Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Original Version – Preliminary	Jul 01
0.2	Preliminary – Menu updates	Aug 01
0.3	Preliminary – Added 7765AVM-4A, –SD and –CA information	Oct 01
1.0	First Release of "-4" versions. ("-4A" to be updated in revision 1.1)	Feb 02
1.0.1	Minor corrections	Mar 02
1.0.2	Correction to 7765AVM-4A – currently supports 2 AES audio channels; other minor updates	May 02
1v0_3	Minor corrections to product manual	Jul 02
1v0_4	Added UMD/tally protocol support – Probel and TSL; Underscan mode and GPI control for on screen fault displays. Now also supports 3 AES on –VGA and –HD versions	Oct 02
1v0_5	Added "Audio invalid duration" setting to menu options and increased "Video invalid duration" to 255 frames from original 30 frames; added menu options for Image Video UMD support	Dec 02
2v0_0	Consolidated all separate Quattro product manuals (7765AVM-4, 7765AVM-4A, 7766AVM-4A, 7765AVM-4V and 7766AVM-4V) into single "Quattro™ Product Manual" document.	Mar 03
2v0_1	Addition of Fault logic feature	Apr 03
2v0_2	Added picture of 7765AVM-4A-BHP-7	Feb 04
2v0_3	Minor correction to SCSI label on Analog Quattro module WPSCS3PEX4 WSCSI33PEX4 WSCSI33PEX4	Dec 04
2v0_4	Added notes on Aspect Ratio control and 625 CC line detect selection	Jan 05

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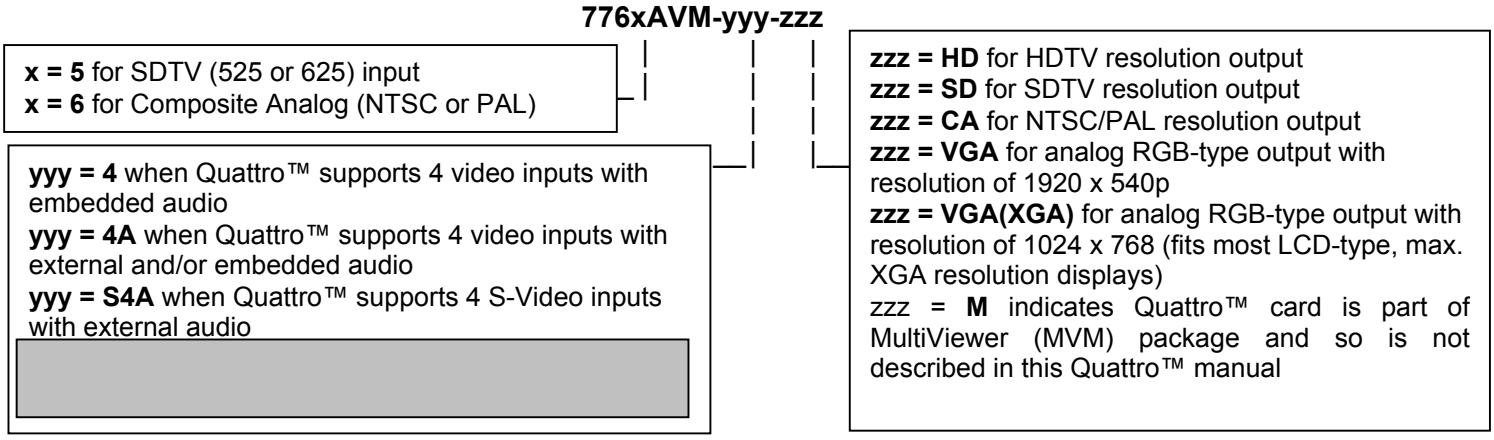
1. OVERVIEW

This Quattro™ Product Manual covers functionality and use of the following Quattro™ products (Video-only versions – shaded in Table 1 - are under development. Please contact Evertz for additional information.):

SDI Input Quattro™ Cards	Video-only SDI and Analog Input Quattro™ Cards	Analog Input Quattro™ Cards
7765AVM-4-HD	7765AVM-4V-SD	7766AVM-4A-SD
7765AVM-4-SD	7765AVM-4V-VGA	7766AVM-4A-VGA
7765AVM-4-CA	7765AVM-4V-VGA(XGA)	7766AVM-4A-CA
7765AVM-4-VGA		7766AVM-S4A-SD
7765AVM-4-VGA(XGA)	7766AVM-4V-SD	7766AVM-S4A-VGA
7765AVM-4A-HD	7766AVM-4V-VGA	7766AVM-S4A-CA
7765AVM-4A-SD	7766AVM-4V-VGA(XGA)	
7765AVM-4A-CA	7766AVM-S4V-SD	
7765AVM-4A-VGA	7766AVM-S4V-VGA	
7765AVM-4A-VGA(XGA)	7766AVM-S4V-VGA(XGA)	

Table 1: Quattro™ Cards Addressed within Quattro™ Product Manual

Quattro™ cards are labeled according to their input and output features. The following naming "key" provides a general Quattro™ labeling example:



Equipped with standard audio and video (AVM) monitoring features including an on-screen, menu-driven display, user configurable audio level bar graphs and status windows, the 7765AVM-4 "Quattro" can simultaneously display four SDI/601 video signals with embedded audio through an HD (7765AVM-4-HD), SD (7765AVM-4-SD), Composite Analog (7765AVM-4-CA) or VGA (7765AVM-4-VGA) output, supporting 4:3 and 16:9 aspect ratios. Furthermore, the 7765AVM-4A "Quattro" series monitors the signal status of either embedded audio or externally supplied AES/EBU audio (3 AES/EBU inputs per video channel for a total of 12 AES/EBU input channels are supported). Upon setting parameter thresholds and enabling fault conditions, any adverse behavior of any one input stream results in a clearly recognizable, user configurable on-screen, or GPI, fault alert message, immediately notifying operators of potential problems. The two-slot, 7765AVM-4 and 7765AVM-4A modules fit conveniently into Evertz's 7700FR-C frame.

Evertz's 7766AVM-4A and 7766AVM-S4A Analog Quattro™ audio and video monitoring cards simultaneously accept and analyze up to four composite analog or S-Video inputs and optionally display up to four signals with alarm, status and audio level monitoring in a 2x2 matrix format. High resolution serial SD, analog RGB and composite analog outputs are available. One analog Quattro™ is ideally suited for monitoring four composite analog or S-Video signals from common IRD outputs thereby providing end-users with a highly efficient, cost-effective analysis tool for confidence monitoring. The two-slot 7766AVM-4A/-S4A module fits conveniently into Evertz's 7700FR-C frame.

Equipped with standard video-only monitoring features including an on-screen, menu-driven display and user configurable status windows, the 7765AVM-4V-VGA video-only Quattro™ and 7766AVM-4V-VGA video-only analog Quattro™ can simultaneously display four SDI/601 video signals through a VGA output, supporting 4:3 and 16:9 aspect ratios. Furthermore, upon setting parameter thresholds and enabling fault conditions, any adverse behavior of any one input stream results in a clearly recognizable, user configurable on-screen, or GPI, fault alert message, immediately notifying operators of potential problems. The two-slot cards fit conveniently into Evertz's 7700FR-C frame.

All Quattro™ cards are VistaLINK™-enabled, offering remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP). This product feature offers another solution to manage operations including signal monitoring and module configuration from SNMP-enabled control systems (Manager or NMS) locally or remotely.

Common Quattro™ Features:

- 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 messages can be configured from these conditions.
- Four user-configurable fault condition alert messages with independent fault threshold and duration settings per video input with configurable background colors and opacities
- On screen messages can be triggered by the configured fault conditions.
- Decodes VBI Source ID packets and burns the ID into the picture
- Detects frozen (patent pending) and black video
- Quadrant, expanded and H/V delay viewing modes
- Genlock reference loop input for proper timing (not available on –VGA models)
- User-configurable tally indicators and configurable SID/UMD text and background colours, with selectable default SID/UMD text
- RS-232/RS-422 communication port (jumper configurable) for interface to common UMD protocols:
  - TSL
  - Probel
  - Image Video
- VGA-models available with "XGA" firmware to display properly on fixed-resolution, non-MultiSync, flat-panel LCD monitors
- 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.
- Optional Bulkhead Breakout Panel accessories provide a convenient way of connecting external audio and GPI I/O signals into either the rear plate DB-25 or SCSI connectors.

Features (Models 7765AVM-4-x and 7765AVM-4A-x):

- Four SDI/601 525 line or 625 line, 270 Mb/s component digital video inputs with embedded audio on 7765AVM-4 versions and embedded or external AES/EBU audio on 7765AVM-4A versions. (-VGA –CA and -SD versions support either 525 or 625 line inputs, 525 line inputs for –HD version.)
- One group (4 channels of audio) is demultiplexed from the SDI source and VU/PPM level and phase graphs are keyed next to the video picture
- Decodes Line 21 XDS packets containing network name, call letters, program name and time of day
- Standard HD-SDI, SD-SDI, Composite Analog and VGA-type outputs
- Twelve GPI inputs (four GPI inputs on 7765AVM-4A) and four GPI outputs (dedicated 1 per video quadrant) defined as fault conditions
- External AES audio (7765AVM-4A versions only) and GPI I/Os are available on a DB-25 connector

Three AES/EBU audio channels are supported in 7765AVM-4A-VGA "Build 2" hardware modules. Modules delivered after August 1, 2002 are considered "Build 2". Prior to this date, modules are considered "Build 1" and only two AES/EBU audio channels on the "–4A" modules are supported. For additional information, please contact Evertz.

