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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original Version – preliminary	Nov 99
1.1	First release – firmware version 1.00	Apr 00
1.2	Updated to show changes for firmware version 1.02 New menu structure	May 00
1.3	Updated to include version 7760AVM-G Added GPI and GPO schematics	Jun 00
1.4	Added Menu Quick Reference	Jul 00
1.4.1	Added specifications for Data Logging Port	Jul 00
1.5	Added features supported in firmware version 1.5 Default SID mode and Default SID message Large Font size for the Time code, Sid and Program rating windows Picture Freeze detect and Picture black detect *AVM ConfigWare* version 1.0 or later is required to properly save and recall configurations from modules with version 1.5 firmware.	Nov 00
1.5.1	Updated specifications for Audio Bar Graphs	Dec 00
1.5.2	GPI1 and GPI2 Fault Conditions added	Feb 01
1.7	Added features supported in firmware version 1.7 Picture Content line added to Status window Status window Fault mode highlights fault conditions Status window can be enabled by fault triggering Fault windows can blink; XDS window added Digital freeze for monitoring MPEG or motion JPEG sources	Mar 01
1.7.1	Corrected COM port configurations	Apr 01
1.9	Corrected automatic equalization specification to >200m Added CC/XDS changes as per firmware revision 1.08 Correlated manual revision number with latest firmware release version number(1.09)	Apr 01
1.10	Added menu items for Loss of audio fault for both Ch ½ and ¾, finer granularity for Freeze and Black durations and fault trigger becomes inactive if fault condition is inactive for 1 second.	Apr 01
2.0	Production release with VistaLINK™ additions, video invalid duration, an “About…” section in Utilities menu, corrected GPO pull-up resistor value and added new factory default fault condition alert messages. Fixed +/–3dB discrepancy and added “Video invalid duration” option.	Jun 01
2.1	Update of fault alert duration description in sections 7.9.6. - 7.9.8	Oct 01
2.1.1	Minor corrections	Feb 02
2.1.2	Added Missing audio duration menu option and increased loss of video duration	Oct 02
2.1.3	Fixed formatting	May 09

1. OVERVIEW

The 7760AVM line of audio and video monitoring cards perform a number of quality control and monitoring functions associated with a modern serial digital television facility. These cards perform audio and vertical blanking interval (VBI) data demultiplexing from the incoming digital video, analyze the data and display key information about the data on the output video. The outputs are either analog and/or digital video with analog or digital audio.

The Features of all 7760AVM's are:

- One SDI 525 or 625, 270 Mb/s component digital video input.
- One group (4 channels of audio) is demultiplexed from the incoming digital video and VU/PPM level Indicators are keyed as bar graphs in over the picture.
- 4 analog audio outputs available for content monitoring.
- Analog audio output levels are adjustable.
- Analog audio outputs can be set so both are mono mix of the selected channel pair.
- Decodes vertical interval time code (VITC) and "burns" the time code into the picture.
- Decodes PESA format Source ID (8 characters) or Evertz format VITC Source ID (5 or 9 characters) and burns the ID into the picture.
- Decodes Line 21 XDS packets containing network name, call letters, program name and time of day.
- A comprehensive on screen display is available to configure the various features of the module.
- Flexible configuration of the text and audio bar graph information displays.
- An extensive list of error conditions can be monitored and fault conditions can be configured from these conditions.
- On screen messages can be triggered by the configured fault conditions.
- Two GPI inputs are available to modify the display characteristics.
- GPO output to indicate user definable fault conditions.
- Audio and GPI/Os are available on a high density DB15 connector.
- 7760AVM-BHP bulkhead panel is available to facilitate wiring to the high density DB15 connector (up to 10 AVM modules can be wired using each bulkhead panel).
- RS-232 Data logging port to log fault conditions.
- VistaLINK® - enabled offering remote monitoring, control and configuration capabilities via SNMP. VistaLINK® is available when modules are used with the 3RU 7700FR-C frame and a 7700FC VistaLINK® Frame Controller module in slot 1 of the frame.
- Comes with *AVM ConfigWare* software to configure a card in a PC environment, then send configurations to multiple modules.

Features available on some 7760AVM versions:

- One re-clocked SDI video output (two on some versions).
- Composite analog output video, SDI output video or both.
- Two pair of stereo balanced analog outputs or 2 AES digital audio outputs.
- Audio monitoring of externally applied AES audio instead of embedded audio.
- Composite analog output versions can be configured to decode the closed captions.

1.1. 7760AVM FEATURE COMPARISONS

Table 1-1 illustrates the differences between the various versions of the 7760AVM. Features that are included on all versions are not included in this table:

Feature	-A	-B	-C	-D	-E	-F	-G
Re-clocked SDI outputs	1	1	1	1	2	2	0
SDI outputs with superimposed information	0	1	0	1	2	2	1
Composite analog outputs with superimposed information	1	0	1	0	2	2	1
Full closed captioning decoding	Y	N	Y	N	Y	Y	Y
AES/EBU digital audio inputs	0	0	2	2	0	2	0
AES/EBU digital audio outputs	2	2	0	0	2	0	2
Analog audio outputs	4	4	4	4	4	4	4
Max. number of cards in a 7700FR	15	15	15	15	7	7	15

Table 1-1: 7760AVM Feature Comparison

1.2. FUNCTIONAL DESCRIPTION

Serial digital video is converted to parallel and embedded audio, VITC, closed captioning and Source ID are extracted from it. The audio is converted to analog and delivered out the high density DB-15 connector on the rear of the card. The audio is also read by the CPU and further processed to extract level information. The CPU creates the level and phase bar graphs and writes them out to the on screen display (OSD) memory.

The CPU also reads raw closed captioning, VITC and SID data and extracts time code, program rating and the source ID information. The time code, program rating and source ID message is also written to the OSD memory.

The hardware mixes (keys) the on screen text and bar graphs display information onto the video stream. This video goes out digitally through a parallel to serial converter and/or analog through a composite encoder.

The CPU also gets pushbutton and toggle switch commands from the card edge controls and draws extensive menus for configuring the operation of the card.

General-purpose inputs are used for remote control of some features and general-purpose outputs are generated under error conditions.

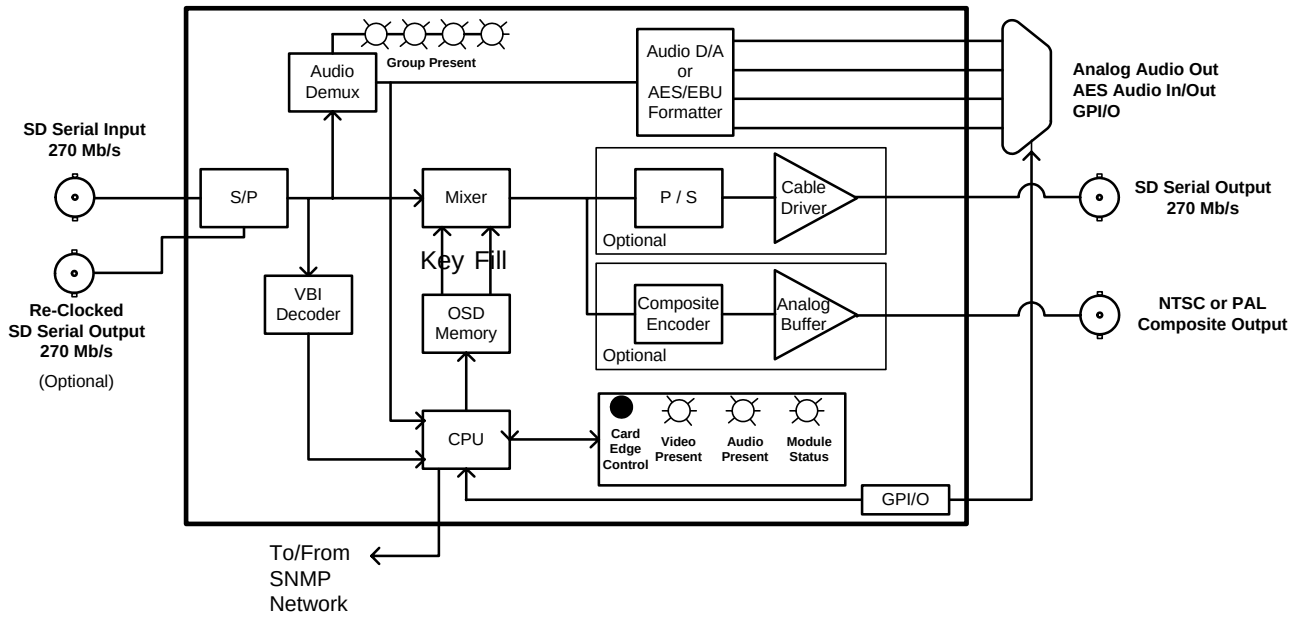

Figure 1-1: 7760AVM Block Diagram

2. INSTALLATION

The 7760AVM A, B, C, D and G version modules come with a companion rear plate that has 3 BNC connectors and one high density female DB-15 and occupy one slot in the 7700FR frame. The 7760AVM E and F version modules come with a companion rear plate that has 7 BNC connectors and one high density DB-15, and occupies two slots in the 7700FR frame. Figure 2-1 shows a picture of each of the rear panels. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter (Section 3).

The 7760AVM cards must be inserted into slots with the correct rear panel. Some cards have physical differences and some have functional differences and the associated labels will be misleading.

2.1. VIDEO IN AND OUT

Connect a source of component digital 525 line or 625 line 270 Mb/s video to the top BNC labeled SDI INPUT. Unprocessed, re-clocked SDI video output(s) are available on the RECLOCKED SDI output BNCs. Processed video with text and audio bar graphs are available on the ANALOG or SDI MON output BNCs. If the card is not present or the power is off, there will be nothing on any of the outputs.

2.2. AUDIO AND AUX I/O

The audio inputs and outputs are available on a female high density DB-15 connector labeled "AUDIO AND AUX I/O". Table 2-1 shows the pin-out of the connector.

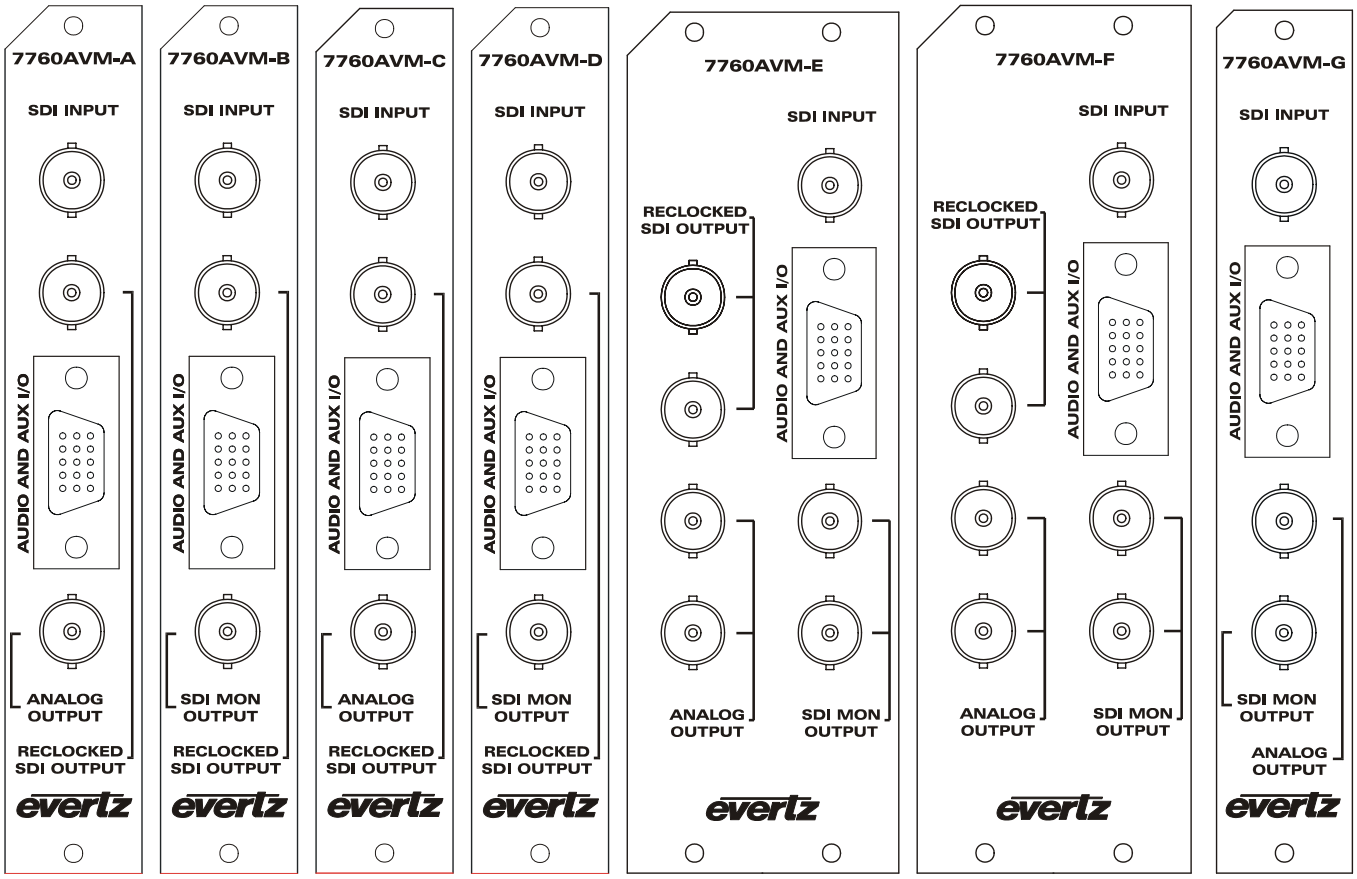

Figure 2-1: 7760AVM Rear Panels

Name	Description	DB-15
A1-	Audio channel 1 -	4
A1+	Audio channel 1 +	5
A2-	Audio channel 2 -	14
A2+	Audio channel 2 +	15
A3-	Audio channel 3 -	9
A3+	Audio channel 3 +	10
A4-	Audio channel 4 -	12
A4+	Audio channel 4 +	13
AES1	Single ended AES input/output 1	11
AES2	Single ended AES input/output 2	7
GPI1	General Purpose Input 1	8
GPI2	General Purpose Input 2	1
GPO1	General Purpose Output 1	3
Tx	RS-232 (output)	2
Rx	RS-232 (input)	6
	Ground	Shell

