Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Original Version – preliminary	Aug 01
0.2	Update to Table 1 – Audio and Aux Pinout description	Aug 01
0.3	Added information about 7761AVM-BHP Bulkhead Breakout Panel	Oct 01
0.4	Added new product features – separate audio channel fault alarm and video “black-out” feature, configurable status window display and increased freeze detect duration.	Nov 01
1.0	Full release	Jan 02

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1. OVERVIEW

The 7761AVM-DC Dual Channel Composite Analog Audio and Video monitoring card performs a number of quality control and monitoring functions similar to that of the 7760AVM SD-SDI input line of audio/video monitoring cards. It performs video, audio and vertical blanking interval (VBI) data analysis. Incoming composite analog video is analyzed and key information about the signal is displayed on the output video. The 7761AVM-DC card has two independent, composite analog video outputs. The 7761AVM is configurable both locally, through a card-edge push-button toggle with an on-screen display menu, and remotely, through the SNMP communication channel – known as VistaLINK™. VistaLINK™ offers remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP) giving the flexibility to manage operations, including signal monitoring and module configuration, from SNMP-enabled control systems (Manager or NMS).

The Features of all 7761AVM-DC's are:

- Two independent, composite analog (NTSC/PAL) video inputs
- One group (4 balanced audio inputs) per video input channel is analyzed and VU/PPM level indicators are keyed as bar graphs in over the video output
- Decodes vertical interval time code (VITC) and "burns" the time code into the picture
- Decodes VITC Source ID (5 or 9 characters) and burns the ID into the picture
- A comprehensive on screen display (OSD) 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, independent composite analog (NTSC/PAL) video outputs
- Video output "black-out" option while maintaining audio, video and data parameter monitoring
- Two GPI inputs per video input are available to modify the display characteristics.
- GPO output per video output is available to indicate user definable fault conditions.
- Audio and GPI/Os are available on a female DB-25 connector
- RS-232 data logging port to log fault conditions
- 7761AVM-BHP bulkhead breakout panel is available to facilitate wiring to the DB-25 connector. (Up to 15 7761AVM-DC cards can be wired per 3 RU bulkhead panel.)
- 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.

1.1. FUNCTIONAL DESCRIPTION

The 7761AVM-DC is a dual channel video monitoring card with 4 balanced analog audio (1 group) inputs per video input channel. Composite analog video inputs are first automatically detected for NTSC or PAL standards, then independently digitized, with VBI data is extracted and processed by the CPU. The CPU analyzes the audio, extracts performance data, and creates level and phase bar graphs writing them 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, which is also written to memory. The hardware mixes (keys) the on-screen text and bar graphs display information onto the video stream. Composite analog video is output after composite encoding. In addition, the CPU receives pushbutton and toggle-switch commands from either the card-edge control or set-up parameters or from *AVM ConfigWare* application software and draws extensive menus for configuring the operation of the card. Two general-purpose (GPI) inputs per input video channel for configurable, automated feature control and one general-purpose (GPO) output per video channel output are also available. Refer to Figure 1 for 7761AVM-DC Block Diagram.

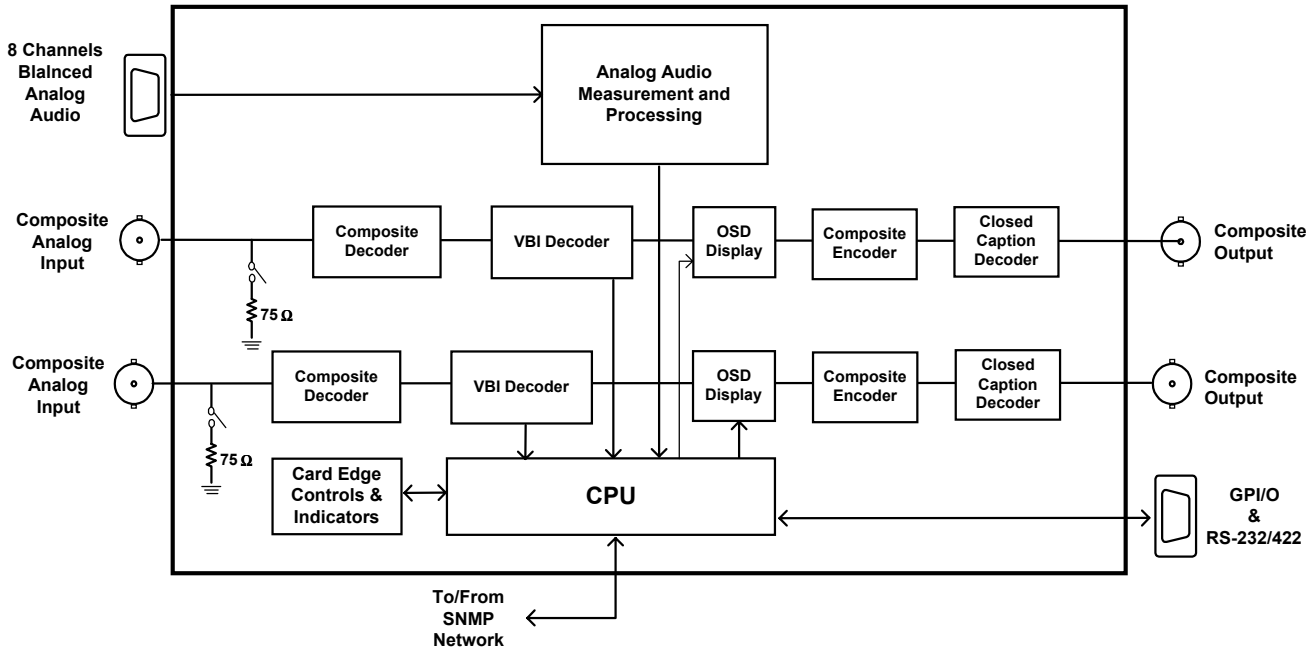


Figure 1: 7761AVM-DC Block Diagram

2. INSTALLATION

The 7761AVM-DC module comes with a companion rear plate that has 4 BNC connectors and one female DB-25, occupying one slot of the 7700FR frame. Figure 2 shows a picture of the rear plate. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter (Section 3) in the MultiFrame Manual.