Features (Models 7766AVM-4A-x and 7766AVM-S4A-x):

- Four composite analog (NTSC or PAL) inputs
- Optional four S-Video input (7766AVM-S4A-x) version
- One analog RGB (-VGA), SDI(-SD) or Composite Analog (-CA) output
- 4 balanced audio inputs per video analyzed and VU/PPM level indicators are keyed as bar graphs beside the video output (16 analog audio channels per card)
- Four GPI inputs (assignable) and four GPI outputs (dedicated 1 per video quadrant) defined as fault conditions
- Audio and GPI/Os are available through SCSI connector
- Comes with 7766AVM-4A-BHP-1 single Bulkhead Breakout Panel for convenient connection to 68-pin SCSI connector.
- Optional 7766AVM-4A-BHP-4 Bulkhead Breakout Panel available for multiple Analog Quattro cards

Features (Models 7765AVM-4V-x):

- Four SDI/601 525 line or 625 line, 270 Mb/s component digital video inputs
- Single analog RGB type output
- Twelve GPI inputs (assignable) and four GPI outputs (dedicated 1 per video quadrant) defined as fault conditions
- GPI I/Os are available on a DB-25 connector

Features (Models 7766AVM-4V-x and 7766AVM-S4V-x):

- Four composite analog (NTSC or PAL) video inputs (7766AVM-4V)
- Optional four S-video inputs (7766AVM-S4V)
- Single analog RGB type output
- Twelve GPI inputs are available to modify the display characteristics
- Four GPO outputs to indicate user definable fault conditions
- GPI I/Os are available on a SCSI connector

Other feature ideas:

- Monitor AES channel status flags.

- Freeze two video frames and compare the frames. If they are the same, then the video content is frozen. Use the EDH checkword (even if there is none on the input video!) as an identifier of same fields. Unfortunately, any noise in the picture will not make this work. How about this:
  - Calculate the checksum of every line (luminance only? Take the absolute value of the chroma to get an accurate "amount" measurement). Best to store the checksum with μ law compression to maintain dark picture information (most video is "dark").
  - Take the upper, more significant, portion of the word and compare it to previous fields. If they differ by more than an amount set by the user (i.e. the noise floor), then there has been motion on that line.
  - If all lines compared are the same, then there has been no motion and the picture is "still". Pure alternating horizontal left and right motion with constant left and right edges will look like a still picture!
  - A "black" (and "white") detector can also be done with this technique.
- Monitor the Web TV URL checksum in T2 of CC. (Romolo has details)

1.1. FUNCTIONAL DESCRIPTIONS

1.1.1. 7765AVM-4-x and 7765AVM-4A-x

For each of the four SDI(601) inputs, serial digital video is converted to parallel and embedded audio, VITC, closed captioning and source ID are extracted from it. The audio is 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 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 push-button and toggle-switch commands from the card edge controls and draws extensive menus for configuring the operation of the card. Card configuration is also possible through VistaLINK™.

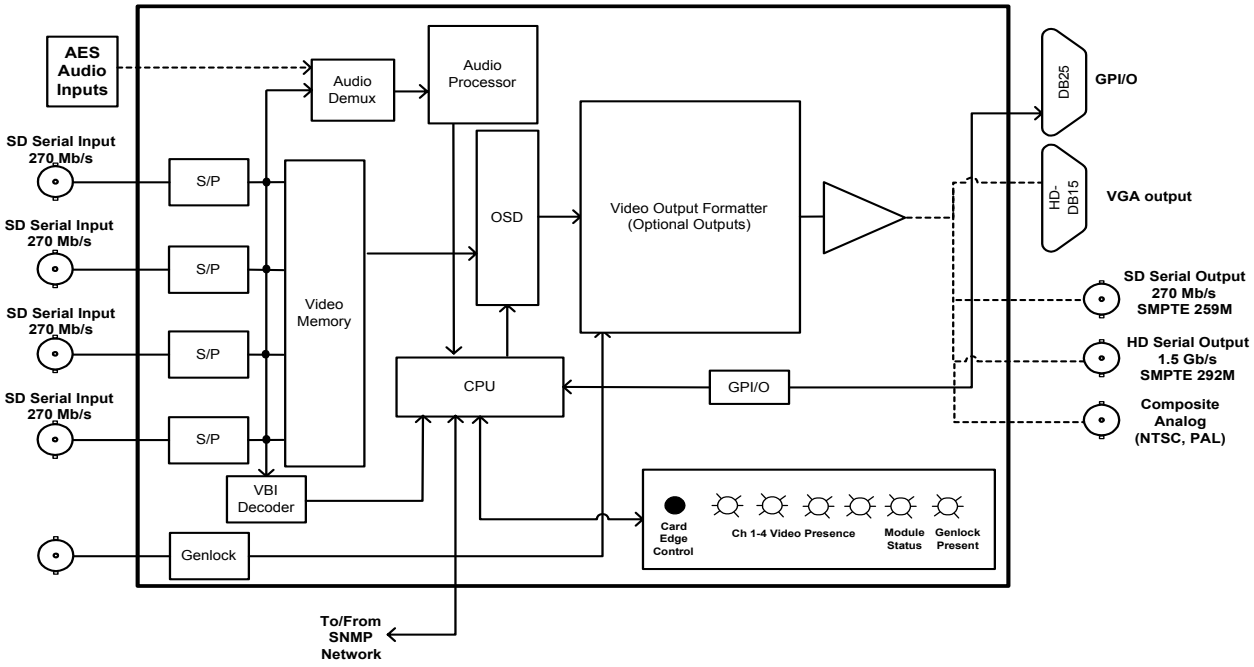


Figure 1: 7765AVM-4 and 7765AVM-4A Block Diagram

1.1.2. 7766AVM-4A-x and 7766AVM-S4A-x

The 7766AVM-4A and 7766AVM-S4A are quad composite analog channel video monitoring cards with 4 balanced analog audio (1 group) inputs per video input. Composite video inputs are programmed for NTSC or PAL standards, then independently digitized, with VBI data 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. Available video output options include "VGA" (7766AVM-4A-VGA and 7766AVM-S4A-VGA), composite analog (7766AVM-4A-CA and 7766AVM-S4A-CA) and SD-SDI (7766AVM-4A-SD and 7766AVM-S4A-SD). In addition, the CPU receives pushbutton and toggle-switch commands from either the card-edge control or set-up parameters and draws extensive menus for configuring the operation of the card. Four general-purpose (GPI) inputs and four general-purpose (GPO) outputs are also available. Refer to Figure 1 for 7766AVM-4A-x and 7766AVM-S4A-x Block Diagram.

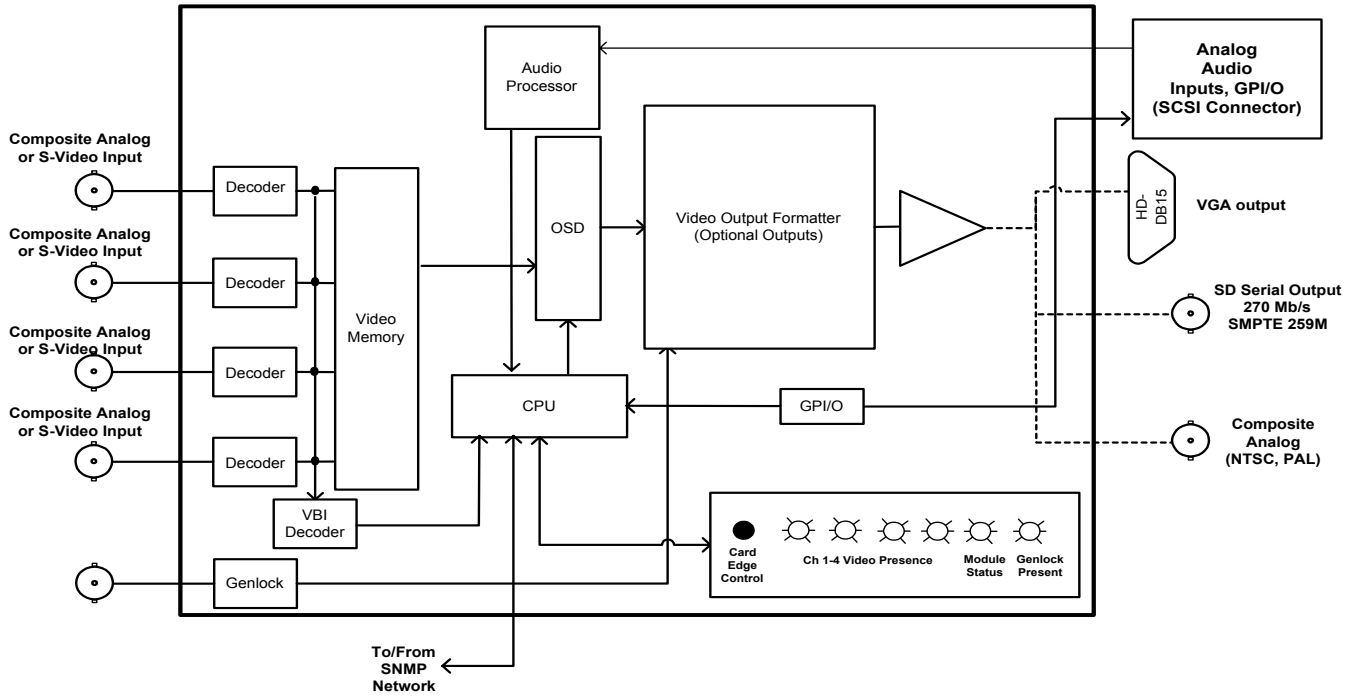


Figure 2: 7766AVM-4A/-S4A Block Diagram

1.1.3. 7765AVM-4V-x, 7766AVM-4V-x and 7766AVM-S4V-x

For each of the four video inputs, video is either digitized and deserialized or only deserialized to parallel where VITC and source ID (if embedded) are extracted from it. 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 push-button and toggle-switch commands from the card edge controls and draws extensive menus for configuring the operation of the card. Card configuration is also possible through VistaLINK™.

