifier controls set by the user or set to calibrated factory levels. Refer to the Configuration Summary in Table 4 on page 21 for a summary of what video lines are affected by each control, all parameters, step sizes, and default values.

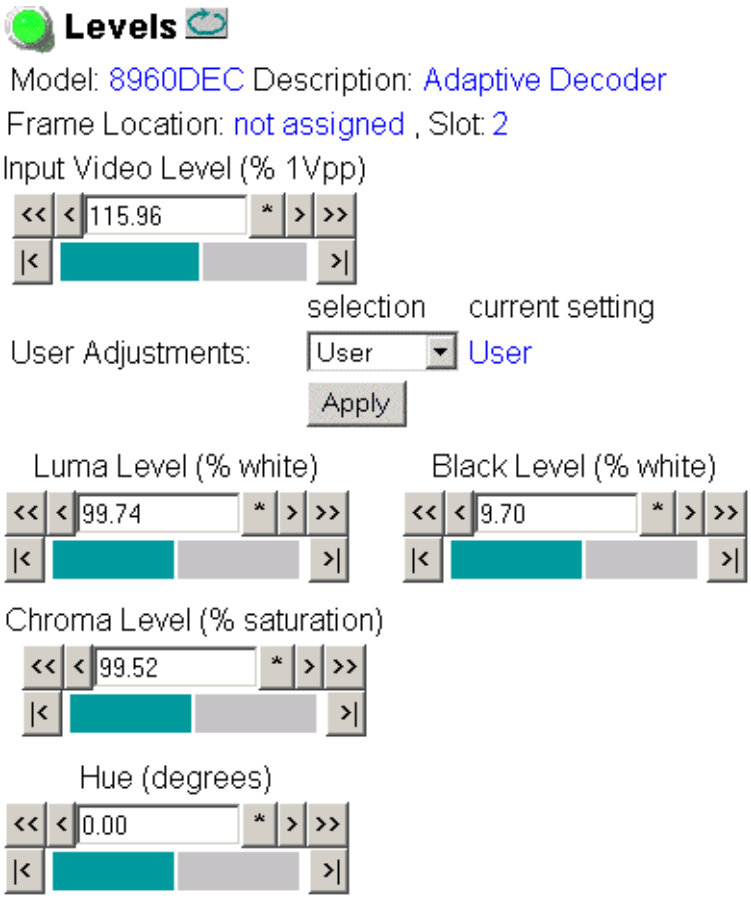
- **Input Video Gain** adjusts the input video level percentage relative to 1 V p-p (100% = 1 V p-p).

Select **User** or **Calibrate** level mode under the User Adjustments pulldown. When calibrated levels are selected (**Calibrate**) the adjustment elements are set to factory defaults and become read-only.

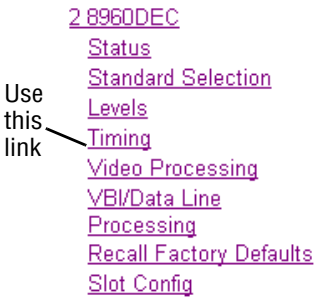
The following parameters can be adjusted in **User** mode in this display:

- **Luma Gain** adjusts the percentage of luminance value relative to white.
- **Black Level** adjusts the percentage of black relative to white.
- **Chroma Gain** adjusts percentage of chroma relative to 100% saturation.
- **Hue** (525 standard only) adjusts the hue of the signal +/– 180 degrees.

Figure 14. Levels Web Page



Timing Web Page



The Timing web page shown in Figure 15 appears when he optional 8900FSS Frame Sync submodule is installed on the 8960DEC module. If the submodule is not installed, the web page will appear as shown in Figure 16 on page 35.

The Timing web page provides lock source selection and fine phase adjustments along with freeze controls for the input video. Refer to the Configuration Summary in Table 4 on page 21 for a summary of what video lines are affected by each control, all parameters, step sizes, and default values.

Use the Timing display to set the following parameters:

- Choose a Lock Source from **Reference** input or **Video In** input.
- Adjust **H Phase** in nanoseconds and **V Phase** adjustment in lines.
- Set **Freeze Recognition** to **Manual** or **Auto**. Selecting **Auto** stores the last field in the Frame Synchronizer to use if the input video is lost or corrupted.
- Set the **Freeze Mode** to **Frame** or **Field**.
- Set the **Freeze Field** to **Field 1** or **Field 2**.
- Set the **Freeze Signal** to **Last Field** or **Black**. This will determine the freeze signal when a freeze is activated in either **Auto** or **Manual** mode.
- To perform a manual freeze, click the **Freeze** button at lower left.