2.1. VIDEO IN AND OUT

Connect a source of composite analog video to the BNC labeled VIDEO A IN and/or VIDEO B IN. Processed video with text and audio bar graphs are available on the VIDEO A OUT or VIDEO B OUT. If the card is not present or the power is off, there will be nothing on the outputs.

2.2. AUDIO AND AUX I/O

The audio inputs, GPI/O and RS-232 ports are available on a female DB-25 connector labeled AUDIO AND AUX I/O. Table 1 shows the pin-out of the connector.

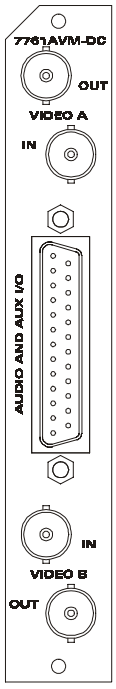


Figure 2: 7761AVM-DC Rear Plate

DB-25	Name	Description
1	A1(4-)	Analog audio, channel 1, input 4-
2	A1(3-)	Analog audio, channel 1, input 3-
3	A1(2-)	Analog audio, channel 1, input 2-
4	A1(1-)	Analog audio, channel 1, input 1-
5	GPI1(1)	General Purpose Interface, channel 1, input 1
6	GPO1	General Purpose Output 1
7	Ground	Ground
8	GPO2	General Purpose Output 2
9	GPI1(2)	General Purpose Interface, channel 1, input 2
10	A2(1-)	Analog audio, channel 2, input 1-
11	A2(2-)	Analog audio, channel 2, input 2-
12	A2(3-)	Analog audio, channel 2, input 3-
13	A2(4-)	Analog audio, channel 2, input 4-
14	A1(4+)	Analog audio, channel 1, input 4+
15	A1(3+)	Analog audio, channel 1, input 3+
16	A1(2+)	Analog audio, channel 1, input 2+
17	A1(1+)	Analog audio, channel 1, input 1+
18	GPI2(1)	General Purpose Interface, channel 2, input 1
19	RX	RS-232 input
20	TX	RS-232 output
21	GPI2(2)	General Purpose Interface, channel 2, input 2
22	A2(1+)	Analog audio, channel 2, input 1+
23	A2(2+)	Analog audio, channel 2, input 2+
24	A2(3+)	Analog audio, channel 2, input 3+
25	A2(4+)	Analog audio, channel 2, input 4+
	Ground	Shell

Table 1: AUDIO AND AUX I/O Pinout

2.2.1. Analog Audio Connections

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

DB-25	XLR
Audio +	2
Audio -	3
Shell	1

Table 2: Analog Audio to XLR Connection

2.2.2. General Purpose Inputs and Outputs

The GPI's are active low with internal pull up resistors 2.2 kΩ 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 3 shows the input circuit for the General Purpose inputs.

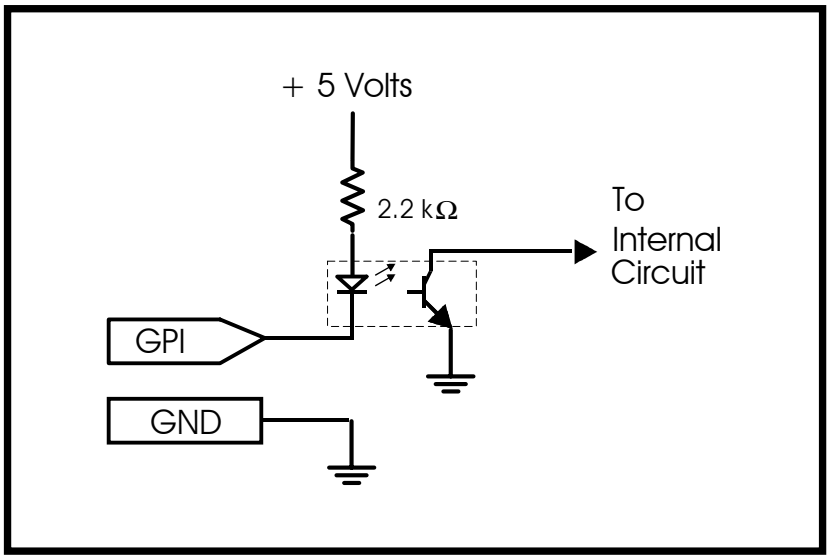


Figure 3: GPI Input Circuitry

The GPO's are software programmable active high or low with internal pull up 2.2 kΩ 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 4 shows the circuit for the General Purpose output.