Table 2-1: AUDIO AND AUX I/O Pinout

The physical layout looks like this:

			6	Rx			
1	GPI2		7	AES2		11	AES1
2	Tx		8	GPI1		12	A4-
3	GPO1		9	A3-		13	A4+
4	A1-		10	A3+		14	A2-
5	A1+					15	A2+

Connect to the shell for ground

Table 2-2: AUDIO AND AUX I/O Physical Layout

2.2.1. AES Audio Connections

On some versions of the AVM, the AES pins are inputs and on others, they are outputs. On versions that have outputs, both the analog and AES outputs have the same audio (the de-multiplexed group). On the other versions, either the input AES audio or the de-multiplexed group can be sent to the audio analyzer (for bar graph display) and digital to analog converter. Note that there can only be one source of audio, either the externally supplied AES or the de-multiplexed group. This means that you can not have one source driving the bar graphs and the other sent to the D to A converter.

	-A	-B	-C	-D	-E	-F	-G
AES1	out	out	in	in	out	in	out
AES2	out	out	in	in	out	in	out

Table 2-3: AES Audio Connections

2.2.2. Analog Audio Connections

Four channels of balanced analog audio are available through this connector. The balanced audio can be connected to male XLR connectors as follows (standard pin 2 +ve connection):

HD DB-15	XLR
Audio +	2
Audio -	3
Shell	1

Table 2-4: Analog Audio to XLR Connection

2.2.3. General Purpose Inputs and Outputs

The GPI's are active low with internal pull up resistors (4.7k Ohms) to +5V. To make an input active, lower the signal to near ground potential (i.e. connect to shell or chassis ground). This can be done with a switch, relay, TTL drive, GPO output or other similar method. Figure 2-2 shows the input circuit for the General Purpose inputs.

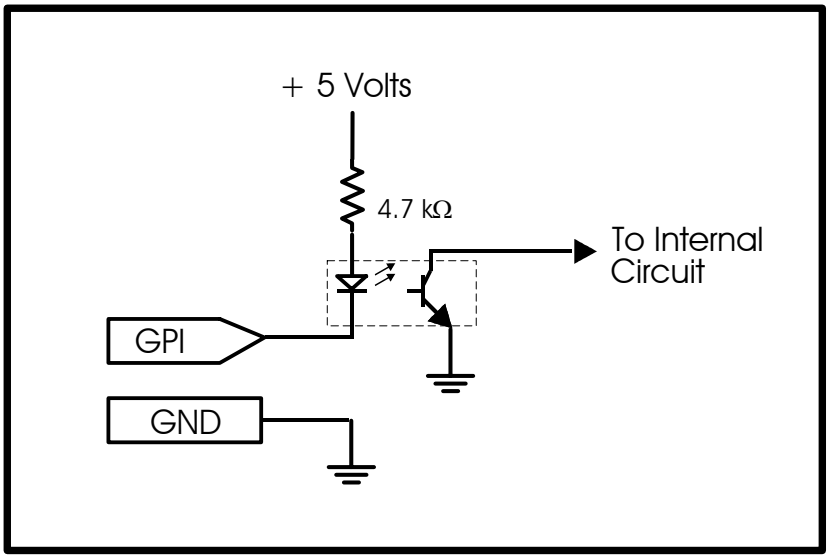

Figure 2-2: GPI Input Circuitry

The GPO's are software programmable active high or low with internal pull up (18kΩ) resistors to +5V. When the output goes low it is able to sink up to 10mA. When high, the signal will go high (+5V). **Do not draw more than 100μA from the output.** Figure 2-3 shows the circuit for the General Purpose output.

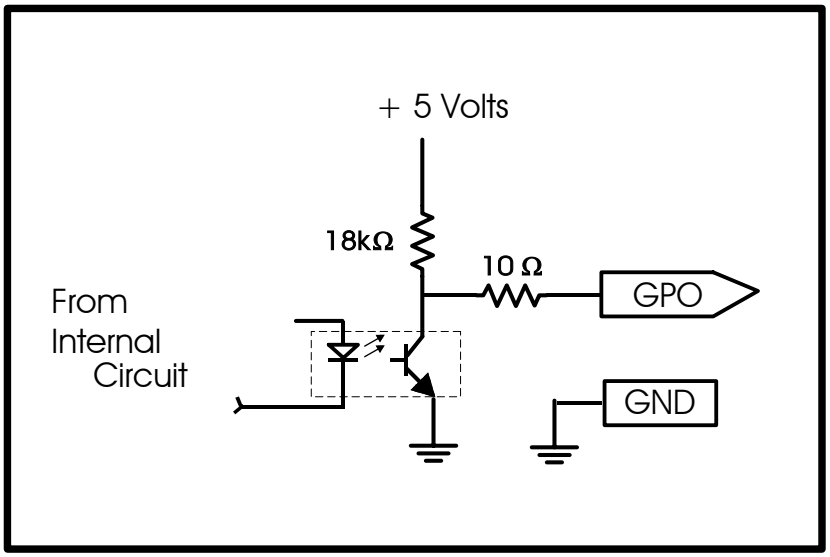

Figure 2-3: GPO Output Circuitry

2.2.4. RS-232 Serial Port Connections

The COM port signals are standard RS-232 with no hardware flow control. The directions of the signals are indicated in Table 2-1. The RS-232 port on the AUDIO AND AUX I/O connector is used for data logging of the status and fault conditions. Connect this port to a COM port on your PC running a terminal application such as Windows HyperTerminal. Configure the port to 57600 baud, 8 bits, no parity, 2 stop bits and no flow control. For more information about configuring the data logging output see section 7.10.2.

2.3. INSTALLING THE BULKHEAD BREAKOUT PANEL

The 7760AVM-BHP Bulkhead breakout panel is an accessory that provides you with a convenient way of connecting the audio and GPIO signals into the HD DB-15 connectors on the rear of the modules. This panel occupies 1.5 rack units of rack space and is designed for mounting at the rear of your rack panel. The breakout panel can be used to connect up to ten AVM modules. Each of the ten sets of connectors on the breakout panel is fitted with two BNCs for AES audio in or out, two six position terminal strips for the 4 channels of analog audio, and one six position terminal strip for the GPIO and RS-232 signals. Figure 2-4 shows one section of the breakout panel. On the rear of the breakout panels are ten female HD DB-15 connectors.

To connect the AVM module to the breakout panel, connect the 15 pin extender cables supplied with the breakout panel between the **AUDIO AND AUX I/O** connector on the rear of the AVM module and the appropriate D connector on the breakout panel. Make sure that you secure the connectors with the screws supplied. The audio and aux. cables can be secured into the removable portion of the terminal strips using a small screwdriver. The removable part of the terminal strip is then inserted into the breakout panel and secured using the two hold-down screws.

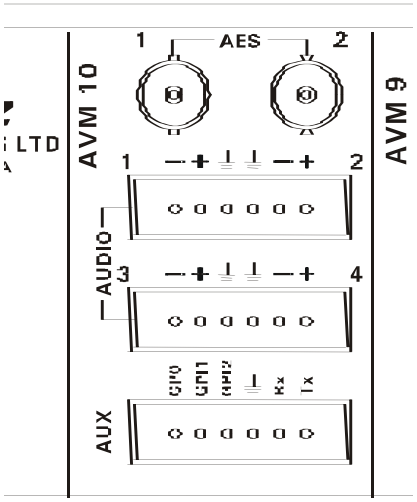

Figure 2-4: Breakout panel for Wiring AUDIO and AUX I/O Connections

3. SPECIFICATIONS

3.1. SERIAL DIGITAL INPUT

Standard: SMPTE 259M-C – 525 or 625-line component
Connector: 1 BNC per IEC 169-8
Termination: 75 ohm
Equalization: Automatic >200m @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss: >15dB up to 270MHz
Embedded Audio: SMPTE 272M-A

3.2. SERIAL VIDEO OUTPUT

Standard: SMPTE 259M-C – 525 or 625-line component. – same as input
Number of Outputs:
Reclocked: 0 on version G
1 on versions A, B, C, and D
2 on versions E and F
Monitor: 1 on versions B, D and G
2 on versions E and F
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 470ps nominal
Overshoot: <10% of amplitude
Embedded Audio: Same signal as input: SMPTE 272M-A

3.3. ANALOG VIDEO OUTPUT

Standard: NTSC, SMPTE 170M
PAL, ITU624-4
Number of Outputs: 1 on versions A, C and G
2 on versions E and F
Connector: BNC per IEC 169-8
Signal Level: 1V nominal
DC Offset: 0V ±0.1V
Return Loss: >35dB up to 5 MHz
Frequency Response: 0.8dB to 4 MHz
DC Offset: 0V +/- 100mV
Differential Phase: <0.9°(<0.6° typical)
Differential Gain: <0.9% (<0.5 % typical)
SNR: >56dB to 5 MHz (shallow ramp)

3.4. ANALOG AUDIO OUTPUT

Number of Outputs:	4
Type:	Balanced analog audio
Connector:	Female High Density DB-15
Output Impedance:	33Ohm
Sampling Frequency:	48kHz
Signal Level:	0dB FS => 8 to 24dBu (user settable) NOTE: High impedance loads only (10 kΩ) Not good for low impedance loads (i.e. 600 Ω)
Frequency Response:	50Hz to 20kHz: +/- 0.20dB
SNR:	>85dB (50Hz to 20 kHz)
THD+N:	65 dB @ 1kHz, 0 dB FS, typical

3.5. AES AUDIO INPUTS AND OUTPUTS

Number of Inputs:	2 on versions C, D and F
Number of Outputs:	2 on versions A, B, E and G
Standard:	SMPTE 276M, single ended synchronous or asynchronous AES
Connectors:	High-density female DB-15
Resolution:	24 bit (outputs 20 bits from embedded audio)
Sampling Rate:	48 kHz
Impedance:	75 Ω unbalanced

3.6. AUDIO BAR GRAPHS

Number of Graphs:	4 (1 group)
Ballistics:	AES/EBU, DIN, BBC and Nordic N9 (See Table 7-1 for detailed specifications)

3.7. GENERAL PURPOSE IN/OUT

Number of Inputs:	2 (behavior is assigned via. On screen menu items)
Number of Outputs:	1 (behavior is programmable via. On screen menu items)
Type:	Opto-isolated, active low with internal pull-ups to +5V
Connector:	Female High Density DB-15
Signal Level:	+5V nominal

3.8. DATA LOGGING SERIAL PORT

Standard:	RS 232
Connector:	Female High Density DB-15
Baud Rate:	57600
Format:	8 bits, no parity, 2 stop bits and no flow control

3.9. ELECTRICAL

Voltage: + 12VDC
Power: 12 W
EMI/RFI: Complies with FCC Part 15, class A and EU EMC directive.

3.10. PHYSICAL

7700 frame mounting:
Number of slots: 1 for versions A, B, C, D, and G
2 for versions E and F

Stand Alone Enclosure:
Dimensions: 14 " L x 4.5 " W x 1.9 " H
(355 mm L x 114 mm W x 48 mm H)
Weight: approx. 1.5 lbs. (0.7 Kg)

4. STATUS LEDS

4.1. MODULE STATUS LEDs

MODULE STATUS: This Green LED will be on when the module is operating properly.

LOCAL FAULT: This Red LED makes it easy to identify one module in a frame that is missing an essential input or has another fault.

The LED will blink on and off if the microprocessor is not running.

The LED will be on when there is a fault in the module power supply or a user configurable error condition exists.

SIGNAL PRESENT: This Green LED will be on when there is a valid video signal present at the module SDI input.

AUDIO PRESENT: This Green LED will be on when the selected audio source is present.