Figure 15. Timing Web Page – 8900FSS Submodule Installed

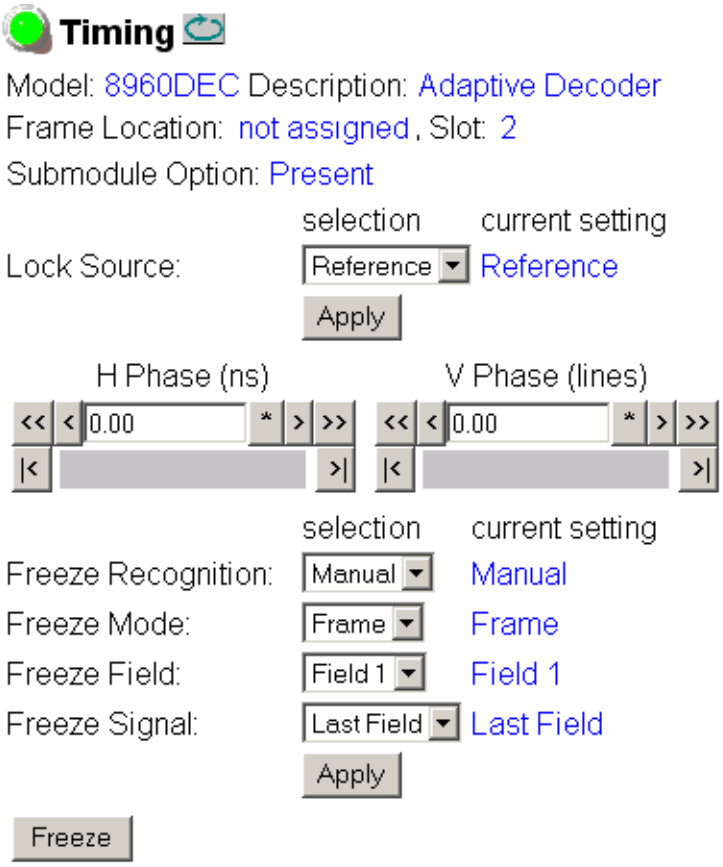
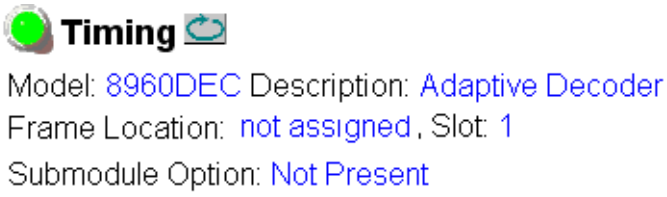
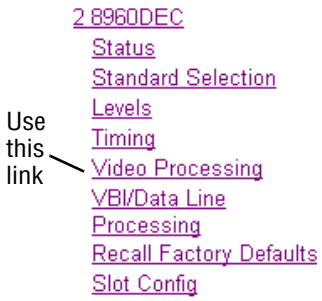