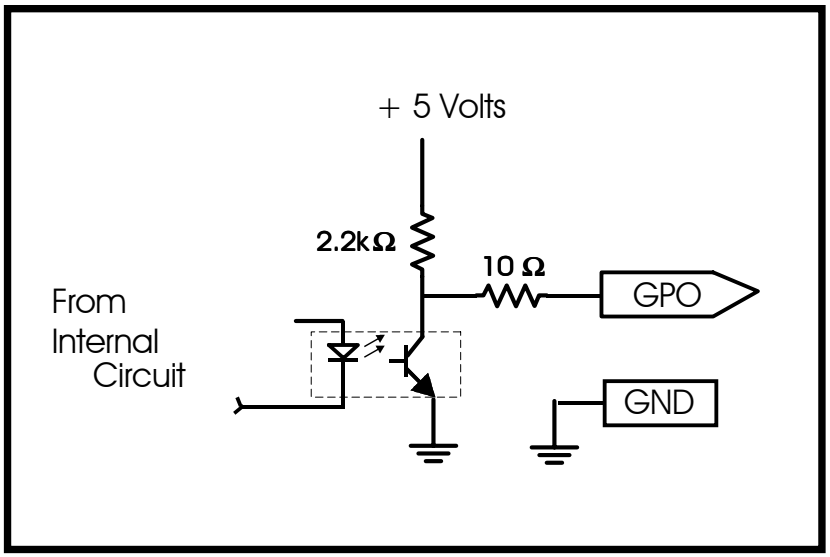
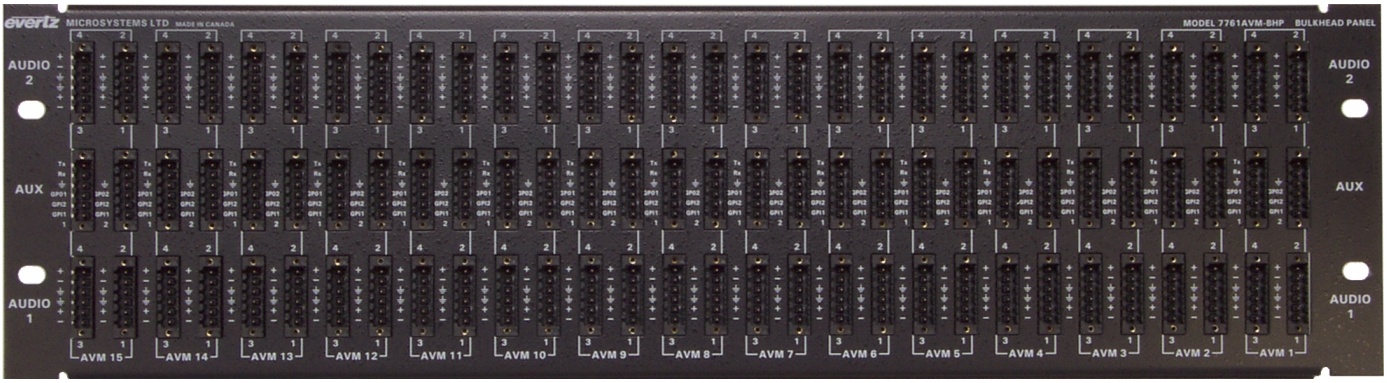


Figure 4: GPO Output Circuitry

2.2.3. 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 1. The RS-232 port on the AUDIO AND AUX I/O connector is used for status and fault condition data logging. 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.

2.2.4. 7761AVM-BHP Bulkhead Breakout Panel



A 7761AVM-BHP bulkhead breakout panel is available to facilitate wiring to the DB-25 connector. This panel allows for convenient audio, GPI/O and RS-232 connections for up to 15 7761AVM-DC cards 3 RU panel.

2.2.5. 7761AVM-DC Custom Cabling

For applications where only a few AUDIO & AUX I/O breakout cables are required, the following Table specifies the suggested configuration, using straight-through cable with DB-25 “male-to-male” or “male-to-female” connectors:

(Note that one male connector must be connected to the female DB-25 on the rear plate of the 7761AVM-DC card.)

Pin # Male Connector 1	Pin # M or F Connector 2	Twisted Pair (For optimal performance, twist the following wire pairs in custom AUDIO & AUX I/O cable)	Pin # Male Connector 1	Pin # M or F Connector 2
1	1	- - 1 & 14 - -	14	14
2	2	- - 2 & 15 - -	15	15
3	3	- - 3 & 16 - -	16	16
4	4	- - 4 & 17 - -	17	17
5	5		18	18
6	6		19	19
7	7		20	20
8	8		21	21
9	9			
10	10	- - 10 & 22 - -	22	22
11	11	- - 11 & 23 - -	23	23
12	12	- - 12 & 24 - -	24	24
13	13	- - 13 & 25 - -	25	25

Table 3: Custom AUDIO & AUX I/O Cabling

3. SPECIFICATIONS

3.1. ANALOG VIDEO INPUT

Standard: NTSC, SMPTE 170M, PAL, ITU624-4
Number of Inputs: 2
Connector: BNC per IEC 169-8
Signal Level: 1V nominal
DC Offset: 0V +/- 1V
Input Impedance: 75 Ω
Return Loss: >40dB up to 5MHz

3.2. ANALOG AUDIO INPUT

Number of Inputs: 8 (4 balanced inputs per video input channel)
Connector: Female DB-25
Input Impedance: 20 kΩ minimum (differential)
Sampling Frequency: 48kHz
Peak Signal and Common Mode Level: 30 dBu

3.3. ANALOG VIDEO OUTPUT

Standard: NTSC (SMPTE 170M) PAL (ITU624-4)
Number of Outputs: 2
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
Differential Phase: <0.9°(<0.6° typical)
Differential Gain: <0.9% (<0.5 % typical)
SNR: >56dB to 5 MHz (shallow ramp)

3.4. AUDIO BAR GRAPHS

Number of Graphs: 4 (1 group) per video input channel, 2 phase meters
Ballistics: DIN, BBC and Nordic N9
(See Table 5 for detailed specifications)

3.5. GENERAL PURPOSE IN/OUT

Number of Inputs: 2 (configurable) per video input
Number of Outputs: 1 (configurable) per video output
Type: Opto-isolated, active low with internal pull-ups to +5V
Connector: Female DB-25
Signal Level: +5V nominal (high), 0V (low)

3.6. DATA LOGGING SERIAL PORT

Standard: RS-232
Connector: Female DB-25
Baud Rate: 57600
Format: 8 bits, no parity, 2 stop bits and no flow control

3.7. ELECTRICAL

Voltage: + 12VDC
Power: 13 W
EMI/RFI: Complies with FCC Part 15, class A and EU EMC directive.