4.2. AUDIO STATUS LEDs

Four LEDs located on the lower end of the module (near the card extractor) indicate which audio groups are present in the input video. Audio group LED 1 is located closest to the center of the module.

Audio Group LED	Colour	Audio Group Status
1	Off	No group 1 present on input video.
	Green	Group 1 present on input video.
2	Off	No group 2 present on input video.
	Green	Group 2 present on input video.
3	Off	No group 3 present on input video.
	Green	Group 3 present on input video.
4	Off	No group 4 present on input video.
	Green	Group 4 present on input video.

Table 4-1: Audio Group Status LEDs

5. OPERATING LEVELS, HEADROOM, CLIPPING AND THE BAR GRAPHS

This section contains notes to understand how the AVM product line relates digital audio levels, analog output audio levels, and the displayed bar graph levels.

When a full-scale digital signal is input, you will get an analog output signal level that is set by the Peak Output Level. The Headroom control sets the 100% program reference level (0 dB on the scale) with respect to the Peak Output Level. For example, if the Peak Output Level is set to 24 dBu and the Headroom is set to 20 dB, then the 0 dB reference on the bar graphs will correspond to an output level of 4 dBu. This level will be achieved when a digital input signal of –20 dB FS is applied at the input. Therefore, the following relationship is always maintained:

PGM reference level + headroom = peak output level

NOTE: The VU and PPM standards were set before the digital revolution. These standards deal with headroom levels that are quite a bit lower than what should be used in the digital world. Also, most of the bar graphs only display a few dB above the program reference level. In a digital world, one needs to leave around 20 dB of headroom to keep most material away from clipping.

For best results, follow these steps when setting up the audio bar graphs and output levels:

1. Set the *Headroom* control to the desired value. Remember that this is the value in dB between the 100% reference level (expressed in dB FS) and saturation level of the digital input word (0 dB FS). It will also correspond to the value in dB between the analog output level when a reference level is input and the maximum output level set by *Peak Output Level*.
2. Pick the bar graph type and mode. This selection will configure the bar graphs with the defaults dictated by the standards. It will also set the *Peak Output Level* and the 0dB reference level to adhere to the standard and the desired headroom.
3. Adjust any of the bar graph configuration parameters to customize the display of the graphs.
4. Save the card configuration into a preset so that you can recall it if any card parameter is tampered with.

6. AUDIO ALARM CALIBRATION PROCEDURE

This section contains a detailed description on setting the various audio warning/error detection parameters.

Some of the audio alarm detection algorithms are dependent on the state of other audio alarm detectors. For instance, the mono detection algorithm will not use periods of silence as determined by the silence detection. For this reason, the following sequence should be used to calibrate the audio alarms. The items in Italics refer to menu items in the AVM. See section 7.9 for a complete description of the fault definition menu items.

6.1. CALIBRATE AUDIO SILENCE DETECTION

1. Supply the card with your plant's noisiest audio feed without any audio program material present. This will be a baseline noise level to calibrate the silence detector.
2. Turn off all sources of errors in a *Fault Condition* and assign *Audio Silence* as the only error. Also, make sure that you set the *Fault Duration* to a small number of frames so that you will see when the error condition disappears.
3. Set the *Silence Duration* to 0.5 sec so that you can see the results of adjusting the *Silence Level* parameter without getting confused with the detection time.
4. Adjust the audio *Silence Level* until the *Fault Condition* begins to go active. This will be the noise floor level. Raise the *Silence Level* a few dB to make the detector insensitive to this noise level.
5. Set the *Silence Duration* to a time appropriate to your application. This should be set to a value longer than your worst case acceptable quiet period.

6.2. CALIBRATE AUDIO PHASE REVERSAL DETECTION

1. Supply the card with a stereo signal that has the phases reversed. Make sure that the material is typical of normal content for this channel.
2. Turn off all sources of errors in a *Fault Condition* and assign *Phase Reversal* as the only error. Also, make sure that you set the *Fault Duration* to a small number of frames so that you will see when the error condition disappears.
3. Set the *Phase Reversal Duration* to 0.5 sec so that you can see the results of adjusting the *Phase Reversal Level* without getting confused with the detection time.
4. Adjust the *Phase Reversal Level* so that the *Fault Condition* detects the phase reversal.
5. Set the *Phase Reversal Duration* to a time period appropriate to your application.
   Warning: Periods of silence (below the *Silence Level*) will extend this duration. In other words, periods without audio content are not included in the phase reversal detection.
   Warning: Stereo material with long periods of dissimilar left/right content (i.e. music with plenty of panning) may cause the phase reversal detector to fire. It is best to set the *Phase Reversal Duration* to a value larger than what you would expect.

6.3. CALIBRATE AUDIO MONO DETECTION

1. Supply the card with a stereo signal that originated from mono material and that has a large amount of uncorrelated noise added to each channel. This will allow you to set the *Mono Threshold* to a value that will detect the mono condition in the presence of noise.
   Warning: Make sure that the material is in-phase. Mono material will not be detected if it is out of phase.
2. Turn off all sources of errors in a *Fault Condition* and assign *Mono* as the only error. Also, make sure that you set the *Fault Duration* to a small number of frames so that you will see when the error condition disappears.
3. Set the *Mono Duration* to 0.5 sec so that you can see the results of adjusting the *Mono Threshold Level* without getting confused with the detection time.
4. Adjust the *Mono Threshold Level* so that the *Fault Condition* detects the mono material in the presence of noise.
5. Set the *Mono Duration* to a time period appropriate to your application.
   Warning: Periods of silence (below the *Silence Level*) will extend this duration. In other words, periods without audio content are not included in the mono detection.
   Warning: Stereo material with long periods of similar left/right content (i.e. talking heads in a news cast) may cause the mono detector to fire. It is best to set the *Mono Duration* to a value larger than what you would expect.

6.4. DEFINE THE AUDIO FAULT CONDITION(S)

1. A *Fault Condition* is defined as a group of one or more problems grouped together that will create a fault when any one of the problems exists. Decide what grouping of error conditions will generate a fault by setting the appropriate condition to *Yes* in the *Fault Condition* menu.
2. Set the *Fault Duration* to either *Until Reset* or to a time value. This is how long the condition will stay active after the conditions generating the fault go away.
3. Configure a *Fault Message*. Enter the text to display on screen, it's H and V position, and it's characteristics (opacity, colour, etc).
4. Assign the *Fault Condition* to an output contact closure (GPO) if it is desired.

7. ON SCREEN MENUS

7.1. NAVIGATING THE ON SCREEN MENU SYSTEM

A toggle switch and pushbutton allow card edge navigation of a set of on-screen menus used to configure the card. When configuring multiple cards you may find it useful to copy board configurations from one board to another using the *AVM ConfigWare* utility provided with your card. Please view the *AVM ConfigWare* information in the section 8 of this manual.

To enter the on-screen menu system, press the pushbutton once. This will bring you to the main setup menu where you can use the toggle switch to move up and down the list of available sub menus. An arrow (>) moves up and down the left hand side of the menu items to indicate which item you are currently choosing. Once the arrow is on the desired item, press the pushbutton to select the next menu level.

On all menus, there are two extra selectable items: *Back* and *Exit*. Selecting *Back* will take you to the previous menu (the one that was used to get into the current menu) while *Exit* will return the display to its normal operating mode. On the main menu, BACK and EXIT will both take you to the normal operating mode.

Once in a sub menu, there may be another menu layer, or there may be a list of parameters to adjust. If there is another set of menu choices, use the toggle switch to select the desired menu item and press the pushbutton.

To adjust any parameter, use the toggle switch to move up or down to the desired parameter and press the pushbutton. The arrow will move to the right hand side of the line (<) indicating that you can now adjust the parameter. Using the toggle switch, adjust the parameter to its desired value. If the parameter is a numerical value, the number will increase if you lift the toggle switch and decrease if you push down on the toggle switch. If the parameter contains a list of choices, you can cycle through the list by pressing the toggle switch in either direction.

When you have stopped at the desired value, depress the pushbutton. This will update the parameter to the selected value and move the arrow back to the left side of the parameter list (>). Continue selecting and adjusting other parameters or use the BACK or EXIT commands.

7.2. CHANGING TEXT FIELDS

Some of the controls of the OSD menu allow you to adjust a text-based field. Editing a line of text can be a little tedious with a toggle switch and a pushbutton, but it can be done with the following procedure:

1. Select the text to edit by pressing the pushbutton when the menu item is selected. This will take you to a screen that has the label/name of the text being edited and a white box. The white box contains the text to change and is drawn to the maximum size of the text field.

   ```
   SAMPLE TEXT
   ^
   ```

   Note the arrow (^) under the character. This indicates which character you will be changing with the toggle switch.

2. Use the toggle switch to change the first character of the text message.

3. Once you have selected the desired character, press the pushbutton. This will advance the arrow to the next character. Continue changing the remainder of the characters in the same way.

4. There are two special characters to help you enter the text: a backspace character (left pointing arrow), and an end of line character (stop sign):

   Left Arrow: If you have accidentally advanced to the next character and want to go back, select the left arrow with the toggle switch. When you press the pushbutton, you will go back to the previous character. This will save you from having to complete the editing and re-edit it to change the mistake.

   Stop Sign: If you are done changing the text, and the new text is shorter than old text, you can terminate the line with a stop sign. When you use the pushbutton after selecting the stop sign, any remaining characters in the text field will be erased and you will return to the menu structure.

5. You are done editing when you reach the end of the field (maximum length), or you select the stop sign and press the pushbutton.

7.3. ON SCREEN DISPLAY – MAIN MENU

Audio	Configuration of the parameters associated with audio de-multiplexing and the analog audio outputs.
Video/SID	Controls for the operation of video processing.
Bar graphs	Configuration of the audio level and phase bar graphs.
On-screen display configuration	Positioning controls and the on/off state of all windows and bar graphs. Configuration of the text window colours and opacity levels. Configuration of the GPI functions and how they affect the window and bar graph displays.
GPO configuration	Configuration of the General Purpose Outputs.
Fault definitions	Definition of the fault conditions. Configuration of the fault message windows.
Utilities	Card preset management and various debug and maintenance features.
Clear faults and peaks	An easy to access “clear fault state and bar graph peaks” command.

The OSD menu is arranged in a layered structure that groups similar configuration items together. The following section gives a brief description of the first level of menus that appear when you enter the OSD screens. Selecting one of these items will take you to the next menu level. Sections 7.4 to 7.11 provide detailed descriptions of each of the sub-menus. The tables in sections 7.4 to 7.11 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

7.4. CONFIGURING THE AUDIO CONTROLS

The *Audio* menus are used to configure parameters associated with the audio demultiplexing and the analog audio outputs. The chart below shows the items available in the *Audio* menu. Sections 7.4.1 to 7.4.5 give detailed information about each of the parameters. Many of the menu items are the same for the channel 1/2 and 3/4 channel pairs. For simplicity only the menu items for the channel 1/2 channel pair are shown in the manual.

Audio source	Selects the source of audio to process.
Ch1/ch2 swap	Controls whether channel 1 and 2 (L/R) outputs will be swapped.
Ch3/ch4 swap	Controls whether channel 3 and 4 (L/R) outputs will be swapped.
Ch1/ch2 output mode	Controls whether channel 1 and 2 will be treated as a stereo pair or will be added to make mono outputs.
Ch3/ch4 output mode	Controls whether channel 3 and 4 will be treated as a stereo pair or will be added to make mono outputs.
Ch1/ch2 peak output level	Controls channel 1 and 2 output level when a 0 dB FS input is applied (1 dB increments).
Ch3/ch4 peak output level	Controls channel 3 and 4 output level when a 0 dB FS input is applied (1 dB increments).
Fine ch 1 adjust	Channel 1 fine level control.
Fine ch 2 adjust	Channel 2 fine level control.
Fine ch 3 adjust	Channel 3 fine level control.
Fine ch 4 adjust	Channel 4 fine level control.

7.4.1. Selecting the Audio Source to Monitor

Audio
- *Audio source*
  - *Group 1*
  - *Group 2*
  - *Group 3*
  - *Group 4*
  - *(Extern AES/EBU)*

Up to 4 groups of audio may be embedded in the incoming SDI video. This control selects which one of the four to monitor. There are four green LEDs under the PCB to indicate which of the four groups are currently present on the input video.

It is this group that is delivered to both the audio bar graph displays and the audio output section of the card.

Only if the card has external AES/EBU inputs is *Extern AES/EBU* option available.

7.4.2. Swapping the Audio Channels of a Channel Pair

Audio
Ch1/ch2 swap
No Yes

This control, if set to *Yes*, routes the two channels or a channel pair to the opposite channel output of the pair.

7.4.3. Selecting Whether A Channel Pair Is Monitored In Stereo Or Mono

Audio
Ch1/ch2 output mode
Stereo Mono

This control, if set to *Mono*, adds the two channels of the pair, reduces the summed amplitude by 2 (to keep consistent operating levels), and routes this mono signal to both analog audio outputs or the channel pair.

7.4.4. Setting the Analog Peak Audio Output Level for a Channel Pair

This parameter can also be set from the *Bar Graphs* menu. See section 7.6.3.