Figure 16. Timing Web Page – No 8900FSS Submodule Installed



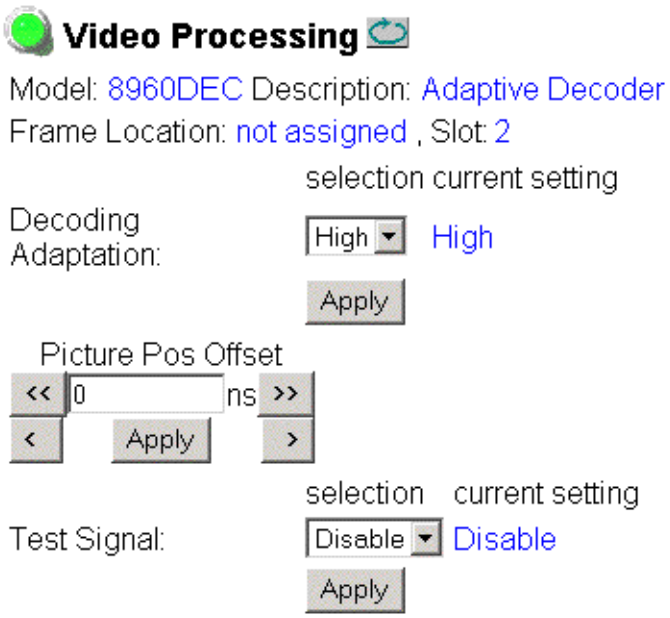
Video Processing Web Page



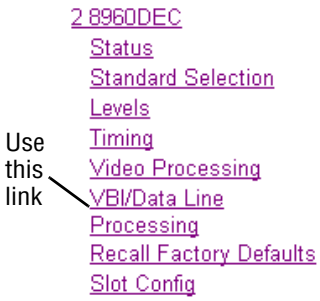
Use the Video Processing display shown in Figure 17 to:

- Choose either **High** or **Low** decoding adaptation sensitivity (**High** for minimizing comb decoding artifacts, **Low** for decoding a picture with more movement).
- Select the amount of picture position offset (centering) in nanoseconds with the **Picture Pos Offset** control, and
- Set the **Test Signal** to enable or disable a luminance range ramp test signal output.

Figure 17. Video Processing Web Page



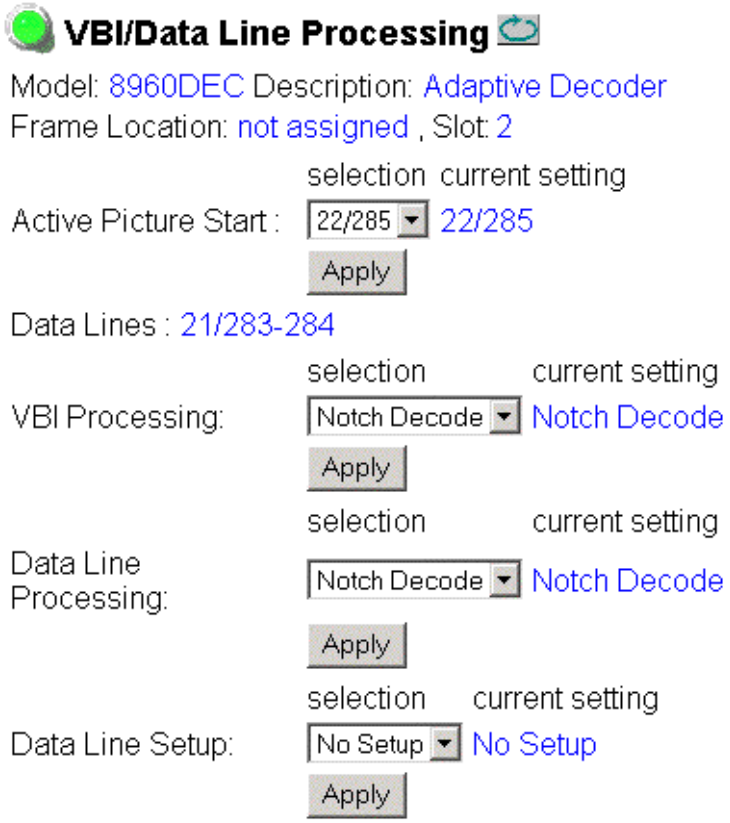
VBI/Data Line Processing Web Page



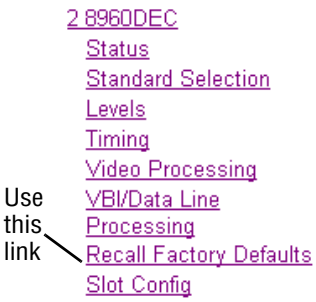
Use the VBI/Data Line Processing web page shown in Figure 18 to:

- Choose the line number for the start of active picture (SAV) from the **Active Picture Start** pulldown selections. (Refer to *Video Path Processing Overview* on page 20 for more details if needed). The available data lines will be displayed.
- Set **VBI Processing** to **Delete**, **Notch Decode** (low and band pass filtering), or **Video to Luma** (no filtering).
- Set the Data Line Processing pulldown to either **Notch Decode** (U and V channels blanked) or **Delete** (remove content), and
- In 525 line standard, set Data Line Setup pulldown to **Setup** or **No Setup**.