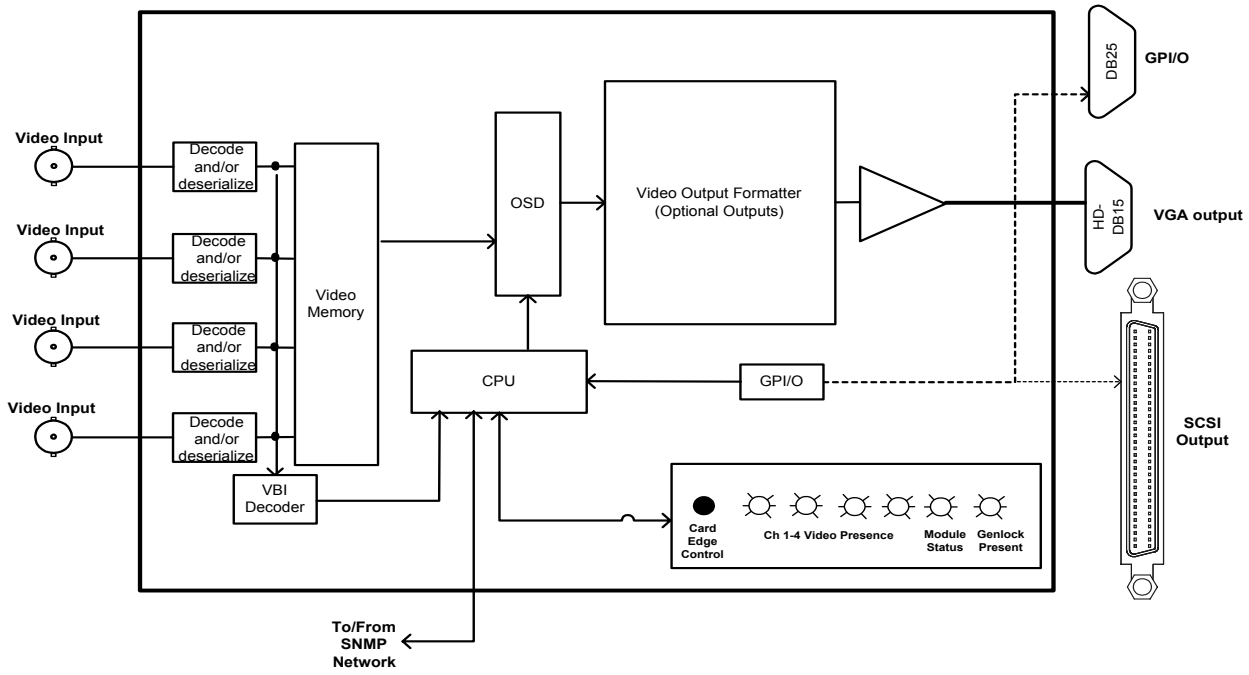
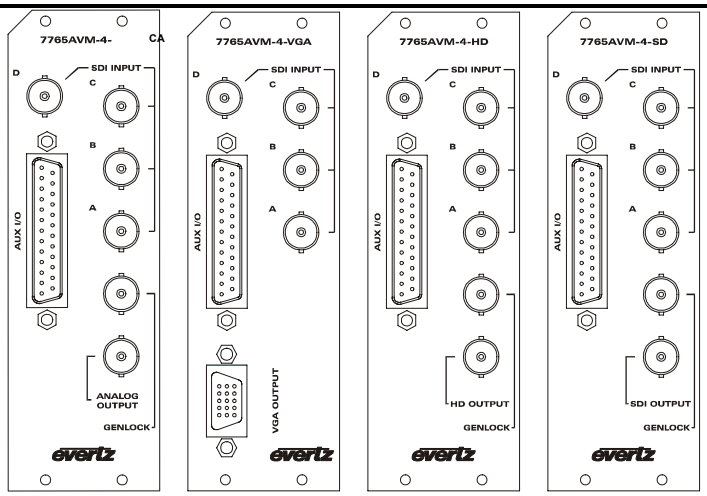
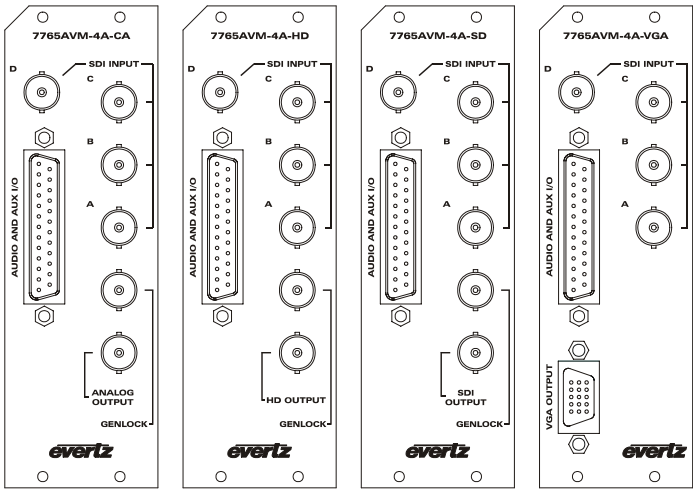


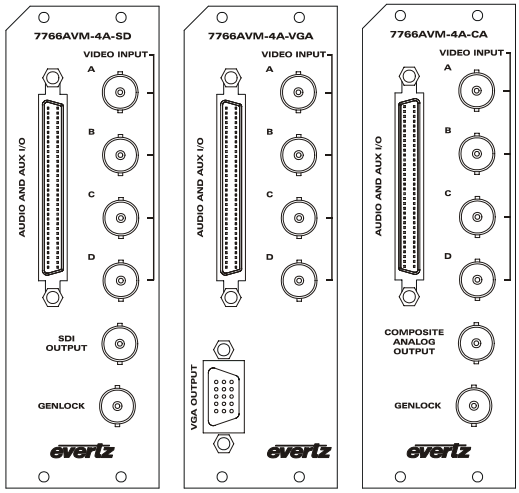
Figure 3: 7765AVM-4V-VGA and 7766AVM-4V-VGA/7766AVM-S4V-VGA Block Diagram

2. INSTALLATION

The Quattro cards come with a companion rear plates that may include BNC connectors, a high-density DB-15 and one female DB-25 or female 68-pin SCSI depending on the “Quattro” model. Modules occupy two slots in the 7700FR-C frame. The cards must be inserted into slots with the correct rear plate assembly. Figure 4 shows a picture of available “Quattro” rear plates. For information on mounting the rear plate and inserting the module into the frame see the 7700FR-C chapter, section 3.


7765AVM-4-CA
7765AVM-4-VGA
7765AVM-4-HD
7765AVM-4-SD
SDI INPUT
AUX I/O
ANALOG OUTPUT
VGA OUTPUT
HD OUTPUT
SDI OUTPUT
GENLOCK


7765AVM-4A-CA
7765AVM-4A-HD
7765AVM-4A-SD
7765AVM-4A-VGA
SDI INPUT
AUDIO AND AUX I/O
ANALOG OUTPUT
HD OUTPUT
SDI OUTPUT
VGA OUTPUT
GENLOCK


7766AVM-4A-SD
7766AVM-4A-VGA
7766AVM-4A-CA
VIDEO INPUT
AUDIO AND AUX I/O
SDI OUTPUT
COMPOSITE ANALOG OUTPUT
VGA OUTPUT
GENLOCK

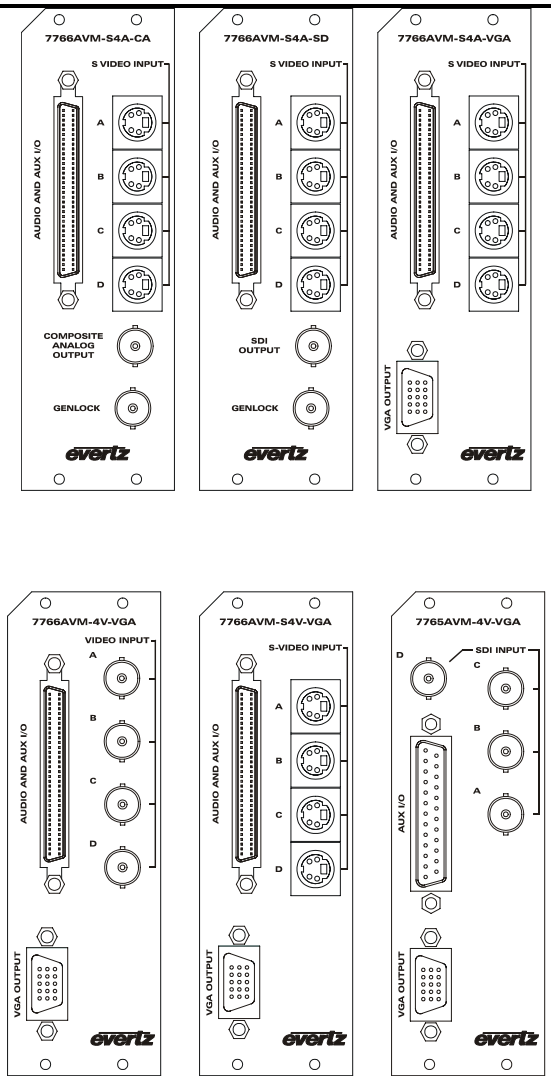


Figure 4: Quattro™ Rear Plates

2.1. VIDEO IN AND OUT

7765AVM-4 and 7765AVM-4A
Connect a source of component digital 525 line or 625 line 270 Mb/s (with or without embedded audio, or external AES/EBU) video to each (or any) of the four SDI inputs (labeled "SDI INPUT 1-4"). The –VGA versions are equipped with firmware to handle only one type of input. Processed video with text and audio bar graphs are available on one of the HD, SD, Composite Analog or VGA outputs.