Audio
Ch1/ch2 peak output level
8 to 24 dBu 14 dBu

This control sets the analog audio outputs of a channel pair to the desired operating level in 1 dB increments. The value selected corresponds to the output level when a 0 dB FS input signal is applied. To adjust the levels independently, or to fine tune the levels, use the *Fine* controls for the respective channels.

7.4.5. Setting the Analog Levels - Fine Adjust

There are 4 menu items to adjust the levels of each of the analog audio outputs. For simplicity only the menu for channel 1 will be shown in the manual.

Audio
Fine ch1 adjust
-128 to 127 0

The channel output level is adjusted with this control. It has a range of approximately +/- 3 dB with 15mdB resolution.

7.5. CONFIGURING THE VIDEO AND SOURCE ID CONTROLS

The *Video/SID* menus are used to configure parameters associated with the video input and output functions and the Source ID decoders. The chart below shows the items available in the *Video/SID* menu. Sections 7.5.1 to 7.5.8 give detailed information about each of the parameters.

Video standard	Selects the input video standard.
Loss of video	Selects the action to take when the input video is missing.
NTSC setup pedestal	Selects whether the NTSC 7.5 IRE pedestal will be enabled on the composite analog output.
Composite display mode	Selects whether the composite analog output will be colour or monochrome.
525 VITC line	Sets the line number for decoding Vertical Interval Time Code in 525-line video.
625 VITC line	Sets the line number for decoding Vertical Interval Time Code in 625-line video.
525 PESA line	Sets the line number for decoding PESA format Source ID in 525-line video.
625 PESA line	Sets the line number for decoding PESA format Source ID in 625-line video.
Default SID mode	Selects whether the Default SID message will be shown when there is no source ID on the incoming video.
Default SID msg	Sets the message that will be shown when *Default SID mode* is enabled and the SID window is turned On.

7.5.1. Setting the Video Standard

Video/SID *Video standard* *525* *625* *Auto*	The video line standard is selected with this control. If set to *Auto* mode, the card will adjust operation as needed for the incoming standard.

7.5.2. Selects the Action to Take when Input Video Is Missing

Video/SID *Loss of video* *Pass* *Black*	The user can either have the output video go to black or pass whatever data is at the input.

7.5.3. Setting the NTSC Setup Pedestal

Video/SID *NTSC setup pedestal* *On* *Off*	The setup pedestal should not be present when operating in Japan. This control allows it to be removed.

7.5.4. Setting the Composite Display Mode – Colour or Monochrome

Video/SID
- *Composite display mode*
  - *Colour*
  - *B/W*

If monochrome operation is desired on the composite output, colour may be turned off with this control.

7.5.5. Setting the VITC Line Number – 525 Line Video

Video/SID
- *525 VITC line*
  - *10 to 32*
  - *10*

With this control, set the VBI line number that contains the VITC information when operating in 525 video mode.

If the VITC contains Source ID (SID) information, the AVM will automatically decode it, and turn on the SID window if the user has enabled this window (see "GPI, GPO and Window State Setup").

If the wrong line number is set, no time code (or SID) will be decoded.

7.5.6. Setting the VITC Line Number – 625 Line Video

Video/SID
- *625 VITC line*
  - *6 to 32*
  - *10*

With this control, set the VBI line number that contains the VITC information when operating in 625 video mode.

If the VITC contains Source ID (SID) information, the AVM will automatically decode it, and turn on the SID window if the user has enabled this feature (see "GPI, GPO and Window State Setup").

If the wrong line number is set, no time code (or SID) will be decoded.

7.5.7. Setting the PESA Source ID Line Number – 525 Line Video

Video/SID
- *525 PESA line*
  - *10 to 21*
  - *11*

With this control, set the VBI line number that contains the PESA SID information when operating in 525 video mode. If the wrong line number is set, no SID will be decoded.

7.5.8. Setting the PESA Source ID Line Number – 625 Line Video

Video/SID
- *625 PESA line*
  - *7 to 22*
  - *11*

With this control, set the VBI line number that contains the PESA SID information when operating in 625 video mode. If the wrong line number is set, no SID will be decoded.

7.5.9. Setting the Default SID Mode

Video/SID	
Default SID mode	
	Disable Enable

Determines if the Default SID message will be displayed in the SID window when there is no incoming source ID on the VITC.

Set to *Disable* to blank the SID window when there is no incoming source ID.

Set to *Enable* to show the Default SID message in the SID window when there is no incoming source ID. The SID window must also be turned On to display the default SID message. See section 7.7.5 for information on turning the SID window On.

7.5.10. Setting the Message to be Displayed When there is No Incoming SID

Video/SID	
Default SID msg	
	No SID

This control sets the message that will be displayed in the SID window when there is no incoming source ID on the VITC. The text of the message can be changed. See section 7.2 for information on changing text fields.

7.6. CONFIGURING THE BAR GRAPH CONTROLS

The *Bar Graphs* menu items deal with the configuration and operation of the audio bar graphs; modes, ballistics, display properties, etc. The chart below shows the items available in the *Bar Graphs* menu. Sections 7.6.1 to 7.6.16 give detailed information about each configuration item for the audio bar graphs. Sections 7.6.1 to 7.6.4 show the items in the bar graphs 1 and 2 menu tree. These sections apply also to the items in the bar graph 3 and 4 menu tree. Sections 7.6.14 to 7.6.16 apply globally to all bar graphs.

Bar graphs 1 and 2	Setup items for bar graphs 1 and 2.
Bar graphs 3 and 4	Setup items for bar graphs 3 and 4.
Size	Sets bar graph size.
Background opacity	Sets the background opacity or how much video picture content will be visible through the bar graph backgrounds.
Bars opacity	Sets the background opacity or how much video picture content will be visible through the bar graph bars.

7.6.1. Selecting the Bar Graph Operating Mode

Bar graphs		
Bar graphs 1 and 2		
	Bar mode	
		Normal, Sum + diff

In *Normal* mode, stereo bar graphs are displayed.

In *Sum + diff* mode, bar graph 1 is the absolute value of the sum of both channels and bar graph 2 displays the absolute value of the magnitude of the difference of the two signals.

7.6.2. Setting the Headroom

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Headroom*
      - *0 to 30db*
      - *0db*

The *headroom* is the level difference between a maximum amplitude signal that can be represented in the digital input (this is called 0 dB FS or 0 dB Full Scale) to a nominal, user defined operating level, represented in Decibels. In modern digital studios and broadcast stations this is on the order of 20 dB.

This control is used to position the 0 dB point for the VU and PPM meters (excluding AES/EBU ballistics mode that always uses 0 dB FS). For example, if you set this control to 15dB and input a signal that is –15 dB FS, then the bar graph top will be at 0dB. If you are in PPM mode with AES/EBU ballistics, then the meter will read –15dB. When you adjust this level, you are also changing the 0dBr or program reference point on the bar graphs to maintain the relationship:

PGM. Ref. + headroom = peak output level

This value should be set first. After you set the headroom and select the bar type/mode, you can adjust the bar graph coloured area sizes with the *Error region* and *Warning region* controls.

7.6.3. Setting the Analog Peak Audio Output Level

This parameter can also be set from the *Audio* Menu. See section 7.4.4 and 7.4.5

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Ch.1/ch2 peak output level*
      - *8 to 24dBu*
      - *14dBu*

This control sets the channel 1 and 2 analog audio outputs to the desired operating level. The value selected corresponds to the output level when a 0 dB FS input signal is applied. When you adjust this level, you are also changing the 0 dBr or program reference point on the bar graphs to maintain the relationship:

PGM. ref. + headroom = peak output level

7.6.4. Setting the Bar Graph Type

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Bar type*
      - *PPM*
      - *PPM peak*
      - *VU*
      - *VU peak*
      - *VU PPM*

This control sets the bar graph to one of five basic types. The ballistics and display characteristics of the bar graphs are configured with other items in this section of the menu structure

PPM:
Peak Program Meter tracks the peaks of the audio content rather than the perceived loudness or the power content of the material.

PPM with peak hold: (PPM peak)
The peak hold feature allows the user to keep track of the audio peak. A floating mark is pushed up by audio peaks and is reset with either a programmed GPI input (see the section on “GPI, GPO and Text Window Setup”) or a menu command (see the “Clear Faults” menu).

VU:
Volume Unit meter follows, approximately, the perceived loudness of human hearing.

VU with peak hold: (VU peak)
The peak hold feature allows the user to keep track of the peak VU reading. A floating mark is pushed up by audio VU peaks and is reset with either a programmed GPI input (see the section on “GPI, GPO and Text Window Setup”) or a menu command (see the “Clear Faults” menu).

VU with floating PPM: (VU PPM)
This mode displays both VU levels and PPM levels on the same bar graph. The VU level is indicated by the solid bar going up and down, while the PPM reading is indicated by a floating white bar. The scale displayed is a decibel scale with 0 corresponding to program reference level (for all modes except AES/EBU).

7.6.5. Setting the PPM Mode and Ballistics

Bar graphs
- *Bar graphs 1 and 2*
  - *PPM mode*
    - *DIN*
    - *BBC*
    - *Nordic N9*
    - *AES/EBU*

This parameter selects one of four industry standard Peak Program Meter (PPM) display modes.

When one of these modes is selected, a number of items are set to adhere with predefined industry standards. The items affected include; meter attack time, meter decay time, min level displayed, max level displayed, analog reference (100%) level and, in some instances, region colouring and phase graph representation. Table 7-1 illustrates the values set by the standards.

Mode	*Attack Time*	*Decay Time*	*Ref. Level*	*Min Level*	*Max Level*	*Peak Output Level*	*Notes*
DIN 45 406 (IRT Rec. 3/6)	10 ms	1.5 sec for 20 dB	6 dBu	-50 dB	5 dB	6 + headroom	1 dB per div until –10 dB, logarithmic to bottom -50dB. Associated DIN phase correlation scale: • both the same => 1 r, • only 1 signal => 0 r, • both out of phase => -1r.
BBC 55428 part 9	12 ms	2.8 sec for 7 to 1	8 dBu	1 -12 dB	7 +12 dB	8 + headroom	# 6 on the scale is the reference level
Nordic N9	5 ms	1.7 sec for 20 dB	6 dBu	-42 dB	+12 dB	6 + headroom	
AES/ EBU	1 sample period	1.5 sec for 20 dB	User defined	-60 dB	0 dB	User defined	100% reading is user definable. 0 dB corresponds to 0 dB FS.

Table 7-1: PPM Bar Graph Characteristics

Note: The phase correlation scale on the DIN type is different from our other phase indicators (*Sum* + *Diff* and phase bar graphs).

7.6.6. Setting the VU Display Range

Bar graphs
Bar graphs 1 and 2
VU range
Normal
Extended

This parameter selects the VU display range when VU modes are active

Most VU meters have two possible ranges. These are:

Normal range: +3 to –20dB
Extended range: +3 to –57dB

The bar graphs will be re-scaled to represent the selected range.

When using VU and BBC PPM mode, the VU scale is truncated to –6dB to match the scaling of BBC mode.

7.6.7. Setting the Phase Bar Graph Type

Bar graphs
Bar graphs 1 and 2
Phase type
Stereo
DIN

There are two types of phase bar graphs available: one that has a focus of presenting the amount and L/R distribution of stereo content (STEREO), and one that presents in-phase/out-of-phase proportions (DIN).

7.6.8. Setting the Bar Graph Error Region

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Error region*
      - *-1 to –20 dB FS*
      - *-6 dB FS*

The bar graph "error" region is the area from clipping (0 dB FS) down to the level selected by this control. It is intended to tell the user when the audio signal is getting close to clipping.

Warning:
Some bar graph types (and ballistics) have this region defined. When you select one of these types, this value will automatically be set. After you choose the type, you can adjust this value to your desired level.

7.6.9. Setting the Bar Graph Warning Region

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Warning region*
      - *-2 to –40 dB FS*
      - *-20 dB FS*

The bar graph "warning" region is the area between the "OK" region and the "error" region. It is intended to indicate when the audio level is approaching the "error" region. This control sets the bottom of the "warning" region. Normally, it is set to the audio program level. The upper boundary of this region is always set with the "error" region control.

This value can not be higher than the "error" region value. If the "error" region is lowered below the value of this parameter, the "warning" region will also be lowered.

Warning:
Some bar graph types (and ballistics) have this region defined. When you select one of these types, this value will automatically be set. After you choose the type, you can adjust this value to your desired level.

7.6.10. Setting the Level Bar Graph Scale Position

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Scale position*
      - *Off*
      - *Left*
      - *Right*

This control allows you to enable and position the level bar graph scale tick marks and the scale labels with respect to the bar itself. When off, there will not be any ticks or numerical labels while left or right will position them to the left or the right of the graphs respectively.

If a combination VU/PPM mode is selected, then "left" will select VU scale on the left, PPM scale on the right and "right" will select VU scale on the right and PPM scale on the left.