Figure 18. VBI/Data Line Processing Web Page

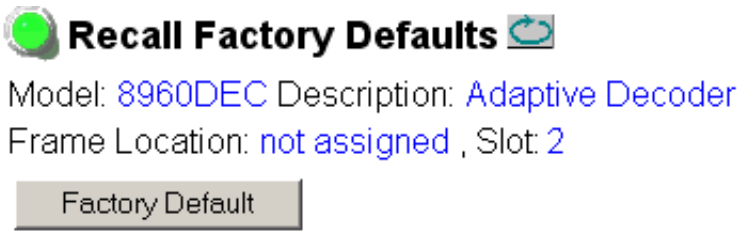


Recall Factory Defaults Web Page

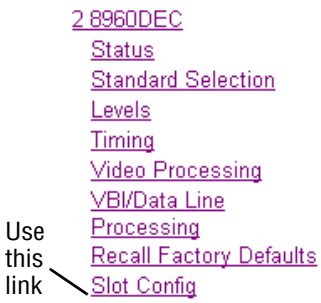


Factory default settings can be recalled by selecting the **Factory Default** button shown in Figure 19 on the Recall Factory Defaults web page.

Figure 19. Factory Default Recall Web Page



Slot Config Web Page



Use the Slot Config web page (Figure 20 on page 40) to perform the following functions on the 8960DEC module:

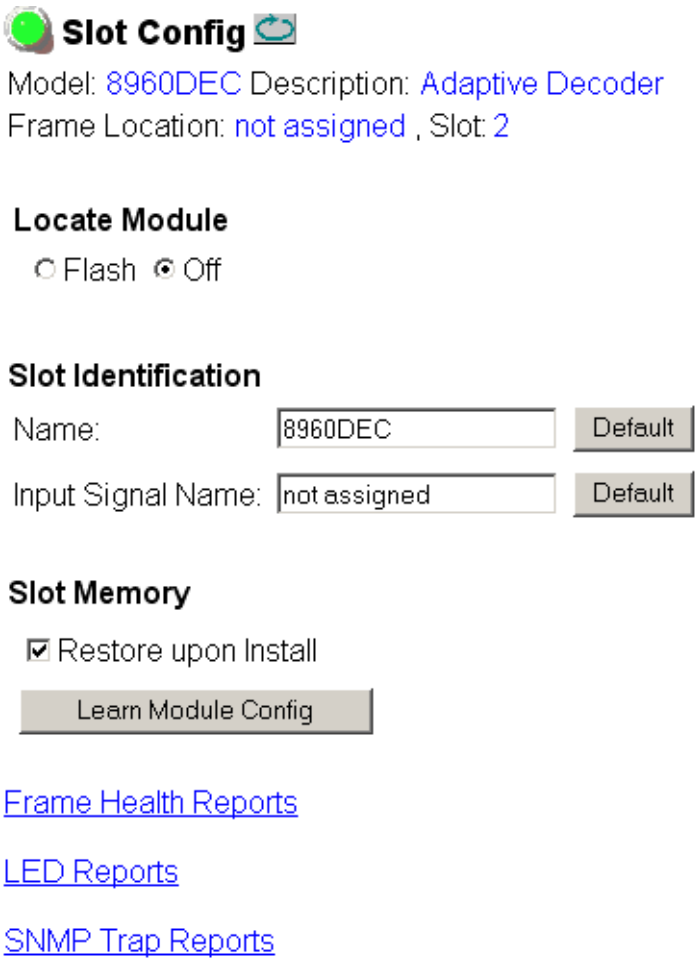
- **Locate Module** – selecting the **Flash** radio button flashes the yellow COMM and CONF LEDs on the front of the module so it can be located in the frame.
- **Slot Identification** – you may identify the module by typing a specific name in the **Name** field. The assigned name is stored on the 8900NET module and travels with the 8900NET module if it is moved to another frame. Select **Default** to enter the factory default module name.

  An **Input Signal Name** field is also provided for entering a name for the input signal. Press the **Default** button to return to the factory default name.
- **Slot Memory** – the slot configuration for each media module is automatically saved periodically (once an hour) to the 8900NET module in that frame. You may also select the **Learn Module Config** button at any time to save the current configuration for this slot. The configuration is saved on the 8900NET module. If the 8900NET module is removed or powered down, the stored configurations are not saved.