3.8. PHYSICAL

Number of slots: 1

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 solid when valid video is present on both inputs. If only one input has video, this LED will blink. If neither inputs have valid video, this LED will remain OFF.

4.2. AUDIO STATUS LEDs

Two LEDs located on the lower end of the module (near the card extractor) indicate audio group presence. Audio LED 1 is located closest to the center of the module.

Audio LED	Color	Audio Group Status
1	Off	Group not present with channel 1
	Green	Group present with channel 1
2	Off	Group not present with channel 2
	Green	Group present with channel 2

Table 4: Audio Group Status LEDs

5. AUDIO ALARM CALIBRATION PROCEDURE

This section contains 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 6.8 for a complete description of the fault definition menu items.

5.1. 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.

5.2. 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.

5.3. CALIBRATE AUDIO MONO DETECTION

1. Supply the card with a balanced 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.

5.4. 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, color, etc).
4. Assign the *Fault Condition* to an output contact closure (GPO) if it is desired.

6. ON SCREEN MENUS

6.1. NAGIVATING THE ON SCREEN MENU SYSTEM

A toggle switch and pushbutton allow card edge navigation of a set of on-screen menus can be used to configure the card. The card can also be configured using the *AVM ConfigWare* utility – a windows-based menu for easy configuration using a PC to configure one or multiple cards through the serial COM port - provided with your card. Please view the *AVM ConfigWare* information in the section 7 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.

6.2. 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.

6.3. ON SCREEN DISPLAY – MAIN MENU

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. The tables 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.

As there are two video input channels on the 7761AVM-DC, the menu items listed below pertain to both *Video Input A* and *Video Input B*. For simplicity, menu items will be described for *Video Input A*, with the same holding true for the other, independent input channel. To access Video Input A from the card edge, press the toggle switch UP and push-button IN. To access Video Input B, press the toggle switch DOWN and push-button IN. To access the common Utilities Menu, press push-button IN.

Video/SID	This control sets video processing operations and decoding parameters.
Audio level	This control sets the audio reference level as well as warning and error regions for audio level bar graphs.
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 colors 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 and configuration of 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.

6.4. 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 6.4.1 to 6.4.8 give detailed information about each of the parameters.

Loss of video	Selects the action to take when the input video is missing
Composite display mode	Selects whether the composite analog output will be color or monochrome
NTSC input pedestal	Selects whether the NTSC 7.5 IRE pedestal already exists on the composite analog input
NTSC output pedestal	Selects whether the NTSC 7.5 IRE pedestal will be enabled on the composite analog output
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.
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
Active video	Option to display or hide the active video output.

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

Video input A *Video/SID* *Loss of video* *Pass* *Black*	The user can either have the output video go to black or pass the inputted signal.

6.4.2. Setting the Composite Display Mode – Color or Monochrome

Video input A *Video/SID* *Composite display mode* *Color* *B/W*	If monochrome operation is desired on the composite output, color may be turned off with this control.

6.4.3. Setting the NTSC Input Pedestal

Video input A *Video/SID* *NTSC input pedestal* *Expected* *None*	This controls whether or not the card should expect a setup pedestal on the input.

6.4.4. Setting the NTSC Output Pedestal

Video input A
Video/SID
NTSC output pedestal
Yes
No

The setup pedestal should not be present when operating in Japan. This control allows it to be removed.

6.4.5. Setting the VITC Line Number – 525 Line Video

Video input A
Video/SID
NTSC VITC line
12 to 32
12

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.

6.4.6. Setting the VITC Line Number – 625 Line Video

Video input A
Video/SID
PAL VITC line
8 to 32
12

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.

6.4.7. Setting the Default SID Mode

Video input A
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 6.6.4 for information on turning the SID window On.

6.4.8. Setting the Message to be Displayed When There Is No Incoming SID

Video input A
Video/SID
Default SID msg
VIDEO SOURCE A

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 6.2 for information on changing text fields.

6.4.9. Monitoring with a Video Black-Out Display

Video input A
Video/SID
Active video
Pass
Hide

This control hides the active video output display while maintaining all video, audio and data monitoring. When active video is hidden, a gray screen appears on the monitor. This feature is used to "black-out" active video displaying sensitive material.

6.5. 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 for Video input A or Video input B. Sections 0 to 6.5.14 give detailed information about each configuration item for the audio bar graphs. Sections 0 to 6.5.3 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 6.5.12 to 6.5.14 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.

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
3	Status window
4	Phase bar graphs
5 (bottom)	Level bar graphs

6.5.1. Selecting the Bar Graph Operating Mode

Video input A
- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Audio level 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.

6.5.2. Setting the Audio Reference Level

Video input A
- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Reference level*
      - *0 to 10 dBu*
      - *4 dBu*

This control is used to set the facility audio level. In most broadcast facilities this level is 4 dBu. By definition, once set, audio reference level is equivalent to 0 dBr and it also defines the “floor” of the Warning region

6.5.3. Setting the Bar Graph Type

Video input A
- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Level 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 dBr corresponding to the set reference level (see Section 6.5.1).

6.5.4. Setting the PPM Mode and Ballistics

Video input A
- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *PPM mode*
      - *DIN*
      - *BBC*
      - *Nordic N9*
      - *Default*

This parameter selects one of three industry standard Peak Program Meter (PPM) display modes. A fourth (Default), factory-configured ballistic with fast attack time and slow decay time is also provided.

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 coloring and phase graph representation. Table 5 illustrates the values set by the standards.

Mode	*Attack Time*	*Decay Time*	*Ref. Level*	*Min Level*	*Max Level*	*Notes*
DIN 45 406 (IRT Rec. 3/6)	10 ms	1.5 sec for 20 dB	6 dBu	-50 dBr	5 dBr	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 dBr	7 +12 dBr	# 6 on the scale is the reference level
Nordic N9	5 ms	1.7 sec for 20 dB	6 dBu	-42 dBr	+12 dBr	
Default	1 sample period	1.5 sec for 20 dB	User defined	down to -60 dBr	up to 30 dBr	Similar to AES/EBU ballistics for digital meters

Table 5: 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).