7.6.11. Setting the Phase Bar Graph Scale Position

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Phase scale*
      - *Top*
      - *Bottom*
      - *None*

This control allows you to enable and position the phase bar graph scale tick marks and the scale labels with respect to the bar itself. When off, there will not be any ticks or numerical labels while top or bottom will position them to the top or the bottom of the phase bar graph respectively.

7.6.12. Setting the Window And Bar Graph Positions

Bar graphs
Bar graphs 1 and 2
Window position

This control allows you to change the window positions of all AVM windows and bar graphs. The window positions can also be set from the *Window position* menu item on the *On-screen display configuration menu.* See sections 7.7.2 to 7.7.4 for detailed information on the position of the windows and bar graphs.

7.6.13. Setting the Colours of the Bar Graphs

Each of the level bar graphs consists of three regions: the “OK”, “Warning” and “Error” regions. The *Colours* menu items allow you to select one of a group of standard colours, or choose your own custom colours for each of the regions. The controls for each region operate the same way so for simplicity only the controls for the OK region will be shown in the manual.

Tip: The colours of the various regions are defined by three 8 bit R, G, B values very similar to the values used in most paint programs like Microsoft Paint. When you choose one of the predefined colours, the AVM automatically sets the R, G, and B values. If you choose the custom colour, you will be able to set the R, G, and B values independently to give you the desired colour. If you are having problems setting these values with the menu system, open a paint program, select the colour you like (usually from a colour wheel) and set the R, G, and B values into the AVM card using the respective *Custom colour* menu items for the region.

7.6.13.1. Setting the Level Bar Graph Region Colour

Bar graphs
Bar graphs 1 and 2
Colours
OK region
White
Black
Grey
Yellow
Red
Green
Custom…

This control sets the colour of the bottom, “OK”, region of level bar graphs. You can choose from one of the predefined colours or define a custom colour.

7.6.13.1.1. Selecting a Bar Graph Region Custom Colour

There are three menu items used to set the custom colour. The menu item for each colour component works in the same way so for simplicity only the menu item for the *Red* component will be shown in the manual.

Bar graphs
Bar graphs 1 and 2
Colours
Custom ok red:
0 to 255

This control defines one of the component colours for a custom colour for one of the regions of level bar graphs.

When the menu item is selected you are shown a screen which shows all three colour components, with an arrow (<) to the right of the colour component you will be adjusting. In addition you are shown two boxes on the screen, which show you the current custom colour value to aid you in selecting the desired colour. The box on the left side of the screen shows the colour with the bar graph background opacity value applied, while the box on the right shows the colour with the bar graph bar opacity value applied.

7.6.14. Setting the Level Bar Graph Size

Bar graphs
Size
Small
Big

This control sets the vertical size of the level bar graphs.

Two sizes of bar graphs are available. The *Big* size is about ¾ of the screen height while the *Small* size is about ½ of the screen height.

7.6.15. Setting the Transparency (Opacity) of Bar Graph Background

Bar graphs
Background opacity
0 to 64
32

This control sets the bar graph background opacity or how much video picture content will be visible through the bar graph backgrounds.

When set to the minimum value, very little of the bar graph background colour will be visible over the video content. At the maximum value, very little of the background video will be visible through the bar graph.

7.6.16. Setting the Transparency (Opacity) of the Bar Graph Bars

Bar graphs
Bars opacity
0 to 64
64

This control sets the bar graph foreground opacity or how much video picture content will be visible through the bar graph backgrounds.

When set to the minimum value, very little of the bar graph colour will be visible over the video content. At the maximum value, very little of the background video will be visible through the bar graph.

7.7. CONFIGURING THE ON-SCREEN DISPLAY CONTROLS

The *On-screen display configuration* menu items is used to configure the position and display characteristics of the text windows. It is also used to program the GPIs, and the on/off states of the text and bar graph windows. The chart below shows the items available in the *On-screen display configuration* menu. Sections 7.7.1 to 7.7.7 give detailed information about each of the menu items.

Window position	Controls used to position each one of the On Screen windows.
Window enable	Controls used to configure the GPI functions, and the on/off states of the text and bar graph windows.
Text windows	Controls used to set the text style, background colour and opacity for the On screen windows.

When many windows are turned on, the on-screen information can get very crowded. The bar graphs and text windows are layered to keep the most important information from being covered by other not-so important windows. The priority is as follows:

Priority Level	Display Type
1 (top)	Fault Messages
2	Time Code Source ID Program Rating XDS
3	Status window
4	Phase bar graphs
5 (bottom)	Level bar graphs

7.7.1. Descriptions of the AVM On Screen Windows

7.7.1.1. Video/Audio Status

The purpose of the Video/Audio status screen is to show as much status information about the video and audio as possible in a small, concise table. Table 7-2 shows each item that may appear in the status screen. The Status window may be operated on one of two modes. In *normal* mode, all lines are controlled by the text window attributes. In *Fault* mode, those lines whose associated fault triggers are used to activate an AVM fault, will be displayed using fault window properties. All other lines use the text window properties. If the Status window is enabled by an AVM fault, only those lines associated with the fault triggers that enable the fault window will be displayed using fault window properties. All other lines use text window properties.

Item	*Value(s)*	*Description*
Video	525 625 Not present	Input video standard detected regardless of what the card is configured to process.
Picture Content	Moving Frozen Frozen, black	Shows the status of the picture content. Shows *moving* if the picture is active, *frozen* if the card detects no motion, or *frozen, black* if the picture is black.
EDH	FF: checksum, AP: checksum Not present	The EDH checksums are periodically sampled and displayed.
VITC	TC Value Not present	If present, the time code value is displayed here.
SID	VITC or PESA SID value Not present	If present, the SID is displayed here. VITC SID has priority over PESA SID.
PR	Value Not present	The program rating of Closed Captioning is indicated, if present.
CC	Present Not present	The presence/absence of Closed Captioning is indicated.
Audio groups	None 1,2,3 or 4	All audio groups that are present are displayed. Note that the LED's under the PCB, near the card extractor also indicates which groups are present.
Audio channels	None 1,2,3 or 4	Displays which channels are present within selected Audio group.
Ch. 1 and 2	NA [(silent/over), (mono/out of phase)]	Status information about channels 1 and 2 are shown here.
Ch. 3 and 4	NA [(silent/over), (mono/out of phase)]	Status information about channels 3 and 4 are shown here.

Table 7-2: Video/Audio Status Screen Items

7.7.1.2. VITC Time Code Window

The VITC time code window shows the vertical interval time code present at the input to the AVM module. Use the VITC line select items on the Video menu to configure the lines that the AVM will use for reading VITC. (See sections 7.5.5 and 7.5.6 for information about setting the VITC line numbers.)

The VITC time code window cannot be positioned in the top half of the screen. The screen updates are performed in the top half of the screen, so if the window is positioned there, the time code will be displayed 1 field too late. The *TC window size* menu item controls whether the time code window will be displayed in the normal or large font size.

7.7.1.3. Program Rating Window

The Program rating window shows data decoded from the Line 21 XDS Program rating packet. The user to control the operation of V-Chip decoders in the viewer's receiver usually encodes this information. The *PR window size* menu item controls whether the time code window will be displayed in the normal or large font size. (Support for Canadian French and English program ratings has also been added.)

7.7.1.4. CC Window

The CC window is only available on AVM models that have an analog video output. It contains caption information from the CC1 data stream.

7.7.1.5. XDS Window

The XDS window contains 2 lines with the following information: network name, call letters, program name and time of day. Only the information found in the XDS stream will be displayed. An item is considered to be missing if it does not appear in the XDS stream for 15 seconds. There is no ability to trigger faults on the absence of XDS.

7.7.1.6. Source Identification Window

The AVM module has the ability to decode source identification (SID) information from the vertical interval time code present at the input to the AVM module. When no VITC SID is encoded, the AVM module will decode SID that has been encoded in the PESA format. The Source Identification window is used to display the decoded SID information. When there is neither VITC SID nor PESA SID encoded, the *Default SID message* will be displayed if *Default SID mode* is enabled, otherwise the SID window will be turned off. (See sections 7.5.9 and 7.5.10 for information about setting the *Default SID message*). Use the VITC line select items on the Video menu to configure the lines that the AVM will use for reading VITC. (See sections 7.5.5 and 7.5.6 for information about setting the VITC line numbers.) Use the PESA line select items on the Video menu to configure the lines that the AVM will use for reading PESA format source ID. (See sections 7.5.7 and 7.5.8 for information about setting the VITC line numbers.) The *SID window size* menu item controls whether the time code window will be displayed in the normal or large font size.

7.7.1.7. Fault Message Windows

The Fault 1 and Fault 2 window show user text messages when the Fault 1 or Fault 2 conditions are triggered. The Fault message windows have their own set of colour, opacity and size attributes, they can be set to come on steady or blinking and they contain fully programmable messages. See section 7.9 for more information on setting up the fault conditions and configuring the fault windows.

7.7.2. Setting the Position of On Screen Windows

To set the horizontal and vertical position of the Status, VITC, Program Rating, SID, or one of the Fault windows, use the *WINDOW H* and *WINDOW V* menu items for the respective window. The controls for all of the windows work in the same way so, for simplicity only the menu items for the *STATUS WINDOW* will be shown.

7.7.2.1. Setting the Horizontal Position of On Screen Windows

On-screen display configuration
- *Window position*
  - *Status window H*
    - *0 to 39*
    - *0*

The *Window H* position menu item sets the leftmost character position for the respective window.

When you select this parameter, the screen text will disappear and a box of the correct size will appear. Move it around to the desired position with the toggle switch. Press the pushbutton when done.

7.7.2.2. Setting the Vertical Position of On Screen Windows

On-screen display configuration
- *Window position*
  - *Status window V*
    - *0 to 19*
    - *0*

The *Window V* position menu item sets the top row for the respective window.

When you select this parameter, the screen text will disappear and a box of the correct size will appear. Move it around to the desired position with the toggle switch. Press the pushbutton when done.

7.7.3. Setting the Position of the Bar Graphs

To set the horizontal and vertical position of the Level bar graph pair 1/2 or 3/4 or the phase bar graph pair 1/2 or 3/4, use the *Level bar H* and *Level bar V* menu items for the respective bar graph. The controls for all of the bar graphs work in the same way so, for simplicity the menu item for the *Level bar graph 1/2* will be shown.

7.7.3.1. Setting the Horizontal Position of the Bar Graphs

On-screen display configuration
- *Window position*
  - *Level bar 1/2 H*
    - *0 to 39*
    - *0 (34)*

The *Bar H* position menu item sets the top row for the respective window.

When you select this parameter, the horizontal position of the respective bar graph can be adjusted. Move it around to the desired position with the toggle switch. Press the pushbutton when complete.

The default H position for Level bar ¾ is (34).

7.7.4. Setting the Vertical Position of the Bar Graphs

On-screen display configuration
- *Window position*
  - *Level bar 1/2 V*
    - *0 to 19*
    - *0*

The *Bar V* position menu item sets the top row for the respective window.

When you select this parameter, the vertical position of the respective bar graph can be adjusted. Move it around to the desired position with the toggle switch. Press the pushbutton when complete.

7.7.5. Selecting What Bar Graphs and Windows to Display (via "*Window enable*" menu item)

The AVM has two general purpose inputs that can be programmed to turn the Level or Phase bar graphs or the Status, VITC, Program Rating, SID, CC, or XDS windows on or off, and to clear the level bar graphs *PEAK HOLD* or the Fault Displays. The windows and bar graphs can also be turned permanently on or off. The *Window enable* menu item is used to program the GPIs, and the on/off states of the text and bar graph windows. To display the Fault windows use the *Fault condition* menu item on the *Fault definitions* menu. (See section 7.9.1.4)

When you select the *Window enable* menu item you are presented with a list of the possible functions that can be controlled using the GPIs as shown in Table 7-3. Select the desired function using the toggle switch. When the pushbutton is pressed, the cell cycles through the valid values for the field. Each of the windows and bar graph displays can be set to *On*, *Off* or *GPI*. When set to *On*, the corresponding window or bar graph is always displayed. When set to *Off*, the window or bar graph is always off. When set to *GPI*, the window will be on when the configured GPI is active. The GPI columns will either be blank or will

contain the *GPI1* or *GPI2*. When they are set to *GPI1* or *GPI2* the window will be turned on when the respective GPI goes active.

Note that the *Peak holds* and the *Clear faults* items can not be set to *On* or *Off*. They must be cleared with the GPI's or the main menu *Clear faults and peaks* menu item (see section 7.11).

Item	State	GPI1	GPI2	Fault 1	Fault 2
Ch 1/2 level bars					
Ch 3/4 level bars					
Ch 1/2 phase bars					
Ch 3/4 phase bars					
Ch 1/2 clear peak					
Ch 3/4 clear peak					
Status					
Time code					
Program Rating					
CC					
XDS					
SID					
Clear fault 1					
Clear fault 2					

Table 7-3: Methods of turning Windows and Bar graphs On and Off

7.7.6. Setting the Text Window Attributes

The On screen text windows can be displayed as white characters with or without a coloured background. In addition the text and background opacity or how much video picture content will be visible through the text or background is adjustable. The *Text window config* menu items are used to set these parameters for all the text windows except the Fault windows. See section 7.7.7 for information on setting the *Fault window* attributes.