  When the **Restore upon Install** box has been checked, the current configuration saved to this slot is saved as slot memory. When the current module is removed and another module of the same type is installed, the configuration saved to the 8900NET module will be downloaded to the new module. The box must be checked before the current module with the saved configuration is removed.
- **Frame Health Reports Link** – select the Frame Health Reports link to open the 8900NET module Frame Alarm Reporting web page. This web page allows configuration of the alarms and warnings that are reported to the external Frame Health Alarm connector on the rear of the GeckoFlex frame.
- **LED Reports** – This link appears when the 8900NET module has software version 4.0.2 or later installed. When the link is selected, a read-only status report of the 8900NET Hardware Switch state is given. In the LED Reporting section of the web page, LED Reporting on the 8900NET module can be enabled or disabled as desired.
- **SNMP Trap Reports Link** – select the SNMP Trap Reports link to open the 8900NET SNMP Reporting web page. This link will only be present when SNMP Agent software has been installed on the 8900NET module. This web page allows configuration of which alarms and warnings that are reported to the SNMP management software.

Refer to the *8900NET Instruction Manual* for complete details on using the 8900NET web pages.

Figure 20. 8960DEC Slot Config Web Page



Software Updating

Software updating, if available, for the module is done using the 8900-FLOAD-CBL assembly available from Grass Valley Customer Service.

The 8900-FLOAD-CBL assembly consists of a circuit board and serial and ribbon cables that connect between a serial port on a PC and the ISP connector on an 8900 or 2000 module. The software upgrade requires downloading files from a PC to the module through the cable assembly.

Equipment Required

The following items are required for this procedure:

- 8900-FLOAD-CBL assembly kit (circuit board and 2 cables),
- Software CD containing ModLoad.exe application (comes inthe 8900-FLOAD-CBL kit) and 8900/2000 module software files and Release Notes, and
- PC with unused Serial Com port that can be connected serially to the 8900 or 2000 frame.

Acquiring Software Updates

For information on acquiring the upgrade kit and available software updates, contact Grass Valley Customer Service at the location given in *Contacting Grass Valley* *on page 2* at the front of this manual.

Specifications

Table 7. 8960DEC Specifications

Parameter	Value
Input	
Number of inputs	1
Input signal formats	Composite analog video, SMPTE170M for NTSC and CCIR624 for PAL[1]
Signal level	1 V p-p ± 3 dB range
Impedance	75 ohm, loop-through
Return loss	> 40 dB to 5.5 MHz
Connector	75 ohm BNC
Outputs	
Number of outputs	4
Signal type	Serial digital video conforming to SMPTE259M 10-bit 4:2:2 component digital signal
Signal level	800 mV ±10%
Output impedance	75 ohm
Connector type	75 ohm BNC on Gecko 8900 frame
DC offset	< 0.5 V when terminated into 75 ¾
Output return loss	> 15 dB up to 270 MHz
Jitter	Conforms to SMPTE 17.12/002
Rise/Fall times	700-900 ps (20 – 80% amplitude)
Performance	
Luma frequency response	± 0.1 dB to 5.5 MHz
Chroma (R-Y,B-Y) response	± 0.5 dB to 1.3 MHz
Group delay	< 5 ns to 5.5 MHz
Chroma/Luma delay	< 10 ns
Chroma/Luma gain inequality	< 0.05 dB adjustable in ±3 dB range
Luma non-linearity	< 0.15%
K factor (2T)	< 0.5%
Line tilt	< 0.5%
Field tilt	< 0.5%
Input resolution	12 bits
Overall processing accuracy	10 bits
SNR (CCIR410 or EIA RS-250B)	> 60 dB to 5.5 MHz
Minimum processing delay	1 line + 2 µs
Phasing	Full frame with optional frame synchronizer
V blanking	20 lines in NTSC, 25 lines in PAL
Picture centering error	< 37 ns
Input CMRR	> 60 dB to 60 Hz
Input hum peak	< 4.5 V p-p
Picture positioning offset	-222 ns to +296 ns

Table 7. 8960DEC Specifications - (continued)