6.5.5. Setting the VU Display Range

Video input A
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 –20dBr
Extended range: +3 to –57dBr
(dBr - relative to the reference or operating level)

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.

6.5.6. Setting The Phase Bar Graph Type

Video input A
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).

6.5.7. Setting the Error region

- *Video input A*
  - *Bar graphs*
    - *Bar graphs 1 and 2*
      - *Error region*
        - *0 to 20 dBr*
        - *16 dBr*

This control is used to set the “floor” of the Error region. The peak signal level input of the 7761AVM-DC is 30dBu.

The Error region is defined as an area above the Warning region and Reference level. These are graphically represented by different colors (usually yellow and red) on the audio level bar graphs. This setting is intended to inform the user when the audio signal is approaching or in the error region.

The values are displayed in dBr units – these are values relative to the set normal operating level (or Reference level).

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 choosing the ballistic, the region is re-adjusted through this control.

6.5.8. Setting the Level Bar Graph Scale Position

- *Video input A*
  - *Bar graphs*
    - *Bar graphs 1 and 2*
      - *Scale positions*
        - *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.

6.5.9. Setting The Phase Bar Graph Scale Position

- *Video input A*
  - *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.

6.5.10. Setting The Window And Bar Graph Positions

- *Video input A*
  - *Bar graphs*
    - *Bar graphs 1 and 2*
      - *Window position*

This quick link to *Window position* menu on the *On-screen display configuration* menu allows you to change the window positions of all AVM windows and bar graphs. See sections 6.6.1 to 6.6.3 for detailed information on position the windows and bar graphs.

6.5.11. Setting the Colors of the Bar Graphs

Each of the level bar graphs consists of three regions: the "OK", "Warning" and "Error" regions. The *Colors* menu items allow you to select one of a group of standard colors, or choose your own custom colors 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 colors 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 colors, the AVM automatically sets the R, G, and B values. If you choose the custom color, you will be able to set the R, G, and B values independently to give you the desired color. If you are having problems setting these values with the menu system, open a paint program, select the color you like (usually from a color wheel) and set the R, G, and B values into the AVM card using the respective *Custom color* menu items for the region.

6.5.11.1. Setting the Level Bar Graph Region Color

Video input A
Bar graphs
Bar graphs 1 and 2
Colors
OK region
White
Black
Grey
Yellow
Red
Green
Custom…

This control sets the color of the bottom, "OK", region of level bar graphs. You can choose from one of the predefined colors or define a custom color.

6.5.11.1.1. Selecting a Bar Graph Region Custom Color

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

Video input A
Bar graphs
Bar graphs 1 and 2
Colors
Custom OK red:
0 to 255

This control defines one of the component colors for a custom color for one of the regions of level bar graphs.

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

6.5.12. Setting The Level Bar Graph Size

Video input A
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.

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

Video input A
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 color will be visible over the video content. At the maximum value, very little of the background video will be visible through the bar graph.

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

Video input A
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 color will be visible over the video content. At the maximum value, very little of the background video will be visible through the bar graph.

6.6. 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.

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 color and opacity for the on screen windows.

6.6.1. 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 H and Status window V* will be shown.

6.6.1.1. 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.

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.

6.6.1.2. 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.)

6.6.1.3. CC Window

The CC window is displayed on the analog video output in NTSC mode only. It contains caption information from the CC1 data stream.

6.6.1.4. 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 6.4.7 and 6.4.8 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 6.4.5 and 6.4.6 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. The *SID window size* menu item controls whether the time code window will be displayed in the normal or large font size.

6.6.1.5. 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 color, opacity and size attributes, they can be set to come on steady or blinking and they contain fully programmable messages. See section 6.8 for more information on setting up the fault conditions and configuring the fault windows.

6.6.1.6. Setting the Horizontal Position of On Screen Windows

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

The Status w*indow 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.

6.6.1.7. Setting the Vertical Position of On Screen Windows

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

The Status w*indow 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.

6.6.2. 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 ½* will be shown.

6.6.2.1. Setting the Horizontal Position of the Bar Graphs

Video input A
On-screen display configuration
Window position
Level bar ½ H
0 to 39 *1 (33)*

The Level b*ar ½ H* position menu sets the horizontal position of the audio level bar graph for channel ½.

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 done.

The default value for the horizontal position of audio level bar ½ is 1. Similarly, for audio level bar ¾ the horizontal position default value is 33.

6.6.3. Setting the Vertical Position of the Bar Graphs

Video input A
- *On-screen display configuration*
  - *Window position*
    - *Level bar ½ 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 done.

The default value for the horizontal position of audio level bar ¾ is 0. Similarly, for audio level bar ¾ the horizontal position default value is 0.

6.6.4. Selecting What Bar Graphs And Windows To Display (via "*Window enable*" menu item)

The AVM has two general purpose inputs per video input (total of four GPIs) that can be programmed to turn the Level or Phase bar graphs or the Status, VITC, Program Rating, SID or CC 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 6.8.)

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 6. 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 6.10).

Item	On/Off	GPI1	GPI2	GPI1 OR GPI2	Fault 1	Fault 2
Ch 1/2 level bar						
Ch 3/4 level bar						
Ch 1/2 phase bar						
Ch 3/4 phase bar						
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 6: Methods of turning Windows and Bar graphs On and Off

6.6.5. Setting the Text Window Attributes

The On screen text windows can be displayed as white characters with or without a colored 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 configuration* menu items are used to set these parameters for all the text windows except the Fault windows.

Text window configuration	Control to set all text window attributes including background colours, opacities and sizes.
Fault window configuration	Control to set fault window attributes including background colours, opacity, size and “blinking”.
Status window configuration	Control to enable status window parameter display when status window displayed is enabled.