7.7.6.1. Turning on the Text Window Backgrounds

On-screen display configuration
Text windows
Text window config
Text type
White on BG
White with no BG

The text displayed in the Text windows may either have a background box or if too much video information is hidden, it may be inserted with a thin black outline.

7.7.6.2. Setting the Text Window Background Colours

On-screen display configuration
Text windows
Text window config
Background colour
Black
Grey
Yellow
Red
Green

Select the desired background colour around the text in the Text windows.

7.7.6.3. Setting the Text Window Background Opacity

On-screen display configuration
Text windows
Text window config
Background opacity
0 to 64
32

This control sets the Text window background opacity or how much video picture content will be visible through the window background.

When set to the minimum value, very little of the window background colour will be visible over the video content. At the maximum value, very little of the background video will be visible through the window background.

7.7.6.4. Setting the Text Window Text Opacity

On-screen display configuration
Text windows
Text window config
Text opacity
0 to 64
64

This control sets the Text window text opacity or how much video picture content will be visible through the text characters.

When set to the minimum value, very little of the white window text will be visible over the video content. At the maximum value, very little of the background video will be visible through the white window text.

7.7.6.5. Setting the Time Code Window Font Size

On-screen display configuration
Text windows
Text window config
TC window size
Normal
Big

This control sets the font size of the VITC time code window.

When it is set to *Big* the font size will be double the height and width of the *Normal* font size.

7.7.6.6. Setting the Program Rating Window Font Size

On-screen display configuration
Text windows
Text window config
PR window size
Normal
Big

This control sets the font size of the program rating window.

When it is set to *Big* the font size will be double the height and width of the *Normal* font size.

7.7.6.7. Setting the Source ID Window Font Size

On-screen display configuration
Text windows
Text window config
SID window size
Normal
Big

This control sets the font size of the source ID window.

When it is set to *Big* the font size will be double the height and width of the *Normal* font size.

7.7.6.8. Setting the Status Window Mode

On-screen display configuration
Text windows
Text window config
Status window mode
Normal
Fault

This control determines the display properties of the status window.

When it is set to *Normal* the status window will use the text window properties.

When it is set to *Fault*, items in the status window that have been selected for fault generation using the *Fault Trigger* menu item will use the *Fault window* properties when the fault is active. If either Fault 1 or Fault 2 triggering enables the status window, then only the faults that actually enabled the window will be shown in the *Fault window* properties. The rest of the items on the status window will be shown in the *Text window* properties.

For example, if "program rating" is set up as a fault trigger, and the rating disappears, then the "program rating" line of text on the status screen will take up the characteristics of the "fault text". Usually this is white text on a red background.

7.7.7. Setting the Fault Window Attributes

The On screen Fault windows can be displayed as white characters with or without a coloured background. In addition, the text and background opacity or how much video picture content will be visible through the text or background is adjustable. The *Fault window config* menu items are used to set these parameters for the Fault windows.

7.7.7.1. Turning on the Fault Window Backgrounds

On-screen display configuration
Text windows
Fault window config
Text type
White on BG
White with no BG

The text displayed in the fault window may either have a background box or if too much video information is hidden, it may be inserted with a thin black outline.

7.7.7.2. Setting the Fault Window Background Colours

On-screen display configuration
- *Text windows*
  - *Fault window config*
    - *Background colour*
      - *Black*
      - *Grey*
      - *Yellow*
      - *Red*
      - *Green*

Select the desired background colour around the text in the fault windows.

7.7.7.3. Setting the Fault Window Background Opacity

On-screen display configuration
- *Text windows*
  - *Fault window config*
    - *Background opacity*
      - *0 to 64*
      - *64*

This control sets the Fault window background opacity or how much video picture content will be visible through the window background.

When set to the minimum value, very little of the window background colour will be visible over the video content. At the maximum value, very little of the background video will be visible through the window background.

7.7.7.4. Setting the Fault Window Text Opacity

On-screen display configuration
- *Text windows*
  - *Fault window config*
    - *Text opacity*
      - *0 to 64*
      - *64*

This control sets the Fault window text opacity or how much video picture content will be visible through the text characters.

When set to the minimum value, very little of the white window text will be visible over the video content. At the maximum value, very little of the background video will be visible through the white window text.

7.7.7.5. Setting the Fault Window Font Size

Similar window size menu items are available for Fault 1 and Fault 2 windows.

On-screen display configuration
- *Text windows*
  - *Fault window config*
    - *Fault 1 window size*
      - *Normal*
      - *Big*

This control sets the font size of the program rating window.

When it is set to *Big* the font size will be double the height and width of the *Normal* font size.

7.7.7.6. Setting the Blink Mode of the Fault Windows

Similar blink mode menu items are available for the Fault 1 and Fault 2 windows.

On-screen display configuration
Text windows
Fault window config
Fault 1 blink
Disable
Enable

This control determines if the Fault 1 window will blink or be on solid when the fault is active.

When it is set to *Disable* the fault window will be on steady when it is active.

When it is set to *Enable* the fault window will blink when it is active.

7.8. GPO CONFIGURATION

The AVM module has a General Purpose output available on the high-density DB-15 connector which can be used to signal several conditions to the user. In addition this output can be configured to be active high or low. The 7700 frame also has a fault monitoring LED and general-purpose output. The user also has the ability to configure which faults the AVM will assert onto the frame status system. The *GPO configuration* menu contains the controls used to configure the GPOs. Sections 7.8.1 to 7.8.3 give detailed information about each of the menu items.

GPO1 active state	Controls whether the general-purpose output is active high or low.
GPO1 trigger	Controls what events will trigger the general-purpose output.
Frame stat trigger	Controls what events will trigger the Frame Status Fault line and the Fault Status LED.

7.8.1. Setting the General Purpose Output Active State

GPO configuration
GPO1 active state
High
Low

This control sets the output level for the active state of the General Purpose output.

NOTE: The output will power up in a high state until the software has had sufficient time to update the output with the appropriate condition.

7.8.2. Configuring Which Condition will Activate the General Purpose Output

GPO configuration
GPO1 trigger
None
Fault 1
Fault 2
Fault 1 or 2

This control configures what condition will cause the general-purpose output to go to the active state.

7.8.3. Frame Status Fault Trigger Condition

GPO configuration
- *Frame status trigger*
  - *None*
  - *Fault 1*
  - *Fault 2*
  - *Fault 1 or 2*

The 7700 frame has a global status line that any card can pull active. With this control, you can select the condition for the card to cause the line to go active. Also included on the frame status signal is card power supply monitoring. This is derived with hardware and can not be disabled from the status signal.

If it is desired to use this feature, the frame status jumper J22 (located near the card extractor) must also be set to the *On* position. See section 9.1

The Red *Local Fault* LED will be On when the global status line is active regardless of the position of jumper J22.

7.9. FAULT DEFINITIONS

When many windows are turned on, the on-screen information can get very crowded. The bar graphs and text windows are layered to keep the most important information from being covered by other not-so important windows. The Fault windows have the highest priority. The priority of the other windows is shown in section 7.7.

The *Fault definition* menu items are used to configure the fault settings, and the presentation of the fault conditions. The chart below shows the items available in the *Fault definition* menu. Sections 7.9.1 to 7.9.13 give detailed information about each configuration item for the fault definitions.

Fault condition 1	Controls used to configure the Fault Condition 1 display.
Fault condition 2	Controls used to configure the Fault Condition 2 display.
Fault window config	Controls used to set the Fault Window text style, background colour and opacity. These parameters may also be set using the *On-screen Display Text window* menu.
Video invalid duration	Sets the number of frames that the AVM will ignore for which the video fault condition message is not triggered.
EDH error duration	Sets the number of consecutive fields of EDH errors to consider as a fault.
Audio invalid duration	Sets the number of frames that the AVM will ignore for which audio fault condition message is not triggered.
Over level	Sets the level of audio over which is considered a fault or error condition.
Over duration	Sets the duration of audio, over the above level which is considered a fault.
Silence level	Sets the level of audio under which is considered silence.
Silence duration	Sets the duration of audio in seconds under the above level which is considered a fault.
Phase reversal level	Sets the level of L/R audio difference over which is considered phase reversal.
Phase reversal duration	Sets the duration of audio in seconds over the above phase reversal level which is considered a fault.
Mono threshold level	Sets the level of L/R audio difference under which is considered mono.
Mono duration	Sets the duration of mono audio in seconds which is considered a fault.
Loss of CC duration	Sets the duration, of no primary CC1 captions, in seconds which is considered a fault.
Loss of PR duration	Sets the duration, of no program rating XDS packet, in seconds which is considered a fault.
Picture noise level	Sets the approximate level of noise expected in the video signal feed. It is used by the freeze detect feature to distinguish motion from background noise on top of a video feed.
Freeze Duration	Sets the duration, of no picture activity above the *Picture noise level*, in seconds which is considered a fault.
Black Duration	Sets the duration, of no active picture content above 7 IRE, in seconds which is considered a fault.

7.9.1. Setting Up How A Fault Is Triggered And How It Is Presented

The AVM has two fault conditions that can be configured to warn the user of numerous conditions. The *Fault condition 1* and *Fault condition 2* menu items are used to configure when fault 1 or fault 2 is triggered, and how the fault should be presented. For audio mono, audio phase reversal and audio silence faults, fault triggers become active if the fault condition is active for the programmed fault duration. The fault trigger will deactivate within 1 second (user configurable, by default) once the fault condition is inactive. The controls for each fault condition operate the same way so, for simplicity, the manual shows only the menu items for *Fault condition 1*.

7.9.1.1. Fault Status

Fault definitions
- *Fault condition 1*
  - *Fault status*

This menu item displays a screen that shows the current status of all faults that can be used to define a fault condition.

7.9.1.2. Setting the position of the Fault Windows

Fault definitions
- *Fault condition 1*
  - *Window position*

This control allows you to change the window positions of all AVM windows and bar graphs. The window positions can also be set from the *Window position* menu item on the *On-screen display configuration menu.* See sections 7.7.2 to 7.7.4 for detailed information on positioning the windows and bar graphs.

7.9.1.3. Setting the Message Associated with a Fault

Fault definitions
- *Fault condition 1*
  - *Fault 1 message*
    - *Video error*

This control sets the message to display when the fault condition is active. The text of the message can be changed. See section 7.2 for information on changing text fields.

Default message for Fault 2 is “Audio error”.

7.9.1.4. Determining if the Fault Message will Be Displayed

Fault definitions
- *Fault condition 1*
  - *Fault 1 mode*
    - *Disable*
    - *Enable*

This control sets whether the fault message will be displayed when the fault condition is active.

When enabled, the fault message will be displayed until the condition is reset. When disabled, it will never be displayed. See section 7.9.1.5 for information on setting the duration of the fault condition.

7.9.1.5. Setting the Duration of the Fault Condition

Fault definitions
- *Fault condition 1*
  - *Fault duration*
    - *Until reset*
    - *1 to 254 frames*
    - *30 frames*

This control sets how long the fault condition will be held. The fault display will be displayed as long as the fault condition is active and the *Fault mode* is set to *Enable*. The fault condition can either be held until the user resets (via programmed GPI, using the Clear faults & peaks menu option or by pressing the toggle switch when not in a menu) the condition or until a programmable timer expires.

7.9.1.6. Determining What Items Will Generate The Fault Condition

Fault definitions
Fault condition 1

This control provides a list of items that may generate a fault condition. Use the toggle switch to travel up and down this list and the pushbutton to enable or disable the item from the fault condition criteria. Enabled items will be shown with a check mark.

A fault condition will exist when any of the selected items occurs.

Video invalid	Video absent or incorrect standard at input
Loss of audio	Audio absent on channels ½ AND ¾
Loss of audio ch ½	Audio absent on channels ½ (independent of *"Loss of audio"* setting)
Loss of audio ch ¾	Audio absent on channels ¾ (independent of *"Loss of audio"* setting)
AP EDH errors	Active picture EDH errors present
FF EDH errors	Full Field EDH errors present
Audio format error	Audio Format Errors
Phase reversal ½	Audio 1 and 2 out of phase
Phase reversal 3/4	Audio 3 and 4 out of phase
Audio over 1/2	Audio 1 or 2 over level
Audio over 3/4	Audio 3 or 4 over level
Audio silence 1/2	Audio 1 and 2 silent
Audio silence 3/4	Audio 3 and 4 silent
Audio mono 1/2	Audio 1 and 2 mono
Audio mono 3/4	Audio 3 and 4 mono
Loss of VITC	VITC absent
Loss of SID	SID absent
Loss of program rating	Program rating absent
Loss of CC	Primary CC1 Closed captioning absent
GPI1	General Purpose Input 1 closed to ground
GPI2	General Purpose Input 2 closed to ground
Picture Freeze	No activity above preset noise level in active picture
Picture Black	No active picture above 7 IRE

Table 7-4: Possible Error Conditions to Produce a Fault

7.9.2. Setting the Fault Window Attributes

The Fault windows can be displayed as white characters with or without a coloured background. In addition the text and background opacity or how much video picture content will be visible through the text or background is adjustable. The Fault window config menu items are used to set these parameters for the Fault windows.