Parameter	Value
Reference Input	
Number of references	2
Signal type	Black burst Separate input assigned for SMPTE170M signal if 525 and CCIR624 signal if 625 input signal selected
Signal level	Sync: 300 mV p-p ±30%
Input impedance	75 ohm jumper terminated
Connector type	75 ohm BNC on Gecko 8900 frame
Return loss	> 40 dB to 5 MHz
Environmental	
Frame temperature range	0 to 45 degrees C
Operating humidity range	0 to 90% non-condensing
Non-operating temperature	-10 to 70 degrees C
Mechanical	
Frame type	8900 Gecko or GeckoFlex with 8900V-R rear module
Power Requirements	
Supply voltage	+12V
Power consumption	< 6.5 Watts, < 8.5 Watts with Frame Sync. option

[1] Grass Valley no longer supports PAL-M in any of its modular products. Although this setting may work in certain applications, Grass Valley will not warrant that it works or provide support if problems are encountered using this product with PAL-M signals. This product has not been modified to eliminate support for PAL-M. If this product has been used with PAL-M in the past without problems, there shouldn't be any issues using it for the same application. However, it is not recommended that customers use it in any new PAL-M applications.

Service

The 8960DEC modules make extensive use of surface-mount technology and programmed parts to achieve compact size and adherence to demanding technical specifications. Circuit modules should not be serviced in the field unless directed otherwise by Customer Service.

If your module is not operating correctly, proceed as follows:

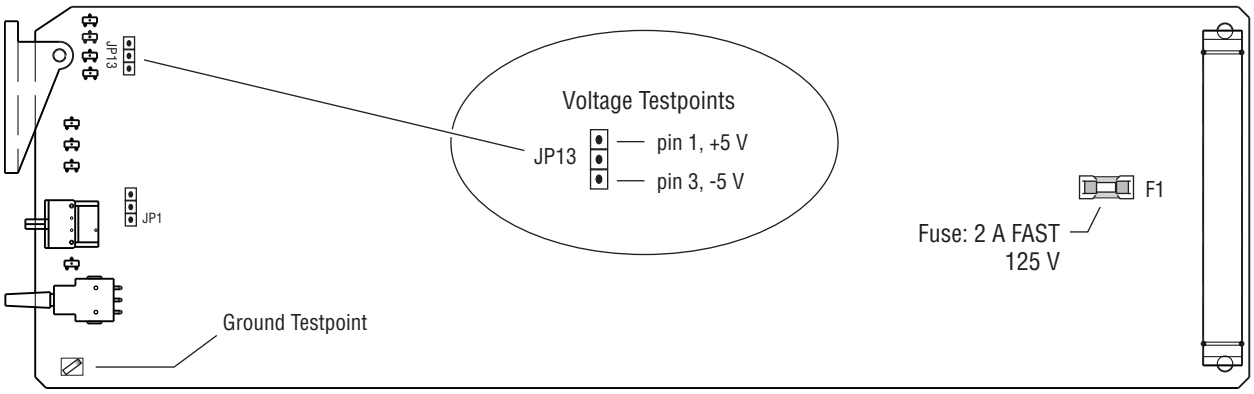
- Check frame and module power and signal present LEDs.
- Verify power at the voltage testpoints (see Figure 21) and check Fuse F1 if no voltage is detected.
- Check for presence and quality of input signals.
- Verify that source equipment is operating correctly.
- Check cable connections.
- Check output connections for correct I/O mapping (correct input connector is used for the corresponding channel output).

Refer to Figure 6 for the location of PWR LED and Table 2 on page 17 for proper LED indications.

If the module is still not operating correctly, replace it with a known good spare and return the faulty module to a designated Grass Valley repair depot. Call your Grass Valley representative for depot location.

Refer to the 8960DEC at the front of this document for the Grass Valley Customer Service Information number.