7766AVM-4 and 7766AVM-S4A
Connect a source of composite analog NTSC or PAL video to each (or any) of the four composite analog inputs (labeled "VIDEO INPUT 1-4"). Processed video with text and audio bar graphs are available on one of the SD, Composite Analog or VGA outputs.

7765AVM-4V, 7766AVM-4V and 7766AVM-S4V
Connect a source of component digital 525 line or 625 line 270 Mb/s video to each (or any) of the four SDI inputs (labeled "SDI INPUT A-D" on the 7765AVM-4V-x) or composite analog (NTSC or PAL) video to each (or any) of the four composite analog inputs (labeled "VIDEO INPUT A-D" on the 7766AVM-4V). Similarly, S-Video inputs are connected to the Quattro module via S-Video inputs.

2.2. 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 5 shows the input circuit for the General Purpose inputs.

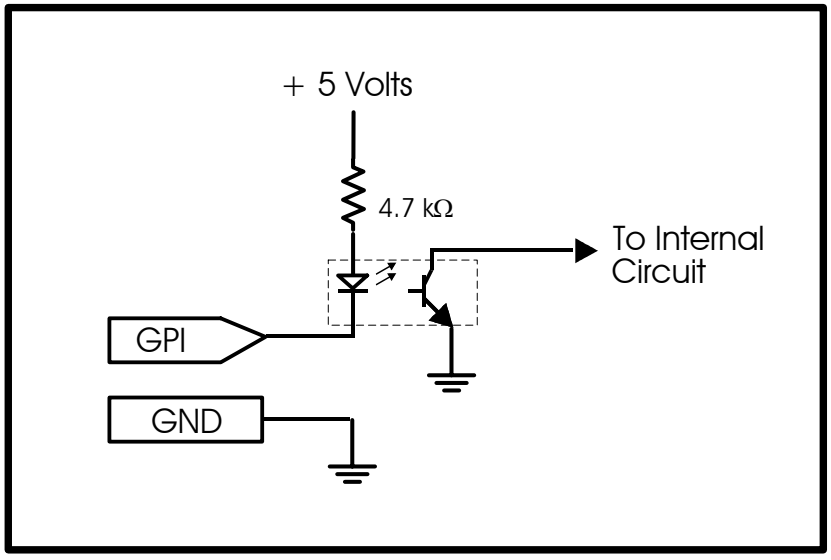


Figure 5: GPI Input Circuitry

The GPO's are software programmable active high or low with internal pull up (10kΩ) 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 6 shows the circuit for the General Purpose output.

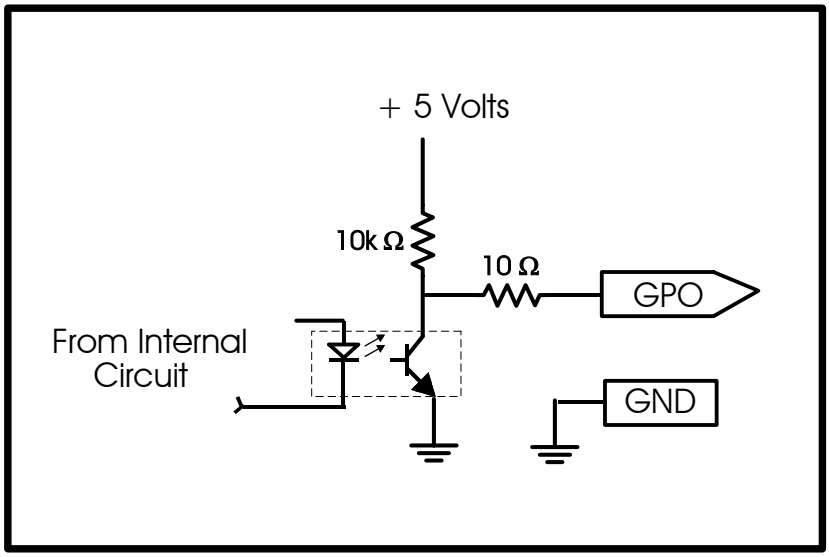


Figure 6: GPO Output Circuitry

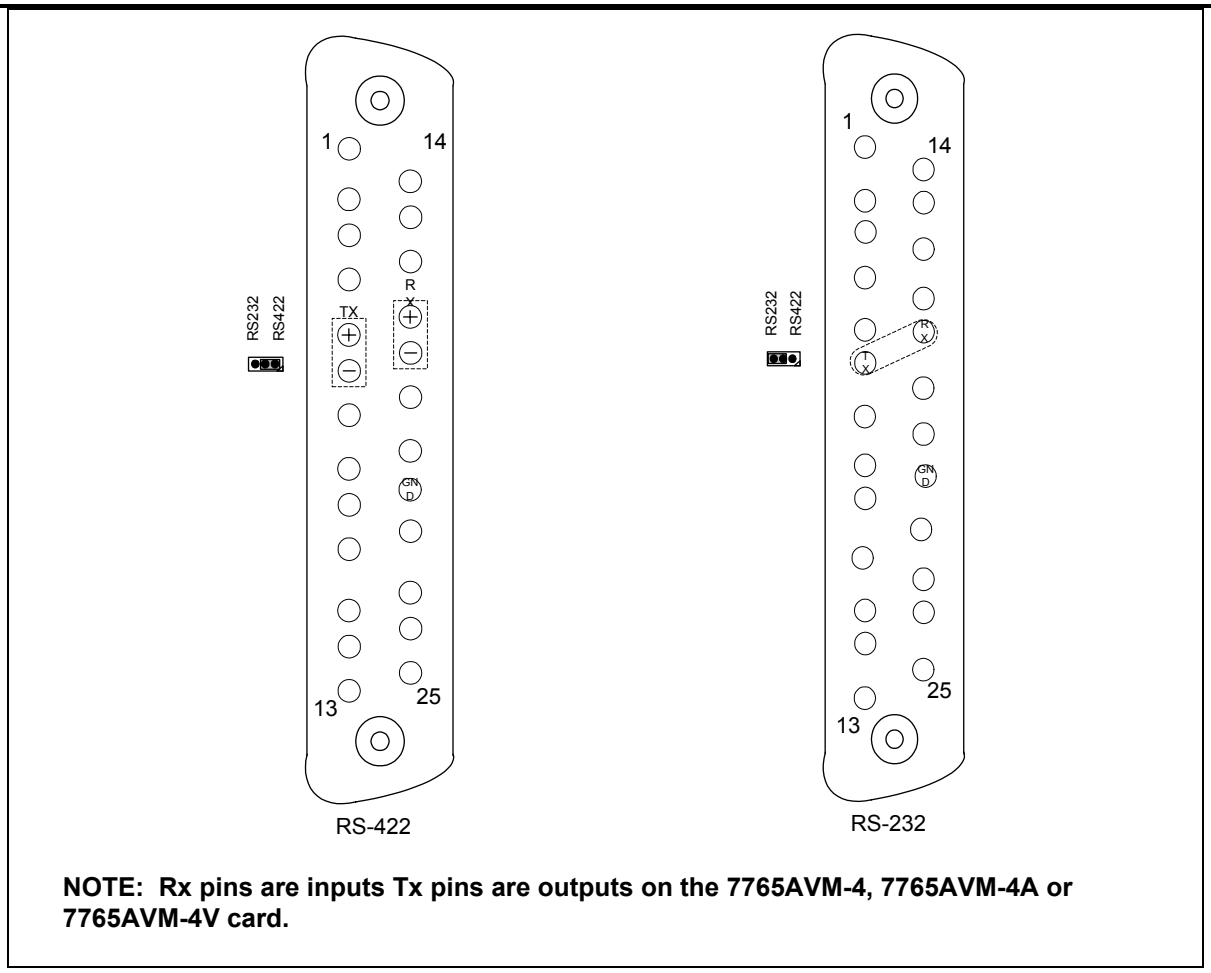
2.2.1. RS-232/422 Serial Port Connections

The COM port signals are either standard RS-422 or RS-232 with no hardware flow control. The directions of the signals are indicated in Table 1. The port on the AUDIO AND AUX I/O connector is used for data logging of the status and fault condition alerts. Jumper J23 located on the 7765AVM-4 module is used to determine whether the designated pins operate as a balanced RS422 Receive and Transmit channel, or as a RS-232 Receive and Transmit channel. (See Figure 7 for jumper location.)

For RS-232 operation, 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.

The port's physical layout on digital input (7765AVM-x) Quattro™ cards is shown in Figure 7. Pin designations for all supported Quattro™ products are provided in Tables 2-4.

For SCSI connection of audio and AUX I/O convenience, a single bulkhead breakout panel (BHP) with terminal blocks is provided with each Analog Quattro™ card. Physical audio, GPI/O and AUX layout connections are depicted in Figure 8.



NOTE: Rx pins are inputs Tx pins are outputs on the 7765AVM-4, 7765AVM-4A or 7765AVM-4V card.

Figure 7: AUDIO AND AUX I/O Physical Layout and RS-232/422 Serial I/O Pin Connections for Specified Quattro™ cards.