Fault definitions
- *Fault window config*

This control is used to change the fault window colours. These parameters can also be set using the *Fault window config* menu items on the *On screen display* menu. See section 7.7.7 for a complete description of the *Fault window config* menu items.

7.9.3. Setting Video Invalid Duration

Upon hot-switches, a resulting glitch in the video signal can cause the AVM to momentarily report a video fault. This menu item allows the user to set a minimum duration (in frames) during which the AVM will ignore such glitches and not trigger a fault alert.

Fault definitions
- *Video invalid duration*
  - *0 to 255 frames*
  - *0*

This control sets the duration for which the AVM ignores glitches on the video signal thereby not displaying fault alert messages.

7.9.4. Error Detection and Handling (EDH) Error Duration

Fault definitions
- *EDH error duration*
  - *NA*
  - *1 to 127 fields*

A check sum is calculated for every field of video and compared to the same EDH check sum transmitted in the vertical interval. If the check sums do not match, then there was at least one bit error in the active picture area of the image.

With this control, you can set an error condition when a number of consecutive fields contain EDH errors. If set to NA, this type of fault detection is turned off. If set to 1, any "Error Detection and Handling" (EDH) error will generate an error while large numbers (>20) will effectively check the presence/absence of EDH encoding.

If the video signal has passed through hardware that has modified the picture (i.e. a vision mixer) without re-calculating the EDH check sums, then both full field and active picture errors will be generated. In that case, disable both full field and active picture error detection in the "Fault Definitions" above.

If the video signal has passed through hardware that has modified the ANC data area (i.e. audio multiplex) without re-calculating the EDH check sums, then full field errors will always be generated. In that case, disable full field error detection and use active picture only. Fore more information on Error Detection and Handling, see SMPTE RP-165.

7.9.5. Setting Loss of Audio Duration

Upon hot-switches, the resulting glitch in the video signal can also cause a corresponding glitch to occur in the audio signal. This can create a brief "Audio Error" message to trigger if "Loss of Audio" duration is set too low. To avoid such an error message, this menu option is used to set a minimum threshold duration (in frames) during which the AVM will ignore such glitches and not trigger a corresponding fault alert.

Fault definitions
Audio invalid duration
0 to 255 frames *0*

This control sets the duration for which the AVM ignores glitches on the audio signal thereby not displaying fault alert messages.

7.9.6. Detecting Audio Over Level Faults

The Over level and Over duration controls are used to detect when an audio amplitude is close to a dangerous level (i.e. clipping a downstream device, or saturating the digital word length). The Over level control sets the audio level over which there is considered to be a fault. The audio must be over this level for the duration set by the Over duration control before the fault condition exists. A fault will be generated when any channel has generated an over condition.

7.9.6.1. Setting the Audio Over Level

Fault definitions
Over level
-30dB to 0dB FS in 1/4dB increments *-6dB FS*

This control sets the audio level over which there is considered to be over level. This value is expressed in dB full scale (FS) and can even be used to detect digital clipping. If set to 0 dB FS, then if 3 or more consecutive samples (set with the duration control) are at digital saturation (max or min), then the digital word length has been exceeded.

7.9.6.2. Setting the Audio Over Duration

Fault definitions
Over duration
3 to 255 SAMPLES *3*

This control sets the duration, in number of consecutive samples that are at or above the *Over level* before a fault condition exists.

Note that as longer durations are configured, you are eliminating the detection of higher frequency content over the set *Over level*.

7.9.7. Detecting Audio Silence Faults

The *Silence level* and *Silence duration* controls are used to detect when the audio is considered to be silent. The *Silence level* control sets the audio level under which the audio is considered to be silent. The audio must be under the *Silence level* for the duration set by the *Silence duration* control before the fault condition exists. When the fault condition exists, the audio must be over the *Silence level* for 1 sec. before the fault condition will be removed. A fault will be generated when both channels in a pair (1 and 2 or 3 and 4) have satisfied a silence condition.

7.9.7.1. Setting the Audio Silence Level

Fault definitions
Silence level
-96dB to –20dB FS
-60dB FS

This control sets the audio level under which it is considered to be silent. This value is expressed in dB full scale (FS)

7.9.7.2. Setting the Audio Silence Duration

Fault definitions
Silence duration
0.5 to 127 sec
10 sec

This control sets the amount of time the audio is silent in seconds before a fault occurs.

7.9.8. Detecting Audio Phase Reversal Faults

All stereo audio material has a varying amount of phase difference between the two channels. If there is significant phase reversal for a period of time, then this is a sign that the audio signals may be out of phase.

The *Phase reversal level* and *Phase reversal duration* controls are used to detect when the left and right audio channels are considered to be out of phase. The *Phase reversal level* control sets the amount of phase difference that is considered to be out of phase. The audio must be out of phase by more than the *Phase reversal level* amount for the duration set by the *Phase reversal duration* control before the fault condition exists. When the fault condition is active, the audio must be out of phase by less than the *Phase reversal level* amount for 1 sec. before the fault condition will be removed.

7.9.8.1. Setting the Audio Phase Reversal Level

Fault definitions
Phase reversal level
0.5 to 1 in 0.01 increments
0.9

This control sets the amount of phase difference before the audio is considered to be out of phase. This phase reversal is calculated by comparing the difference of the two channels to the average of the two. If a signal is always out of phase, then the difference between the two will be high compared to the average of the two. This corresponds to 1 in this control.

If there is only content on one of the channels (i.e. left only or right only), then the difference is equivalent to the average of the two channels. This corresponds to 0.5 in this control.

7.9.8.2. Setting the Audio Phase Reversal Duration

Fault definitions
Phase reversal duration
0.5 to 127 sec
10 sec

This control sets the period over which to analyze the audio content for phase reversal.

Note that conditions of silence are not included in this value. This means that if the audio is 50% quiet then it will take twice the period set with this control to detect a phase reversal condition.

7.9.9. Detecting Audio Mono Faults

Mono audio material can take two forms: one channel with information and the other quiet or both channels with the same information. The AVM cards will detect both types of mono material.

If there is only a small amount of phase difference between the two channels (perhaps caused by the noise present on the audio) then the content may be mono. If there is no significant difference for a period of time, then this is a sign that the audio signals are mono.

Mono is detected by comparing the difference of the two channels to the average of the two. If a signal always has no out of phase information (or just a small amount) for a period of time, then the signal may be mono.

The *Mono threshold level* and *Mono duration* controls are used to detect when two audio channels are considered to be mono. The *Mono threshold level* control sets the threshold that decides whether the signals are the same. The audio difference must be less than the *Mono threshold level* amount for the duration set by the *Mono duration* control before the fault condition exists. When the fault condition exists, the audio difference must be more than the *Mono threshold level* amount for 1 sec. before the fault condition will be removed.

Material that is both mono and out of phase will be detected as being out of phase and not mono. Once the phase polarity is fixed, then the card will detect mono material.

7.9.9.1. Setting the Audio Mono Threshold Level

Fault definitions
Mono threshold level
0.2 to 0.5 in 0.01 increments
0.2

This control sets the level of L/R audio difference under which is considered mono.

0 corresponds to both channels being identical while 1 corresponds to both channels being exactly out of phase.

7.9.9.2. Setting the Audio Mono Duration

Fault definitions
Mono duration
0.5 to 127 sec
10 sec

This control sets the duration of mono audio in seconds, which is considered a fault.

7.9.10. Detecting Loss of Primary Captioning

Fault definitions
Loss of CC duration
2 to 512 sec in 2 sec increments
180 sec

This control sets the amount of time in seconds with no primary CC1 captions encoded, which is considered a fault.

This fault condition will also be generated if the closed caption signal is missing on the input video.

7.9.11. Detecting Loss of Program Rating Duration

Fault definitions
Loss of PR duration
1 to 255 sec *30 sec*

This control sets the amount of time in seconds with no program rating packet encoded in the Line 21 XDS data stream, which is considered a fault.

This fault condition will also be generated if the closed caption signal is missing on the input video.

7.9.12. Detecting Picture Freeze

The *Picture noise level* and *Picture freeze duration* controls are used to detect when a video picture is considered frozen. The *Picture noise level* control sets the threshold that decides whether activity in the picture is considered to be noise. The picture activity must be greater than this amount for the duration set by the *Picture freeze duration* control before the fault condition exists.

7.9.12.1. Setting the Picture Noise Level

Fault definitions
Picture noise level
1 to 10 *9*

This control sets the approximate level of noise expected in the video signal feed. It is used by the freeze detect feature to distinguish motion from background noise on top of a video feed.

As a guide, here are some signal to noise ratio comparisons:
1 = digital freeze (no noise on top of frozen picture)
10 = 40 dB SNR

7.9.12.2. Setting the Picture Freeze Duration

Fault definitions
Picture freeze duration
6 to 902 frames (in 4 frame increments) *302 frames*

This control sets duration, in frames, of video activity under the *Picture noise level* that is considered a fault.

When increasing *Picture noise level*, it is recommended that you increase *Picture freeze duration* as well. This is because the higher the Picture noise level, the lower is equipment's motion sensitivity, thus long periods without significant on-screen movement are more likely to trigger a "false" freeze alarm.

7.9.12.3. Optimizing the Picture Noise Level and Picture Freeze Duration Parameters

Setting up the optimum *Picture noise level* and *Picture freeze duration* parameters will depend on the amount of noise in the video path from the first equipment with freeze-frame capability to the monitoring point. The system designer should determine the maximum amount of time permissible between the moment of freeze and the alarm.

Setting this time as high as tolerable has two benefits:

- It lowers the frequency of "false" freeze alarms generated when a perfectly valid content contains long motionless periods.
- It allows raising the *Picture noise level* parameter, without increasing frequency of "false" freeze alarms.

It is suggested that *Picture noise level* should be set after setting the *Picture freeze duration*.

If the video path is fully digital, then set the *Picture noise level* depending on bit-error rate of the link as follows:

- For bit-error rates less than 1 in 10^{E-12}, set value in the range of 1 to 5
- For bit-error rates greater than 1 in 10^{E-12}, set value in the range of 6 to 10

If the path is even partially analog and if the user can place the equipment farthest upstream in the video path to go to a 'freeze frame' mode, then the *Picture noise level* should be optimized by initiating the 'freeze frame' mode in the upstream equipment and adjusting *Picture noise level* as low as possible, without losing the freeze alarm on the AVM. The user should note that because of the random nature of noise, the freeze alarm might be intermittent at some *Picture noise level* settings. The optimal *Picture noise level* setting is obtained when the loss of freeze alarm in the AVM occurs no more then once every 5 minutes.

If the path is even partially analog and the equipment farthest upstream in the video path cannot go to a 'freeze frame' mode, then *Picture noise level* should be optimized by adjusting it as high as possible. If you trigger false freeze alarms more often than acceptable lower the *Picture noise level* setting. Since the acceptable rate could be on the order of a day perhaps (depending on the facility), this adjustment procedure may consume a couple of days.

Failing to accomplish optimal adjustment of the *Picture noise level* will result in either:

- A large number of false alarms, or
- Lack of alarm condition when the video is frozen.

The *Picture noise level* and *Picture freeze duration* controls have been designed to be able to detect short-term "digital" freezes such as MPEG or motion JPEG server artifacts. When these devices have a significant problem with the content that they are de-compressing, they will typically start to produce a "blocky" effect. If the problem is severe enough, they will freeze a frame of video and play it out for a number of frames. With the *Picture noise level* set to 1 (i.e. only detect exact, or nearly exact pictures) and the *Picture freeze duration* set to *minimum*, the AVM can detect these quick "digital freezes". You cannot however detect both this type of freeze and a freeze from a link that has added noise to the picture.

7.9.13. Detecting Picture Black Duration

Fault definitions
Picture black duration
4 to 900 frames (in 4 frame increments)
88 frames

This control sets duration, in frames, of active picture content below 7 IRE that is considered a fault.

A Fault is generated when the video level within the active picture area falls below the preset black level (7 IRE) and remains for the specified duration.

7.10. UTILITIES

7.10.1. Accessing Information About this Module and its Firmware

Utilities
  About…

This menu item list some basic information about this module and the firmware residing within it. It gives quick access to information about revisions that can be used to determine when upgrades are required.

7.10.2. Data Logging

Data logging is performed through the rear serial port. Since standard ASCII text is used, the fault data is human readable. Any PC running a terminal program can be used to view the log data or save the data logs to disk, providing a permanent report of any errors that existed over a specific period of time. When faults are logged on the serial port an event stamp accompanies them from incoming VITC or from an internal clock.

There are 2 data logging options which can be enabled separately or at the same time:

- Periodically output card status
- Output fault data on a fault status change

The data logging serial port operates at 57600 baud, 8 bits, no parity, 2 stop bits and no flow control. See section 2.2.4 for information on connecting the serial port to your computer.