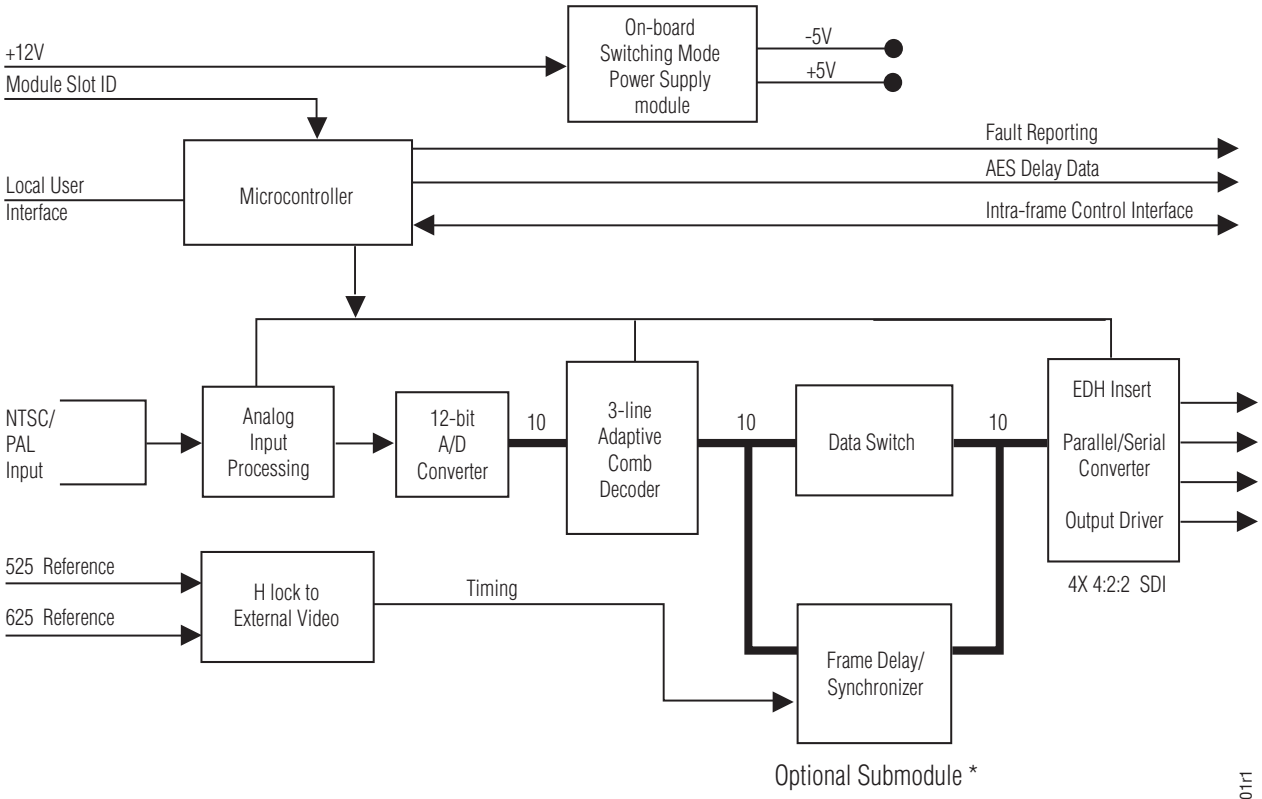
Figure 21. Fuse and Voltage Testpoint Locations



Functional Description

Refer to the block diagram in Figure 22 while reading the following functional description.

Figure 22. 8960DEC Block Diagram



* The main decoder module automatically recognizes the attachment of the frame synchronizer submodule.

Analog Input and A/D Conversion

The analog video signal is connected to the high impedance loop-through input. In the analog section the DC black level is automatically restored to produce standard D1 output blanking levels. The overall video-gain adjustment gives a ±3 dB range to compensate for standard input video levels. Before the 12-bit resolution A/D converter, the signal is lowpass filtered to avoid anti-aliasing artifacts.

The input serves as the timing reference for the digital decoding process and is highly tolerant to low quality and noisy signals. The noise level can vary from as low as 14 dB S/N (white noise) to noise spikes measuring as high as 1 V p-p (satellite narrow spike noise).

Three-line Adaptive Comb Decoder

The Decoder accepts the 27 MHz oversampled NTSC/PAL composite video signal and generates the decoded Luma and Chroma signals using 2-D adaptive comb filtering. This technology gives better performance than standard comb filtering for moving pictures without using external memory. The output signal complies with digital video standards CCIR-601 and SMPTE-259 at the 27 MHz output clock frequency. All the necessary timing and interfacing signals are generated internally and for the selected incoming signal's standard.

Synchronizer/Output Driver

With the addition of the optional frame synchronizer module, the Data Switch routes the video through the module and the phasing range becomes infinite. The frame synchronizer is locked to the selected reference in the horizontal and vertical domain in 37 ns steps that are overlapped with a fine phase adjustment. The driver section embeds the EDH data and delivers four SMPTE-259 standard outputs.

References

If the frame sync submodule is present, independent 525/625 reference inputs are automatically selected according to last valid video input standard.