DB-25	7765AVM-4 7765AVM-4V	Description	7765AVM-4A	Description
1	GPI1	General Purpose Input 1	GPI1	General Purpose Input 1
2	GPI2	General Purpose Input 2	GPI2	General Purpose Input 2
3	GPI3	General Purpose Input 3	AES5	AES2 Video B
4	GPI4	General Purpose Input 4	AES6	AES3 Video B
5	Tx+	RS-422 (Jumper configurable)	Tx+	RS-422 (Jumper configurable)
6	Tx-/Tx	RS-422/232 (Jumper configurable)	Tx-/Tx	RS-422/232 (Jumper configurable)
7	GPO1	General Purpose Output 1	GPO1	General Purpose Output 1
8	GPO2	General Purpose Output 2	GPO2	General Purpose Output 2
9			AES1	AES1 Video A
10			AES2	AES2 Video A
11	GPI9	General Purpose Input 9	AES7	AES1 Video C
12	GPI10	General Purpose Input 10	AES8	AES2 Video C
13	GPI5	General Purpose Input 5	AES9	AES3 Video C
14	GPI6	General Purpose Input 6	AES11	AES2 Video D
15	GPI7	General Purpose Input 7	AES12	AES3 Video D
16	GPI8	General Purpose Input 8	GPI3	General Purpose Input 3
17	Rx+	RS-422 (Jumper configurable)	Rx+	RS-422 (Jumper configurable)
18	Rx-/Rx	RS-422/232 input (Jumper configurable)	Rx-/Rx	RS-422/232 input (Jumper configurable)
19	GPO3	General Purpose Output 3	GPO3	General Purpose Output 3
20	GPO4	General Purpose Output 4	GPO4	General Purpose Output 4
21	Ground	Ground	GND	Ground
22			AES3	AES3 Video A
23			AES4	AES1 Video B
24	GPI11	General Purpose Input 11	GPI4	General Purpose Input 4
25	GPI12	General Purpose Input 12	AES10	AES1 Video D
Shell	GND	Ground	GND	Ground

Table 2: Audio and AUX I/O Pinouts for Quattro™ 7765AVM-4-x, 7765AVM-4A-x and 7765AVM-4V-x Cards

68-pin SCSI	7766AVM-4A 7766AVM-S4A	Description	68-pin SCSI	7766AVM-4A 7766AVM-S4A	Description
1	Rx+	RS-422 (Jumper configurable)	35	RX-/RX	RS-422/232 input (Jumper configurable)
2	Tx+	RS-422 (Jumper configurable)	36	TX-/TX	RS-422/232 (Jumper configurable)
3	GPO1	General Purpose Output 1	37	GPO4	General Purpose Output 4
4	GPO2	General Purpose Output 2	38	GPO3	General Purpose Output 3
5	GND	Ground	39	GND	Ground
6	A3+	Audio Input Channel	40	A3-	Audio Input Channel
7	A4-	Audio Input Channel	41	A4+	Audio Input Channel
8	GND	Ground	42	GND	Ground
9	A1+	Audio Input Channel	43	A1-	Audio Input Channel
10	A2+	Audio Input Channel	44	A2-	Audio Input Channel
11	GND	Ground	45	GND	Ground
12	B1-	Audio Input Channel	46	B1+	Audio Input Channel
13	GND	Ground	47	GND	Ground
14	D1-	Audio Input Channel	48	D1+	Audio Input Channel
15	GND	Ground	49	GND	Ground
16	B3-	Audio Input Channel	50	B3+	Audio Input Channel
17	GND	Ground	51	GND	Ground
18	B4-	Audio Input Channel	52	B4+	Audio Input Channel
19	GND	Ground	53	GND	Ground
20	D2+	Audio Input Channel	54	D2-	Audio Input Channel
21	GND	Ground	55	GND	Ground
22	B2-	Audio Input Channel	56	B2+	Audio Input Channel
23	GND	Ground	57	GND	Ground
24	C1-	Audio Input Channel	58	C1+	Audio Input Channel
25	GND	Ground	59	GND	Ground
26	C2+	Audio Input Channel	60	C2-	Audio Input Channel
27	GND	Ground	61	GND	Ground
28	C3-	Audio Input Channel	62	C3+	Audio Input Channel
29	C4+	Audio Input Channel	63	C4-	Audio Input Channel
30	GND	Ground	64	GND	Ground
31	D3+	Audio Input Channel	65	D3-	Audio Input Channel
32	D4+	Audio Input Channel	66	D4-	Audio Input Channel
33	GPI3	General Purpose Input 3	67	GPI4	General Purpose Input 4
34	GPI1	General Purpose Input 1	68	GPI2	General Purpose Input 2

Table 3: Audio and AUX I/O Pinouts for 7766AVM-4A-x and 7766AVM-S4A-x Quattro™ Cards

68-pin SCSI	7766AVM-4V-VGA 7766AVM-S4V-VGA	Description	68-pin SCSI	7766AVM-4V-VGA 7766AVM-S4V-VGA	Description
1	Rx+	RS-422 (Jumper configurable)	35	RX-/RX	RS-422/232 input (Jumper configurable)
2	Tx+	RS-422 (Jumper configurable)	36	TX-/TX	RS-422/232 (Jumper configurable)
3	GPO1	General Purpose Output 1	37	GPO4	General Purpose Output 4
4	GPO2	General Purpose Output 2	38	GPO3	General Purpose Output 3
5	GND	Ground	39	GND	Ground
6 - 32	N/A	Not used	40 - 66	N/A	Not used
33	GPI3	General Purpose Input 3	67	GPI4	General Purpose Input 4
34	GPI1	General Purpose Input 1	68	GPI2	General Purpose Input 2

Table 4: AUX I/O Pinouts on 7766AVM-4V-x and 7766AVM-S4V-x Quattro™ Cards

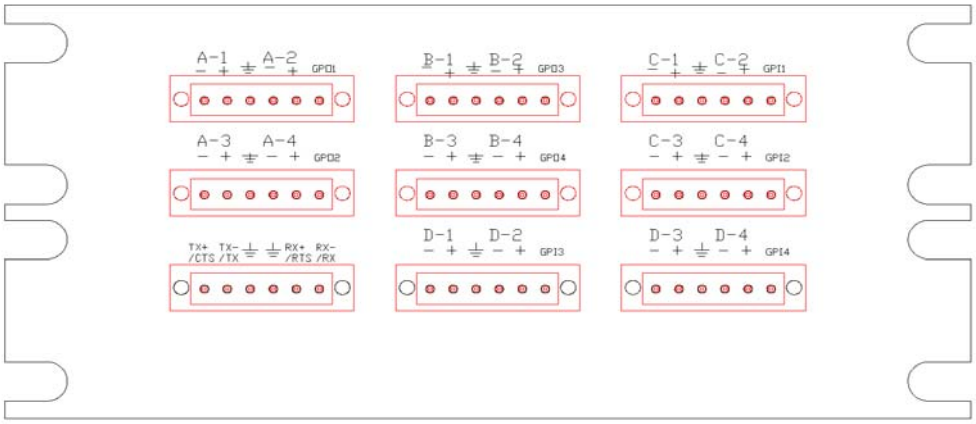


Figure 8: 7766AVM-4A-BHP-1

Figure 9: 7765AVM-4A-BHP-7

The 7765AVM-4A-BHP-7 breakout panel features audio and Aux inputs for up to seven 7765AVM-4A-x modules in a convenient rack-mounted format. Three AES inputs (1, 2 and 3) can be provided via BNC for Video Inputs A, B, C and D respectively. As a factory default, these Video Inputs correspond to Quadrants 1, 2, 3 and 4 respectively, but can be reconfigured if necessary (see section 12 for more information).

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUT

Applicable Quattro™ Cards: 7765AVM-4-xx
7765AVM-4A-xx
7765AVM-4V-xx

Standard:	SMPTE 259M-C, 525 OR 625 lines component (525 line input only on 7765AVM-4/-4A-HD)
Number of Inputs:	4
Connector:	BNC per IEC 169-8
Termination:	75 ohm
Equalization:	Automatic >225m @ 270 Mb/s with Belden 8281 (or equivalent)
Return Loss:	>15dB up to 270MHz
Embedded Audio:	SMPTE 272M-A (not available on 7765AVM-4V versions)

3.2. ANALOG VIDEO INPUT

Applicable Quattro™ Cards: 7766AVM-4A-xx
7766AVM-4V-xx

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

3.3. S-VIDEO INPUT

Applicable Quattro™ Cards: 7766AVM-S4A-xx
7766AVM-S4V-xx

Number of Inputs:	4
Connector:	4-pin mini DIN
Signal Level:	Y: 1.0 Vp-p, C: 0.286 Vp-p
Input Impedance:	75Ω, sync negative, 75Ω terminated

3.4. DIGITAL AES/EBU AUDIO INPUT

Applicable Quattro™ Cards: 7765AVM-4A-xx

Number of Inputs: 3 AES/EBU per video input (total 12 inputs)
Standard: SMPTE 276M, single ended AES
Connectors: Female DB-25
Resolution: 24 bit
Sampling Rate: 48 kHz
Impedance: 75 Ω unbalanced

Three AES/EBU audio channels are supported in 7765AVM-4A-VGA "Build 2" cards. Quattro™ cards delivered after August 1, 2002 are considered "Build 2". Prior to this date, modules are considered "Build 1" and only two AES/EBU audio channels on the "–4A" modules are supported. For additional information, please contact Evertz.