7.10.2.1. Setting the Status Poll Polling Rate

Utilities
  Data logging
    Status poll setup
      Poll rate
        1 to 60 min
        1 min

This control sets the rate at which card status is sent out the rear serial port when Status logging is enabled.

The status includes all items from the status window, AP and FF EDH error states, and the audio format error state.

7.10.2.2. Outputting the Module Status at Any Time

Utilities
  Data logging
    Status poll setup
      Query status
        Yes
        No

This menu item is used to output the card status regardless of whether the polling rate timer has expired. Each time the *Query status* menu item is set to *Yes*, the card status is output on the serial port.

7.10.2.3. Selecting the Fault Log Event Stamp Mode

Utilities
Data logging
Fault log setup
Event stamp mode
Free run,
VITC

When a fault state changes, the AVM will event stamp the fault log output. This control selects whether the AVM will use VITC (if present) or an internal, free-running clock to event stamp the fault log.

Note: This event stamp does not necessarily have any relation to real time but is designed to be a relative indication of when faults occur.

7.10.2.4. Selecting the Fault Data Logging Mode

Utilities
Data logging
Fault log
Disable
Enable

This control selects whether or not fault log data should be sent out the serial port.

When Fault logging is enabled, a text message is sent out the serial port when a fault condition changes.

7.10.2.5. Enabling the Status Logging Output

Utilities
Data logging
Status log
Disable
Enable

This control selects whether or not status log data should be sent out the serial port.

When Status logging is enabled, text messages representing the current status of the 7760AVM are sent out the serial port at the poll rate specified in the *Status poll rate* menu item. (See section 7.10.2.1)

7.10.2.6. Setting the Data Logging ID

Utilities
Data logging
Card ID
7760AVM

All data logs include a text string that can be used to uniquely identify a 7760AVM-X card.

This menu item is used to set the text string. See section 7.2 for information on changing text fields.

7.10.2.7. Setting the Time Stamp Clock

Utilities
Data logging
Event stamp
Current time

This control shows and sets the current state of the free-running clock (*Current time*).

7.10.3. Saving And Recalling AVM Configurations

The AVM modules provide two user preset areas to save the complete set of control from the on screen menu. The *Store preset* and *Recall preset* menu items are used to save and recall these configurations.

In addition, you can use the AVM *ConfigWare* software provided with your AVM card to save and recall an unlimited number of configurations using a PC running Windows 9 or later version. The AVM *ConfigWare* software also allows you to transport a configuration from one card to another. For information on using the AVM *ConfigWare* utility see section 8.

For simplicity the following sections of the manual show how to store and recall from Preset 1 only.

7.10.3.1. Storing AVM Configurations to the User Presets

Utilities
Store preset 1
Store
Cancel

This control is used to initiate a store of the current card configuration into one of the user presets.

After selecting the store preset operation, you must change the command to *Store* and press the pushbutton before the store will take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

7.10.3.2. Recall AVM Configurations from the User Presets

Utilities
Recall preset 1
Recall,
Cancel

This control is used to initiate a recall of the current card configuration from one of the user presets.

After selecting the recall preset operation, you must change the command to *Recall* and press the pushbutton before the store will take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

Warning: There will be a slight disturbance in the operation of the card and the on-screen display while the new preset is being recalled.

Warning: The current state of the card will be forgotten if it has not been saved to a preset before a recall is performed.

7.10.4. Initiating a Software Upgrade

- *Utilities*
  - *Upgrade*
    - *Yes*
    - *Cancel*

This menu item is used to initiate an upgrade of the module software.

In addition to the software upgrade support detailed in this manual (See the *Upgrading Firmware* section of this manual for more information), you can initiate an upgrade with this command. This will allow you to upgrade the software without unplugging the card and changing the upgrade jumper.

After selecting the upgrade operation, you must change the command to *Yes* and press the pushbutton before the upgrade can take place. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

After the upgrade has finished, the unit will automatically restart and run in normal operating mode.

7.10.5. Restoring the AVM to its Factory Default Configuration

- *Utilities*
  - *Factory reset*
    - *Yes*
    - *Cancel*

This menu item is used to restore all controls back to their factory defaults.

After selecting the reset operation, you must change the command to *Yes* and press the pushbutton before the command takes place. After the command, all parameters will be set to their factory default. You can abort the operation by pressing the pushbutton when *Cancel* is displayed.

7.11. CLEAR FAULTS AND PEAKS

- *Clear faults and peaks*
  - *Clear,*
  - *Cancel*

This menu item on the top level menu provides a convenient method to clear any fault conditions and reset audio peak holds. You can also perform the clear by pressing the toggle switch up or down when not in the menu structure or using a GPI if it is programmed to do so.

8. CONFIGURATION USING AVM ConfigWare SOFTWARE

A companion application software called *AVM ConfigWare* was shipped with your order of AVM cards. This software not only allows you to copy configurations from card to card using a standard PC computer, but also allows you to configure the card using a simple, user-friendly windows interface. Furthermore, *AVM ConfigWare* allows you to maintain more configurations than the two presets available on the card as well as make backup copies of these configurations.

For set-up and use instructions, please consult the Help file on the *AVM ConfigWare* application software.

9. JUMPERS

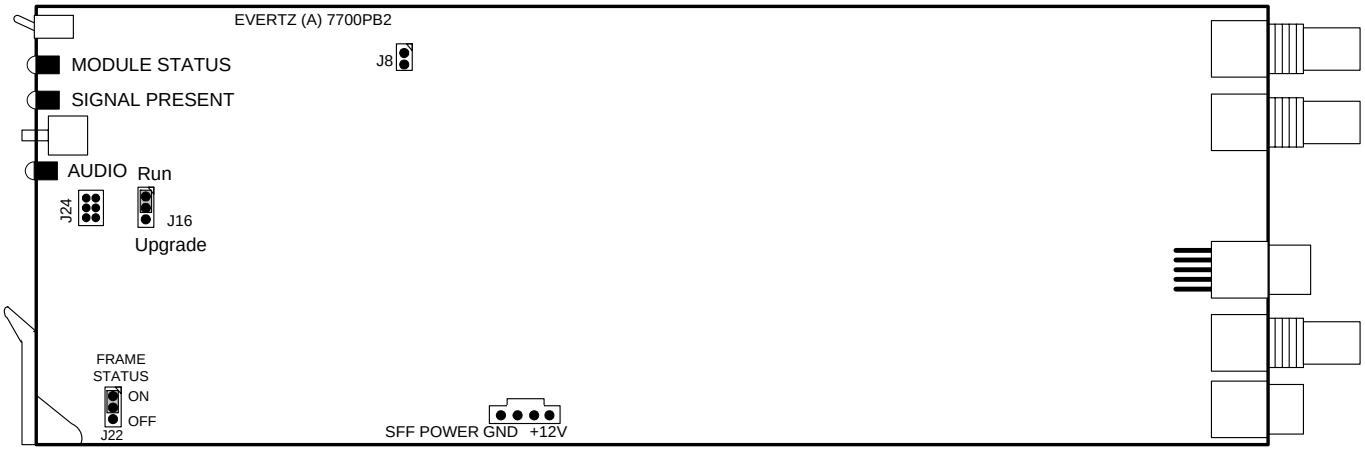

Figure 9-1: Location of Jumpers on 7700PB2 Boards

9.1. SELECTING WHETHER LOCAL FAULTS WILL BE MONITORED BY THE GLOBAL FRAME STATUS

FRAME STATUS: The FRAME STATUS jumper J22 located at the front of the module determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

To monitor faults on this module with the frame status indicators (on the PS FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper. (Default) When this jumper is removed, local faults on this module will not be monitored. For convenience you may re-install the jumper so that only one side is connected.

The *Frame stat trigger* menu item on the *GPO configuration* menu is used to configure whether *Fault condition 1* or *Fault condition 2* will assert the frame status fault line. Power supply faults will always assert the frame status fault line when J22 is installed.

9.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

The following method can be used to upgrade the firmware in the AVM card. You can also use the *UPGRADE* menu item located on the *UTILITIES* menu to upgrade the firmware.

UPGRADE

The UPGRADE jumper J16 located at the front of the module is used when firmware upgrades are being done to the module. For normal operation it should be installed in the *RUN* position. See the *Upgrading Firmware* section of this manual for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move Jumper J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J24 at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section of this manual. Once the upgrade is completed, remove the module from the frame, move J16 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

10. MENU QUICK REFERENCE

Audio

- **Audio source**
- **Ch 1/2 swap**
- **Ch 3/4 swap**
- **Ch 1/2 output mode**
- **Ch 3/4 output mode**
- **Ch 1/2 peak analog output level**
- **Ch 3/4 peak analog output level**
- **Fine ch 1 adjust**
- **Fine ch 2 adjust**
- **Fine ch 3 adjust**
- **Fine ch 4 adjust**

Video/SID

- **Video standard**
- **Loss of video**
- **NTSC setup pedestal**
- **Composite display mode**
- **525 VITC line**
- **625 VITC line**
- **525 PESA line**
- **625 PESA line**
- **Default SID mode**
- **Default SID msg**

Bar Graphs

- **Bar graphs 1 and 2**
  - Bar mode
  - Headroom
  - Ch1 / ch2 peak output level
  - Bar type
  - PPM mode
  - VU range
  - Phase type
  - Error region
  - Warning region
  - Scale position
  - Phase scale
  - Window position
    - *(goes to "On Screen Display-> Windows position" sub-menu)*
  - Colours
    - *OK region*
    - *Custom OK red*
    - *Custom OK green*
    - *Custom OK blue*
    - *Warning region*
    - *Custom warning red*
    - *Custom warning green*
    - *Custom warning blue*
    - *Error region*
    - *Custom error red*
    - *Custom error green*
    - *Custom error blue*
- **Bar graphs 3 and 4**
  - Same as bar graphs 1 & 2
- **Size**
- **Background opacity**
- **Bars opacity**

On Screen Display Configuration

- **Window position**
  - Status window H
  - Status window V
  - TC window H
  - TC window V
  - PR window H
  - PR window V
  - XDS window H
  - XDS window V
  - SID window H
  - SID window V
  - Level bar 1/2 H
  - Level bar 1/2 V
  - Level bar 3/4 H
  - Level bar 3/4 V
  - Phase bar 1/2 H
  - Phase bar 1/2 V
  - Phase bar 3/4 H
  - Phase bar 3/4 V
  - Fault 1 window H
  - Fault 1 window V
  - Fault 2 window H
  - Fault 2 window V
- **Window enable**
  - Ch 1/2 Level bar
  - Ch 3/4Level bar
  - Ch 1/2 Phase bar
  - Ch 3/4Phase bar 3/4
  - Ch 1/2 peak clear
  - Ch 3/4 peak clear
  - Status
  - Time code
  - Program rating
  - CC
  - XDS
  - SID
  - Clear fault 1
  - Clear fault 2
- **Text windows**
  - Text window configuration
    - *Text type*
    - *Background colour*
    - *Background opacity*
    - *Text opacity*
    - *TC window size*
    - *PR window size*
    - *SID window size*
    - *Status window mode*
  - Fault window configuration
    - *Text type*
    - *Background colour*
    - *Background opacity*
    - *Text opacity*
    - *Fault 1 window size*
    - *Fault 2 window size*
    - *Fault 1 blink*
    - *Fault 2 blink*

GPO Configuration

- **GPO1 active state**
- **GPO1 trigger**
- **Frame status trigger**

Fault Definitions

- **Fault condition 1**
  - Fault status
  - Window position
    - *(goes to "On Screen Display Configuration ->Windows position" sub-menu)*
  - Fault 1 Message
  - Fault Mode
  - Duration
  - Video invalid
  - Loss of audio
  - Loss of audio ch ½
  - Loss of audio ch ¾
  - AP EDH
  - FF EDH
  - Audio format
  - Phase reversal 1/2
  - Phase reversal 3/4
  - Over 1/2
  - Over 3/4
  - Silence 1/2
  - Silence 3/4
  - Mono 1/2
  - Mono 3/4
  - Loss of VITC
  - Loss of SID
  - Loss of PR
  - Loss of CC
  - GPI 1
  - GPI 2
  - Picture freeze
  - Picture black
- **Fault condition 2**
  - Same as fault condition 1
- **Fault window config**
  - (goes to "OSD config->Text windows->fault" sub-menu)
- **Video invalid duration**
- **EDH error duration**
- **Audio invalid duration**
- **Over level**
- **Over duration**
- **Silence level**
- **Silence duration**
- **Phase reversal level**
- **Phase reversal duration**
- **Mono threshold level**
- **Mono duration**
- **Loss of CC duration**
- **Loss of PR duration**
- **Picture noise level**
- **Freeze duration**
- **Black duration**

Utilities

- **About…**
- **Data logging**
  - Status poll setup
    - *Poll rate*
    - *Query Status*
  - Fault log setup
    - *Event stamp mode*
  - Fault log
  - Status log
  - Card id
  - Event stamp
- **Store preset 1**
- **Store preset 2**
- **Recall preset 1**
- **Recall preset 2**
- **Upgrade**
- **Factory reset**

Clear Faults and Peak

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