Microcontroller

Upon power up, the microcontroller configures the decoder chip and loads the firmware according to the last stored user adjustments. The user adjustable parameters are input through a of multi-function rotary and paddle switch interface with an option to recall factory presets.

Frame Communication

All functions are remote read/write through the frame control interface (available in Gecko 8900TX/TF/TFN frames). The fault reporting output is connected to the frame controller through the frame motherboard.

Audio Delay Output

The audio delay output is an RS-232 type (refer to 118AS documentation).

Regulator

The +12V input is stepped down to ±5V using an onboard double-buck Switch Mode Power Supply (SMPS). The regulator does not start up until the main supply voltage reaches approximately 80% of its nominal value.

Status Monitoring

This section provides a summary of status monitoring and reporting for a Gecko 8900 Series system. It also summarizes what status items are reported and how to enable/disable reporting of each item. There are a number of ways to monitor status of modules, power supplies, fans and other status items depending on the method of monitoring being used.

8900 Frame status will report the following items:

- Power supply health,
- Status of fans in the frame front cover,
- Temperature,
- Module health, and
- Frame bus status.

Module health status will report the following items:

- Internal module state (and state of submodule or options enabled) including configuration errors (warning), internal faults, and normal operation (Pass).
- Signal input states including valid/present (pass), not present or invalid (warning), not monitored, and not available (no signal inputs).
- Reference input states including locked/valid (pass), not locked/invalid (warning), and not monitored.
- Signal output states with reporting functionality (reference output).

LEDs

LEDs on modules in the frame and on the front of the 8900TF/TFN/FFN frames indicate status of the frame and the installed power supplies, fans in the front covers, and modules. (The 8900TX-V/A frames have no LED indicators on the front cover.)

When a red FAULT LED is lit on a frame front cover, the fault will also be reported on the 8900NET or Frame Monitor module. The LEDs on the front of these modules can then be read to determine the following fault conditions:

- Power Supply 1 and 2 health,
- Fan rotation status,
- Frame over-temperature condition,
- Frame Bus fault (8900NET only), and
- Module health bus.

In general, LED colors used on the frame and modules indicate:

- Green – normal operation, (Pass) or signal present, module locked.
- Red – On continuously = fault condition, flashing = configuration error.
- Yellow – On continuously = active condition (configuration mode or communication), flashing in sequence = module locator function.

Status LEDs for this module are described in *Operation Indicator LEDs* on page 16. LEDs for the 8900NET module are described in the *8900NET Network Interface Instruction Manual*.

Frame Alarm

A Frame Alarm connection is available on pins 8 and 9 of the RS-232 connector on the rear of the 8900 frame (Frame Monitor or 8900NET Network Interface module required). This will report any of the status items enabled with the 8900NET or Frame Monitor module configuration DIP switch. Connection and use of the Frame Alarm is covered in detail in the 8900NET Network Interface Instruction Manual.

Web Browser Interface

When the 8900NET module is installed in the frame, a web browser GUI can indicate frame and module status on the following web pages:

- Frame Status web page – reports overall frame and module status in graphical and text formats.
- Module Status web page – shows specific input and reference signal status to the module along with enabled options and module versions.
- A Status LED icon on each web page to report communication status for the frame slot and acts as a link to the Status web page where warnings and faults are displayed (8900NET version 3.0 or later).

In general, graphics and text colors used indicate the following:

- Green = Pass – signal or reference present, no problems detected.
- Red = Fault – fault condition.
- Yellow = Warning – signal is absent, has errors, or is mis-configured.
- Gray = Not monitored (older 8900 module).
- White = Not present.

Status reporting for the frame is enabled or disabled with the configuration DIP switches on the 8900NET module. Some module status reporting items can also be enabled or disabled on individual configuration web pages.

SNMP Reporting

The Gecko 8900 Series system uses the Simple Network Monitoring Protocol (SNMP) internet standard for reporting status information to remote monitoring stations. When SNMP Agent software is installed on the 8900NET module, enabled status reports are sent to an SNMP Manager such as the Grass Valley's NetCentral application.

There are both hardware and software report enable switches for each report. Both must be enabled for the report to be sent. Software report switches are set on the 8900NET Configuration web page for the Frame, the 8900NET module, and each module slot. Refer to the 8900NET Network Interface Instruction Manual for installation instructions.

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