6.6.5.1. Setting the Text Window Background Colors

Video input A
- *On-screen display configuration*
  - *Text windows*
    - *Text window configuration*
      - *Background color*
        - *Black*
        - *Grey*
        - *Yellow*
        - *Red*
        - *Green*

Select the background color around the text in the Text windows.

6.6.5.2. Setting the Background Window Opacity

Video input A
On-screen display configuration
Text windows
Text window configuration
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 color will be visible over the video content. At the maximum value, very little of the background video will be visible through the window background.

6.6.5.3. Setting the Time Code Window Font Size

Video input A
On-screen display configuration
Text windows
Text window configuration
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.

6.6.5.4. Setting the Program Rating Window Font Size

Video input A
On-screen display configuration
Text windows
Text window configuration
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.

6.6.5.5. Setting the Source ID Window Font Size

Video input A
On-screen display configuration
Text windows
Text window configuration
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.

6.6.6. Setting the Fault Window Attributes

The On screen Fault windows can be displayed as white characters with or without a colored 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 configuration* menu items are used to set these parameters for the Fault windows.

6.6.6.1. Setting the Fault Window Background Colors

Video input A
On-screen display configuration
Text windows
Fault window configuration
Background color
Black
Grey
Yellow
Red
Green

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

6.6.6.2. Setting the Fault Window Background Opacity

Video input A
On-screen display configuration
Text windows
Fault window configuration
Background opacity
0 to 64
32

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 color will be visible over the video content. At the maximum value, very little of the background video will be visible through the window background.

6.6.6.3. Setting the Fault Window Text Opacity

Video input A
On-screen display configuration
Text windows
Fault window configuration
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.

6.6.6.4. Setting the Fault Window Font Size

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

Video input A *On-screen display configuration* *Text windows* *Fault window configuration* *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.

6.6.6.5. Setting the Blink Mode of the Fault Windows

Video input A *On-screen display configuration* *Text windows* *Fault window configuration* *Fault 1 blink* *Disable* *Enable*	This control determines if the Fault 1 window will blink or be on solid when the fault is active. Fault 2 can also be set to "blink" mode. 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.

6.6.7. Setting the Status Window Display Parameters

6.6.7.1. 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 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.

Table 5 also shows a "Display Status" column. This column lists enable/disable options for the parameters of the Status Display window. Each parameter can be displayed through selections made in the *Status windows configuration* menu.

Item	*Display Status*	*Value(s)*	*Description*
Video	On/Off	NTSC/PAL/Not present	Input video standard detected regardless of what the card is configured to process.
Picture content	On/Off	Active/Frozen/Frozen, black	Shows the status of the picture content. Shows *active* if the picture is active, *frozen* if the card detects no motion, or *frozen, black* if the picture is black
VITC	On/Off	TC Value/Not present	If present, the time code value is displayed here.
VITC SID	On/Off	SID value/Not present	If present, the VITC SID is displayed here.
CC	On/Off	Present/Not present	The presence/absence of Closed Captioning is indicated.
PR	On/Off	Value/Not present	The program rating of Closed Captioning is indicated, if present.
Ch. 1	On/Off	NA/[(silent/over), (mono/out of phase)]	Status information about channel 1 is shown here.
Ch. 2	On/Off	NA/[(silent/over), (mono/out of phase)]	Status information about channel 2 is shown here.
Ch. 3	On/Off	NA/[(silent/over), (mono/out of phase)]	Status information about channel 3 is shown here.
Ch. 4	On/Off	NA/[(silent/over), (mono/out of phase)]	Status information about channel 4 is shown here.

Table 7: Video/Audio Status Screen Items

6.6.7.2. Setting the Status Window Mode

Video input A
On-screen display configuration
Text windows
Status window configuration
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.

6.7. GPO CONFIGURATION

The AVM module has one General Purpose output (GPO) available per output video channel on the DB-25 connector which can be used to signal several conditions to the user. 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 GPO. Sections 6.7.1 to 6.7.3 give detailed information about each of the menu items.

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

6.7.1. Setting the General Purpose Output Active State

Video input A
- *GPO configuration*
  - *GPO active state*
    - *High*
    - *Low*

This control sets the output level for 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.

6.7.2. Configuring what Condition will Activate the General Purpose Output

Video input A
- *GPO configuration*
  - *GPO 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.

6.7.3. Frame Status Fault Trigger Condition

- *Video input A*
  - *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 J6 (located near the card extractor) must also be set to the *On* position. See section 8.1

The Red *Local Fault* LED will be On when the global status line is active regardless of the position of jumper J6.

6.8. 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 6.6.

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 6.8.1 to 6.8.10 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.
Video lost duration	Sets the duration for which TRS-IDs (H, F or V) are not detected before displaying video fault.
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 on the video input.
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

6.8.1. 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 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*.

6.8.1.1. Fault Status

Video input A
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

6.8.1.2. Setting the Message Associated with a Fault

Video input A
Fault definitions
Fault condition 1
Fault 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 6.2 for information on changing text fields.

Fault condition 2 *Fault message* default is “AUDIO ERROR”.

6.8.1.3. Determining If The Fault Message Will Be Displayed

Video input A
Fault definitions
Fault condition 1
Fault 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 6.8.1.4 for information on setting the duration of the fault condition.

6.8.1.4. Setting the Duration of the Fault Condition

Video input A
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 clears the condition or until a programmable timer expires.

6.8.1.5. Determining What Items Will Generate The Fault Condition

Video input A
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 following selectable items occur.