3.5. ANALOG AUDIO INPUT

Applicable Quattro™ Cards: 7766AVM-4A-xx
7766AVM-S4A-xx

Number of Inputs: 8 (4 balanced inputs per video input channel)
Connector: 68-pin SCSI
Input Impedance: 20 kΩ minimum (differential)
Sampling Frequency: 48kHz
Peak Signal and Common Mode Level: 30 dBu

3.6. AUDIO BAR GRAPHS

Applicable Quattro™ Cards: All, except video-only versions

Number of Graphs: 4 (1 group) per input video channel
Ballistics: AES/EBU, DIN, BBC and Nordic N9

3.7. SERIAL VIDEO OUTPUT

Applicable Quattro™ Cards: 7765AVM-4-HD
7765AVM-4A-HD

Standard: SMPTE 292M
Number of Outputs: 1
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 200ps nominal
Overshoot: <10% of amplitude

3.8. SERIAL VIDEO

Applicable Quattro™ Cards:
7765AVM-4-SD
7765AVM-4A-SD
7765AVM-4V-SD
7766AVM-4V-SD
7766AVM-S4V-SD
7766AVM-4A-SD
7766AVM-S4A-SD

Standard:	SMPTE 259M-C
Number of Outputs:	1
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

3.9. ANALOG VIDEO OUTPUT

Applicable Quattro™ Cards:
7765AVM-4-CA
7765AVM-4A-CA
7766AVM-4A-CA

Standard:	NTSC, SMPTE 170M, PAL ITU624-4
Number of Outputs:	1
Connector:	BNC per IEC 169-8
Signal Level:	1V nominal
DC Offset:	0V +/- 0.1V
Return Loss:	>35 dB up to 5MHz
Frequency Response:	0.8 dB to 4 MHz
Differential Phase:	<0.9deg. (<0.6deg. typical)
Differential Gain:	<0.9% (<0.5% typical)
SNR:	>56 dB to 5MHz (shallow ramp)

3.10. ANALOG VIDEO OUTPUT

Applicable Quattro™ Cards:
7765AVM-4-VGA
7765AVM-4A-VGA
7765AVM-4V-VGA
7766AVM-4V-VGA
7766AVM-S4V-VGA
7766AVM-4A-VGA
7766AVM-S4A-VGA

Standard: VESA (Resolution: 1920 x 540p)
Number of Outputs: 1
Connector: Female high-density DB-15
Video: 1Vp-p YPrPb/RGB or 0.7V p-p VGA, 60Hz refresh
Sync: 300 mV or 4V
Impedance: 75Ω

3.11. ANALOG VIDEO OUTPUT

Applicable Quattro™ Cards: 7765AVM-4-VGA(XGA)
7765AVM-4A-VGA(XGA)
7765AVM-4V-VGA(XGA)
7766AVM-4V-VGA(XGA)
7766AVM-S4V-VGA(XGA)
7766AVM-4A-VGA(XGA)
7766AVM-S4A-VGA(XGA)

Standard: VESA (Resolution: 1024 x 768)
Number of Outputs: 1
Connector: Female high-density DB-15
Video: 1Vp-p YPrPb/RGB or 0.7V p-p VGA, 60Hz refresh
Sync: 300 mV or 4V
Impedance: 75Ω

3.12. GENLOCK INPUT

Applicable Quattro™ Cards: All, except for –VGA versions

Type: NTSC (SMPTE 170M) color black
Level: 1Vp-p nominal
Connector: BNC per IEC 169-8

3.13. GENERAL PURPOSE IN/OUT

Applicable Quattro™ Cards: 7765AVM-4-xx
7765AVM-4V-xx

Number of Inputs: 12 (configurable)
Number of Outputs: 4 (configurable)
Type: Opto-isolated, active low with internal pull-ups to +5V
Connector: Female DB-25
Input signal: Closure to ground
Signal Level: +5V nominal

3.14. GENERAL PURPOSE IN/OUT

Applicable Quattro™ Cards: 7765AVM-4A-xx

Number of Inputs: 4 (configurable)
Number of Outputs: 4 (configurable)
Type: Opto-isolated, active low with internal pull-ups to +5V
Connector: Female DB-25
Input signal: Closure to ground
Signal Level: +5V nominal

3.15. GENERAL PURPOSE IN/OUT

Applicable Quattro™ Cards: All 7766AVM-xx-yy cards

Number of Inputs: 4 (configurable)
Number of Outputs: 4 (dedicated)
Type: Opto-isolated, active low with internal pull-ups to +5V
Connector: 68-pin SCSI
Input signal: Closure to ground
Signal Level: +5V nominal

3.16. DATA INPUT/OUTPUT SERIAL PORT

Number of Ports: 1 RS-232 or 1 RS-422 (jumper selectable)
Connector: Female DB-25
Baud Rate: Up to 1 Mbaud
Format: RS-232: 8 bits, no parity, 2 stop bits and no flow control

3.17. ELECTRICAL (All Quattro™ Cards)

Voltage: +12VDC
Power: 24 Watts
EMI/RFI: Complies with FCC Part 15, Class A and EU EMC directive.

3.18. PHYSICAL (All Quattro™ Cards)

Number of slots: 2

4. ORDERING INFORMATION

SDI Input Quattro™ Cards	
Quattro™ Product Name	**Description**
7765AVM-4-HD	Quattro™ Four SDI quad-split display and monitoring with embedded AES/EBU audio and HD-SDI output
7765AVM-4-SD	Quattro™ Four SDI quad-split display and monitoring with embedded AES/EBU audio and SDI output
7765AVM-4-CA	Quattro™ Four SDI quad-split display and monitoring with embedded AES/EBU audio and composite analog output
7765AVM-4-VGA	Quattro™ Four SDI quad-split display and monitoring with embedded AES/EBU audio and VGA output (High resolution)
7765AVM-4-VGA(XGA)	Quattro™ Four SDI quad-split display and monitoring with embedded AES/EBU audio and VGA output (XGA resolution)
7765AVM-4A-HD	Quattro™ Four SDI quad-split display and monitoring with embedded or external AES/EBU audio and HD-SDI output
7765AVM-4A-SD	Quattro™ Four SDI quad-split display and monitoring with embedded or external AES/EBU audio and SDI output
7765AVM-4A-CA	Quattro™ Four SDI quad-split display and monitoring with embedded or external AES/EBU audio and composite analog output
7765AVM-4A-VGA	Quattro™ Four SDI quad-split display and monitoring with embedded or external AES/EBU audio and VGA output (High resolution)
7765AVM-4A-VGA(XGA)	Quattro™ Four SDI quad-split display and monitoring with embedded or external AES/EBU audio and VGA output (XGA resolution)

SDI Input Video-only Quattro™ Cards	
Quattro™ Product Name	**Description**
7765AVM-4V-SD	Four SDI video-only Quattro™ quad-split display with SDI output
7765AVM-4V-VGA	Four SDI video-only Quattro™ quad-split display with analog RGB output (High Resolution)
7765AVM-4V-VGA(XGA)	Four SDI video-only Quattro™ quad-split display with analog RGB output (XGA Resolution)

Analog and S-Video Input Quattro™ Cards	
Quattro™ Product Name	**Description**
7766AVM-4A-SD	Analog Quattro™ Four Composite Analog Video (BNC) quad-split display and Analog Audio Monitoring with SDI output (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-4A-CA	Analog Quattro™ Four Composite Analog Video (BNC) quad-split display and Analog Audio Monitoring with composite analog output (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-4A-VGA	Analog Quattro™ Four Composite Analog Video (BNC) quad-split display and Analog Audio Monitoring with analog RGB output (High resolution) (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-4A-VGA(XGA)	Analog Quattro™ Four Composite Analog Video (BNC) quad-split display and Analog Audio Monitoring with analog RGB output (XGA resolution) (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-S4A-SD	Analog Quattro™ Four S-Video quad-split display and Analog Audio Monitoring with SDI output (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-S4A-CA	Analog Quattro™ Four S-Video quad-split display and Analog Audio Monitoring with composite analog output (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-S4A-VGA	Analog Quattro™ Four S-Video quad-split display and Analog Audio Monitoring with analog RGB output (High resolution) (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)
7766AVM-S4A-(XGA)	Analog Quattro™ Four S-Video quad-split display and Analog Audio Monitoring with analog RGB output (XGA resolution) (includes 1x 7766AVM-4A-BHP-1 & 1 breakout cable for Audio and AUX I/O)

Quattro™ Card Accessories	
Product Name	**Description**
7765AVM-4A-BHP-7	Bulkhead breakout panel, linking audio, GPI/O and comm. port to up to seven 7764AVM-4A-xx Quattro™ cards (includes 7x 3ft cables)
7766AVM-4A-BHP-4	Bulkhead breakout panel, linking audio, GPI/O and comm. port to up to four 7766AVM-4A/-S4A Analog Quattro™ cards
7766AVM-4A-BHP-1	Bulkhead breakout panel, linking audio, GPI/O and comm. port to one 7766AVM-4A/-S4A Analog Quattro™ card (included with every 7766AVM-4A and 7766AVM-S4A product. See Figure 3.)
WA7765AVM4ABHP	Breakout cable (3ft) for 7765AVM-4A-BHP-7
WSCSI33PEX4	Breakout cable (3ft) for 7766AVM-4A-BHP (will work for both “BHP–4” or “BHP–1” models)

5. STATUS LEDs

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

The Red LED will be on when there is a fault in the module power supply or a user configurable error condition exists (as configured through the Frame Status Trigger menu option).

5.2. VIDEO STATUS LEDs

Four LEDs on the top board (7700CC) indicate which video input signals are present.

Video LED	Color	Video Status
1	Off	No video present on channel A
	Green	Video present on channel A
2	Off	No video present on channel B
	Green	Video present on channel B
3	Off	No video present on channel C
	Green	Video present on channel C
4	Off	No video present on channel D
	Green	Video present on channel D

Table 5: Video Status LEDs

6. OPERATING LEVELS, HEADROOM, CLIPPING AND THE BAR GRAPHS (7765AVM-4-xx and 77665AVM-4A-xx)

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 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.

Programming rules for bar type/ballistics, headroom and max. analog output level:

1. If the user sets the bargraph type/ballistics then: grab the headroom and calculate the max. analog output level. This will set things appropriate to the "standard". The user can then change things to become "non-standard".
2. If the user sets the headroom then: grab the max. analog output level and calculate the new reference level that corresponds to 0dB on the bargraph. This is the 0dB relative or 100% level.
3. If the user sets the max. analog output level then: grab the headroom and calculate the new reference level that corresponds to 0dB on the bargraph. This is the 0dB relative or 100% level.