Loss of video	Video (non-detected H, F or V) absent
Phase reversal ½	Audio 1 and 2 out of phase
Phase reversal ¾	Audio 3 and 4 out of phase
Audio over ch1	Audio channel 1 over level
Audio over ch2	Audio channel 2 over level
Audio over ch3	Audio channel 3 over level
Audio over ch4	Audio channel 4 over level
Audio silence ch1	Audio channel 1 silent
Audio silence ch2	Audio channel 2 silent
Audio silence ch3	Audio channel 3 silent
Audio silence ch4	Audio channel 4 silent
Audio mono 1/2	Audio channel 1 and 2 mono
Audio mono 3/4	Audio channel 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 8: Possible Error Conditions to Produce a Fault

6.8.2. Setting Loss of Video Duration

Video input A
- *Fault definitions*
  - *Video lost duration*
    - *0 to 30 frames*
    - *0*

This allows the user to define a duration during which TRS-IDs are not detected in the input stream, before reporting a loss of video fault. At a “0” setting, video fault is reported immediately when H, F or V values are not detected.

6.8.3. 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.

6.8.3.1. Setting the Audio Over Level

Video input A
Fault definitions
Over level
0 dBr to 20 dBr in ¼ dB increments
16 dBr

This control sets the audio level over which there is considered to be over level. This value is expressed in dBr – relative to set reference level.

6.8.3.2. Setting the Audio Over Duration

Video input A
Fault definitions
Over duration
3 to 255 samples
3

This control sets the duration in samples that audio is at or above the *Over level* before a fault condition exists. As a guide, with audio sampling rate at 48 kHz, period between samples is approximately 21 usec. Subsequently, the minimum and factory default over duration setting is approximately 63 usec.

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

6.8.4. 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 the duration set by the *Silence duration* control 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.

6.8.4.1. Setting the Audio Silence Level

Video input A
Fault definitions
Silence level
-60 dBr to 0 dBr in ¼ dB increments
-40 dBr

This control sets the audio level under which it is considered to be silent. This value is expressed in dBr – relative to the reference audio level setting.

6.8.4.2. Setting the Audio Silence Duration

Video input A
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.

6.8.5. Detecting Audio Phase Reversal Faults

All balanced 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 the duration set by the *Phase reversal duration* control before the fault condition will be removed.

6.8.5.1. Setting the Audio Phase Reversal Level

Video input A
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.

6.8.5.2. Setting the Audio Phase Reversal Duration

Video input A
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.

6.8.6. 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 the duration set by the *Mono duration* control 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.

6.8.6.1. Setting the Audio Mono Threshold Level

Video input A
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.

6.8.6.2. Setting the Audio Mono Duration

Video input A
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.

6.8.7. Detecting Loss of Primary Captioning

Video input A
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.

6.8.8. Detecting Loss of Program Rating Duration

Video input A
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.

6.8.9. 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.

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 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 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.

6.8.9.1. Setting the Picture Noise Level

Video input A
Fault definitions
Picture noise level
1 to 10
7

This control sets the approximate level of noise (such as due to impulse noise or "off-air" 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 = min. noise present (i.e. best signal)
10 = 40 dB SNR

6.8.9.2. Setting the Picture Freeze Duration

Video input A
Fault definitions
Freeze duration
6 to 9000 frames
300 frames

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

From 6 to 150 frames – in 4 frame increments
From 150 to 1800 frames – in 30 frame increments
From 1800 to 9000 frames – in 150 frame increments

When increasing *Picture noise level*, it is recommended that you increase F*reeze 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.

6.8.10. Detecting Picture Black Duration

Video input A
Fault definitions
Black duration
6 to 9000 frames
90 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.

From 6 to 150 frames – in 4 frame increments
From 150 to 1800 frames – in 30 frame increments
From 1800 to 9000 frames – in 150 frame increments

6.9. UTILITIES

The *Utilities* menu is common to both video inputs. To access this menu, simply exit any menus currently being viewed then press the push-button switch.

6.9.1. 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 a time 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 2.2.3 for information on connecting the serial port to your computer. All data logs include a text string that can be used to uniquely identify a 7761AVM-DC card.

6.9.1.1. Setting Data Logging for Video Inputs A and/or B

Utilities
- *Data logging*
  - *Status poll setup*
    - *Channel setup*
      - *Video input A only*
      - *Video input B only*
      - *Video inputs A and B*

This control enables data logging for either one or both video channels. Card ID (default or user-configured) will be automatically added to the data log once configured (as in 7.9.1.2) to identify whether recorded log represents video input A or video input B.

6.9.1.2. Setting Card ID

Utilities
- *Data logging*
  - *Status poll setup*
    - *Card ID (A)*
      - *7761AVM-DC (A)*

This control allows the user to set the name for data logging output from video input A. Factory default is 7761AVM-DC (A).

For Video input B, factory default is 7761AVM-DC (B).

6.9.1.3. 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 and the audio format error state.

6.9.1.4. 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.

6.9.2. 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 time stamp the fault log output. This control selects whether the AVM will use VITC (if present) or an internal, free-running clock to time-stamp the fault log.

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

6.9.3. 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.

6.9.4. 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 7761AVM-DC are sent out the serial port at the poll rate specified in the *Status poll rate* menu item. (See section 6.9.1.2)

6.9.5. 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*). This parameter is user-configurable.

6.9.6. 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 9x or later version. The *AVM ConfigWare* software also allows you to transport a configuration from one card to another or set the configuration via a PC window interface. See section 7 for information on using the *AVM ConfigWare* utility.

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

6.9.6.1. 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.

6.9.6.2. 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.

6.9.7. 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.

6.9.8. 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.

6.9.9. Accessing Information About this Module and its Firmware

Utilities
About…

This menu item list the particulars 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.

6.10. 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 use a GPI if it is programmed to do so.

7. CONFIGURING THE AVM USING *AVM CONFIGWARE*

A companion application software called *AVM ConfigWare* is available for AVM cards. This application not only allows you to copy configurations from card to card using a standard PC, but also allows you to configure the card using a simple, user-friendly windows interface, then transfer the configuration parameters to one or more AVM cards within the frame. 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. *AVM* ConfigWare operates via RS-232 protocol through a link from the serial COM port of the PC to the header J1 using the 7700PB serial cable (supplied).

For set-up and use instructions, refer to the *AVM ConfigWare User's Guide* or the Help file on the *AVM ConfigWare* application software.

8. JUMPERS

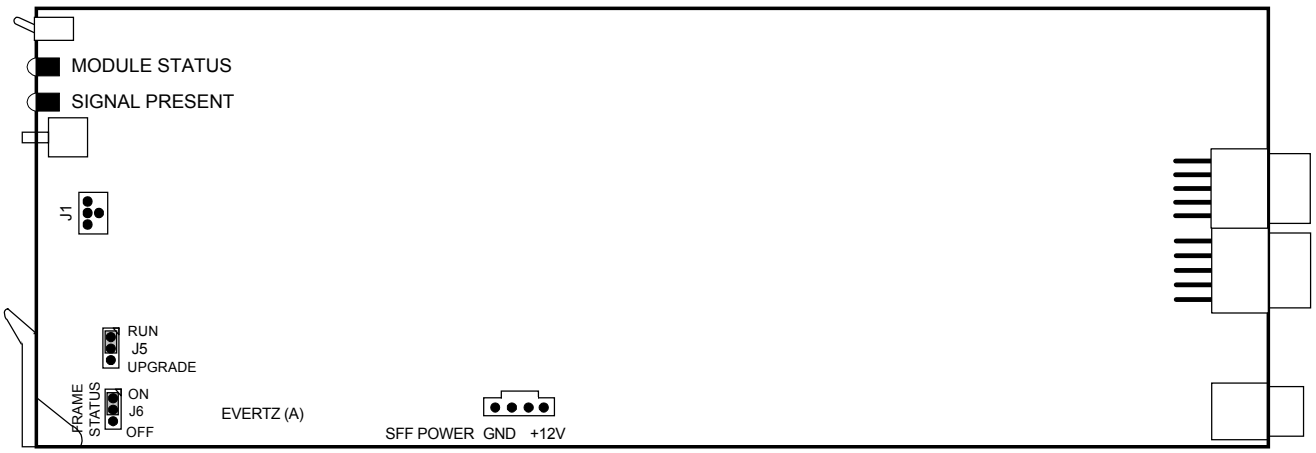


Figure 5: Location of Jumpers on 7761AVM-DC Boards

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

FRAME STATUS

The FRAME STATUS jumper J6 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 status 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 J6 is installed.

8.2. 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 J5 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 J5 into the *UPGRADE* position. Install the 7700PB serial cable provided (located in the vinyl pouch in the front of this manual) onto header J1 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 J5 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

9. Menu Quick Reference

- **Video input A**
  - **Video/SID**
    - Loss of video
    - Composite display mode
    - NTSC input pedestal
    - NTSC output pedestal
    - 525 VITC line
    - 625 VITC line
    - Default SID mode
    - Default SID msg
    - Active video
  - **Bar graphs**
    - Bar graphs 1 and 2
      - *Audio level mode*
      - *Reference level*
      - *Level type*
      - *PPM mode*
      - *VU range*
      - *Phase type*
      - *Error region*
      - *Scale positions*
      - *Phase scale*
      - *Window position (goes to "On Screen Display-> Windows position" sub-menu)*
      - *Colors*
        - 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 and 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 ½ level bar*
    - *Ch ¾ level bar*
    - *Ch ½ phase bar*
    - *Ch ¾ phase bar*
    - *Ch 1/2 clear peak*
    - *Ch 3/4 clear peak*
    - *Status*
    - *Time code*
    - *Program rating*
    - *CC*
    - *XDS*
    - *SID*
    - *Clear fault 1*
    - *Clear fault 2*
  - Text windows
    - *Text window configuration*
      - Bckgnd. color
      - Bckgnd. opacity
      - Text opacity
      - TC window size
      - PR window size
      - SID window size
    - *Fault window configuration*
      - Bckgnd. color
      - Bckgnd. opacity
      - Text opacity
      - Fault 1 window size
      - Fault 2 window size
      - Fault 1 blink
      - Fault 2 blink
    - *Status window configuration*
      - Status window mode
      - Video status
      - Picture content status
      - VITC status
      - VITC SID status
      - CC status
      - PR status
      - Aud ch1 status
      - Aud ch2 status
      - Aud ch3 status
      - Aud ch4 status
- **GPO configuration**
  - GPO active state
  - GPO trigger
  - Frame status trigger
  - **Fault definitions**
    - Fault condition 1
      - *Fault status*
      - *Fault mode*
      - *Fault message*
      - *Fault duration*
      - *Loss of video*
      - *Phase reversal 1/2*
      - *Phase reversal 3/4*
      - *Audio over 1*
      - *Audio over 2*
      - *Audio over 3*
      - *Audio over 4*
      - *Audio silence 1*
      - *Audio silence 2*
      - *Audio silence 3*
      - *Audio silence 4*
      - *Audio mono 1/2*
      - *Audio mono 3/4*
      - *Loss of VITC*
      - *Loss of SID*
      - *Loss of program rating*
      - *Loss of CC*
      - *GPI 1*
      - *GPI 2*
      - *Picture freeze*
      - *Picture black*
    - Fault condition 2
      - *Same as Fault condition 1*
    - Video lost 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
  - **Clear faults/peaks**
  - **Utilities**
    - Data logging
    - Status poll setup
      - *Channel setup*
      - *Card ID (A)*
      - *Card ID (B)*
      - *Poll rate*
      - *Query Status*
    - Fault log setup
      - *Event stamp mode*
    - Fault log
    - Status log
    - Event stamp
    - Store preset 1
    - Store preset 2
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