7. AUDIO ALARM CALIBRATION PROCEDURE

This section not applicable to Video-only Quattro™ versions 7765AVM-4V-xx, 7766AVM-4V-xx and 7766AVM-S4V-xx)

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 7.5 for a complete description of the fault definition menu items.

7.1. 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.

7.2. 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.

7.3. 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.

7.4. 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.

8. ON SCREEN MENUS

8.1. NAGIVATING 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. Module configuration is possible through VistaLINK™ using either the VistaLINK™ PRO Network Management System (NMS) or other SNMP Manager (provided that the interface has been developed for the third-party manager).

Using the push-button/toggle technique, enter the on-screen menu system by pressing 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.

8.1.1. 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.

9. On-Screen Display (OSD) Menu Quick Reference (7765AVM-4-xx and 7765AVM-4A-xx Cards)

VIDEO SOURCE A
- Audio channel 1/2
  - Audio level mode
  - Headroom
  - PPM mode
  - Clear peak
- Audio channel 3/4
  - same as Audio channel 1/2
- Audio channel 5/6
  - same as Audio channel 1/2 (only on 7765AVM-4A-xx versions)
- Source ID
  - 525 VITC line
  - 625 VITC line
  - Default source ID mode
  - Default source ID message
  - Source ID color 1 enable
  - Source ID color 2 enable
  - Source ID color 3 enable
- Fault definitions
  - **Video error duration**
  - **Loss of audio duration**
  - **EDH error 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 program rating duration**
  - **Picture noise level**
  - **Freeze duration**
  - **Black video duration**
- Audio source
- 625 CC line
- Clear peaks

VIDEO SOURCE B
- same as Video source A

VIDEO SOURCE C
- same as Video source A

VIDEO SOURCE D
- same as Video source A

QUADRANT 1
- Bar graph 1/2
  - Bar graph properties
  - Level type
  - VU range
  - Phase type
  - Error region
  - Warning region
- Bar graph 3/4
  - Same as Bar graph 1/2
- Bar graph 5/6
  - Same as Bar graph 1/2 (only on 7765AVM-4A-xx versions
- Burn-in configuration
  - On screen display configuration (Quick Link)
  - Burn-in enable
    - *Ch 1/2 level bars*
    - *Ch 3/4 level bars*
    - *Ch 5/6 level bars (only on 7765AVM-4A version)*
    - *Ch 1/2 phase bar*
    - *Ch 3/4 phase bar*
    - *Ch 5/6 phase bar (only on 7765AVM-4A version)*
    - *Status*
    - *Time code*
    - *Program rating*
    - *XDS*
    - *Source ID/UMD*
  - 4:3 quadrant burn-in position
    - *Time code window row*
    - *Time code window col*
    - *Program rating window row*
    - *Program rating window col*
    - *XDS window row*
    - *XDS window col*
    - *Fault 1 window row*
    - *Fault 1 window col*
    - *Fault 2 window row*
    - *Fault 2 window col*
    - *Fault 3 window row*
    - *Fault 3 window col*
    - *Fault 4 window row*
    - *Fault 4 window col*
  - 16:9 quadrant burn-in position (only on – HD versions)
    - *Time code window row*
    - *Time code window col*
    - *Program rating window row*
    - *Program rating window col*
    - *XDS window row*
    - *XDS window col*
    - *Fault 1 window row*
    - *Fault 1 window col*
    - *Fault 2 window row*
    - *Fault 2 window col*
    - *Fault 3 window row*
    - *Fault 3 window col*
    - *Fault 4 window row*
    - *Fault 4 window col*
  - Expanded view burn-in position
    - *Status window row*
    - *Status window col*
    - *Time code window row*
    - *Time code window col*
    - *Program rating window row*
    - *Program rating window col*
    - *XDS window row*
    - *XDS window col*
    - *Fault 1 window row*
    - *Fault 1 window col*
    - *Fault 2 window row*
    - *Fault 2 window col*

- *Fault 3 window row*
- *Fault 3 window col*
- *Fault 4 window row*
- *Fault 4 window col*
- Status burn-in mode
- Fault conditions
  - Fault burn-in properties (Quick link)
  - Fault condition 1
    - *Fault status*
    - *4:3 quadrant burn-in position*
    - *16:9 quadrant burn-in position*
    - *Expanded view burn-in position*
    - *Message*
    - *Mode*
    - *Logic*
    - *Color*
    - *Blink*
    - *Duration*
    - *Clear fault*
    - *Video error*
    - *Loss of audio*
    - *Loss of audio channel 1/2*
    - *Loss of audio channel 3/4*
    - *Loss of audio channel 5/6*
    - *AP EDH errors*
    - *FF EDH errors*
    - *Phase reversal 1/2*
    - *Phase reversal 3/4*
    - *Phase reversal 5/6*
    - *Audio over 1/2*
    - *Audio over 3/4*
    - *Audio over 5/6*
    - *Audio silence 1/2*
    - *Audio silence 3/4*
    - *Audio silence 5/6*
    - *Audio mono 1/2*
    - *Audio mono 3/4*
    - *Audio mono 5/6*
    - *Loss VITC*
    - *Loss SID*
    - *Loss of program rating*
    - *Loss of CC*
    - *Picture freeze*
    - *Picture black*
    - *GPI1 - 12*
  - Fault condition 2
    - *same as Fault condition 1*
  - Fault condition 3
    - *same as Fault condition 1*
  - Fault condition 4
    - *same as Fault condition 1*
  - Video source
  - Expanded view
  - H/V delay
  - Clear faults
  - Disable on-screen faults

QUADRANT 2

- same as Quadrant 1

QUADRANT 3

- same as Quadrant 1

QUADRANT 4

- same as Quadrant 1

ON SCREEN DISPLAY CONFIGURATION

- Bar graph properties
  - *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*
  - *Background opacity*
  - *Bars opacity*
- Text burn-in properties
  - *Source ID color 1*
  - *Source ID color 2*
  - *Source ID color 3*
  - *Default background color*
  - *Background opacity*
  - *Text opacity*
- Fault burn-in properties
  - *Background color 1*
  - *Background color 2*
  - *Background opacity*
  - *Text opacity*

GPI CONFIGURATION

- GPIx

GPO CONFIGURATION
- GPO1
  - GPO active state
  - Q1F1
  - Q1F2
  - Q1F3
  - Q1F4
  - Q2F1
  - Q2F2
  - Q2F3
  - Q2F4
  - Q3F1
  - Q3F2
  - Q3F3
  - Q3F4
  - Q4F1
  - Q4F2
  - Q4F3
  - Q4F4
- GPO2
  - Same as for GPO1
- GPO3
  - Same as for GPO1
- GPO4
  - Same as for GPO1
- Frame status trigger
  - Q1F1
  - Q1F2
  - Q1F3
  - Q1F4
  - Q2F1
  - Q2F2
  - Q2F3
  - Q2F4
  - Q3F1
  - Q3F2
  - Q3F3
  - Q3F4
  - Q4F1
  - Q4F2
  - Q4F3
  - Q4F4

H/V DELAY
- 525 start line
- 625 start line
- 525 start sample
- 625 start sample

SERIAL PORT
- Data logging
  - Fault log
  - Status log
  - Card ID
  - Event stamp
  - Poll rate
  - Query status
- Image video protocol
  - Video source A
    - *Identification number*
    - *Tally mode*
    - *Power-up line 1*
    - *Power-up line 2*
    - *Power-up line 3*
    - *Message 1*
    - *Message 2*
    - *Message 3*
    - *Identification string*
    - *Message 1 duration*
    - *Message 2 duration*
    - *Message 3 duration*
    - *Message 4 duration*
    - *Tally 1*
    - *Tally 2*
  - Video source B
    - *same as Video source A*
  - Video source C
    - *same as Video source A*
  - Video source D
    - *same as Video source A*
  - Baud rate
- TSL protocol
- Video source A address=
- Video source B address=
- Video source C address=
- Video source D address=
- Serial port configuration
  - Data logging
  - TSL protocol
  - Probel protocol
  - Image video protocol

UTILITIES
- About…
- Store preset 1
- Store preset 2
- Recall preset 1
- Recall preset 2
- Upgrade
- Factory reset

LOSS OF VIDEO

DISPLAY MODE

ASPECT RATIO GPI SELECT

VIDEO ASPECT RATIO ENABLE

QUADRANT FAULT INDICATOR

OUTPUT ACTIVE WINDOW

NTSC SETUP PEDESTAL

10. On-Screen Display (OSD) Menu Quick Reference (7766AVM-4A-xx and 7766AVM-S4A-xx Cards)

VIDEO SOURCE A
- Audio Channel ½
  - Audio level mode
  - Reference level
  - PPM mode
  - Clear peak
- Audio Channel ¾
  - *same as Audio Channel ½*
- Source ID
  - 525 VITC line
  - 625 VITC line
  - Default Source ID mode
  - Default Source ID message
  - Source ID color 1 enable
  - Source ID color 2 enable
  - Source ID color 3 enable
- Active video
- Fault definitions
  - **Video error duration**
  - **Max APL**
  - **Max APL duration**
  - **Min APL**
  - **Min APL 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 program rating duration**
  - **Picture Noise Level**
  - **Freeze duration**
  - **Black video duration**
  - Clear peaks

VIDEO SOURCE B
- same as Video source A

VIDEO SOURCE C
same as Video source A

VIDEO SOURCE D
same as Video source A

QUADRANT X
- Bar graph ½
  - Bar graph properties (Quick link)
  - Level type
  - VU range
  - Phase type
  - Error region
- Bar graph ¾
  - Same as Bar graph ½
- Burn-in configuration
  - On screen display configuration (Quick link)
  - Burn-in enable
    - *Ch ½ level bar*
    - *Ch ¾ level bar*
    - *Ch ½ phase bar*
    - *Ch ¾ phase bar*
    - *Status*
    - *Time code*
    - *Program rating*
    - *XDS*
    - *Source ID/UMD*
  - 4:3 Quadrant burn-in position
    - *Time code window row*
    - *Time code window col*
    - *Program rating window row*
    - *Program rating window col*
    - *XDS window row*
    - *XDS window col*
    - *Fault 1 window row*
    - *Fault 1 window col*
    - *Fault 2 window row*
    - *Fault 2 window col*
    - *Fault 3 window row*
    - *Fault 3 window col*
    - *Fault 4 window row*
    - *Fault 4 window col*
  - Expanded view burn-in position
    - *Status window row*
    - *Status window col*
    - *Time code window row*
    - *Time code window col*
    - *Program rating window row*
    - *Program rating window col*
    - *XDS window row*
    - *XDS window col*
    - *Fault 1 window row*
    - *Fault 1 window col*
    - *Fault 2 window row*
    - *Fault 2 window col*
    - *Fault 3 window row*
    - *Fault 3 window col*
    - *Fault 4 window row*
    - *Fault 4 window col*
  - Status burn-in mode
- Fault conditions
  - Fault burn-in properties (Quick link)
  - Fault condition 1
    - *Fault status*
    - *4:3 quadrant burn-in position (Quick link)*
    - *Expanded view burn-in position (Quick link)*
    - *Message*
    - *Mode*
    - *Logic*
    - *Color*
    - *Blink*
    - *Duration*
    - *Clear fault*
    - *Video error*
    - *Max APL over*
    - *Min APL under*
    - *Phase rev. ½*
    - *Phase rev. ¾*
    - *Audio over 1*
    - *Audio over 2*

- *Audio over 3*
- *Audio over 4*
- *Audio silence1*
- *Audio silence 2*
- *Audio silence 3*
- *Audio silence 4*
- *Audio mono ½*
- *Audio mono ¾*
- *Loss VITC*
- *Loss SID*
- *Loss of program rating*
- *Loss of CC*
- *Picture freeze*
- *Picture black*
- *GPI1*
- *GPI2*
- *GPI3*
- *GPI4*

- Fault condition 2
  - *Same as for Fault condition 1*
- Fault condition 3
  - *Same as for Fault condition 1*
- Fault condition 4
  - *Same as for Fault condition 1*
- Video source
- Expanded view
- H/V delay
- Clear faults
- Disable on screen faults

ON SCREEN DISPLAY CONFIGURATION

- Bar graph properties
- *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*
- *Background opacity*
- *Bars opacity*
- Text burn-in properties
  - *Source ID color 1*
  - *Source ID color 2*
  - *Source ID color 3*
  - *Default background color*
  - *Background opacity*
  - *Text opacity*
- Fault burn-in properties
  - *Background color 1*
  - *Background color 2*
  - *Background opacity*
  - *Text opacity*

GPI CONFIGURATION

- GPIx

GPO CONFIGURATION

- GPO1
  - GPO active state
  - Q1F1
  - Q1F2
  - Q1F3
  - Q1F4
  - Q2F1
  - Q2F2
  - Q2F3
  - Q2F4
  - Q3F1
  - Q3F2
  - Q3F3
  - Q3F4
  - Q4F1
  - Q4F2
  - Q4F3
  - Q4F4
- GPO2
  - Same as for GPO1
- GPO3
  - Same as for GPO1
- GPO4
  - Same as for GPO1
- Frame status trigger
  - Q1F1
  - Q1F2
  - Q1F3
  - Q1F4
  - Q2F1
  - Q2F2
  - Q2F3
  - Q2F4
  - Q3F1
  - Q3F2
  - Q3F3
  - Q3F4
  - Q4F1
  - Q4F2
  - Q4F3
  - Q4F4

H/V DELAY
- 525 start line
- 625 start line
- 525 start sample
- 625 start sample

SERIAL PORT
- Data logging
  - Fault log
  - Status log
  - Card ID
  - Event stamp
  - Poll rate
  - Query status
- TSL protocol
  - Video source A address=
  - Video source B address=
  - Video source C address=
  - Video source D address=
- Serial port configuration
  - Data logging
  - TSL protocol
  - Probel protocol

UTILITIES
- About…
- Store preset 1
- Store preset 2
- Recall preset 1
- Recall preset 2
- Upgrade
- Factory reset

LOSS OF VIDEO

DISPLAY MODE

QUADRANT FAULT INDICATOR

VIDEO INPUT TYPE

NTSC SETUP PEDESTAL

OUTPUT ACTIVE WINDOW

11. On-Screen Display (OSD) Menu Quick Reference (7765AVM-4V-xx, 7766AVM-4V-xx and 7766AVM-S4V-xx Cards)

VIDEO SOURCE X

- Source ID
  - 525 VITC line
  - 625 VITC line
  - Default Source ID mode
  - Default Source ID message
  - Source ID color 1 enable
  - Source ID color 2 enable
  - Source ID color 3 enable
- Active video

QUADRANT X

- Burn-in configuration
  - On screen display configuration (Quick link)
  - Burn-in enable
    - *Status*
    - *Time code*
    - *Source ID/UMD*
  - 4:3 Quadrant burn-in position
    - *Time code window row*
    - *Time code window col*
  - Expanded view burn-in position
    - *Status window row*
    - *Status window col*
    - *Time code window row*
    - *Time code window col*
  - Status burn-in mode
- Video source
- Expanded view
- H/V delay

ON SCREEN DISPLAY CONFIGURATION

- Text burn-in properties
  - *Source ID color 1*
  - *Source ID color 2*
  - *Source ID color 3*
  - *Default background color*
  - *Background opacity*
  - *Text opacity*

GPI CONFIGURATION

- GPIx

GPO CONFIGURATION
- GPO1
  - GPO active state
- GPO2
  - Same as for GPO1
- GPO3
  - Same as for GPO1
- GPO4
  - Same as for GPO1

H/V DELAY
- 525 start line
- 625 start line
- 525 start sample
- 625 start sample

SERIAL PORT
- Data logging
  - Fault log
  - Status log
  - Card ID
  - Event stamp
  - Poll rate
- Query status
- Image video protocol
- Video source A
  - *Identification number*
  - *Tally mode*
  - *Power-up line 1*
  - *Power-up line 2*
  - *Power-up line 3*
  - *Message 1*
  - *Message 2*
  - *Message 3*
  - *Identification string*
  - *Message 1 duration*
  - *Message 2 duration*
  - *Message 3 duration*
  - *Message 4 duration*
  - *Tally 1*
  - *Tally 2*
- Video source B
  - *same as Video source A*
- Video source C
  - *same as Video source A*
- Video source D
  - *same as Video source A*
- Baud rate
- TSL protocol
  - Video source A address=
  - Video source B address=
  - Video source C address=
  - Video source D address=
- Serial port configuration
  - Data logging
  - TSL protocol
  - Probel protocol
  - Image video protocol

UTILITIES
- About…
- Store preset 1
- Store preset 2
- Recall preset 1
- Recall preset 2
- Upgrade
- Factory reset

LOSS OF VIDEO

DISPLAY MODE

VIDEO INPUT TYPE

NTSC SETUP PEDESTAL

OUTPUT ACTIVE WINDOW

Notes:
- Must do a silence cal before others (mono, anti-phase).
- Set durations to short values so you do not have to wait too long for alarm to fire.
- Can not calibrate mono and anti-phase together. Mono cannot be detected when signal is out of phase.
-

Silence cal:
- Set silence level by giving worst case "noisy" signal
- Set silence duration to min
- Adjust silence threshold to level where silence warning does not fire.
- Set duration to desired value.
- Verify operation by switching silent audio on and off.

12. ON SCREEN DISPLAY AND MENU OPTION DESCRIPTIONS

12.1. SET-UP (MAIN) MENU

There are many common menu items between Quattro™ cards 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.

Video source X

Source ID, audio and fault definition configuration for a specified video input. On any Quattro™ card, there are four (4) video source inputs, designated A, B, C and D respectively.

Quadrant Y

Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu.

On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram:

A	B
C	D

On-screen display configuration

This set-up menu is used to configure general on-screen display properties such as colors and opacities for audio bar graphs, text windows and fault message displays.

GPI configuration

GPIx enable status (x = 1 to 12)

This menu item provides a quick link to a summary screen showing General Purpose Interface input (GPI) trigger assignments. The number of GPI inputs varies among Quattro™ cards, as outlined in the “Specification” section of this product manual.

GPO configuration

Unlike the *GPI configuration* menu option, this GPO set-up option allows the user to define what circumstances will trigger one of four General Purpose Interface outputs (GPO) as well as the Frame Status output. The number of GPOs is fixed at four (4) across all Quattro™ cards.

H/V delay

H/V delay or “Pulse Cross” settings through this menu option allow the user to view the blanking intervals by setting the viewable start line and sample.

Serial Port

This common Quattro™ set-up menu item allows the user to set-up data logging of fault alert conditions recorded by the Quattro™, separately from any VistaLINK™ application. Alternatively, this set-up menu item also allows the user to enable and configure third-party UMD/SID and tally sources through supported protocols. A list of supported protocols is provided in the "Features" section of this product manual.

Utilities

If not using the VistaLINK™ configuration capabilities, it is possible to store and recall Quattro™ card configuration presets through this main menu item. In addition, the *Utilities* menu contains an upgrade utility, factory reset option and product firmware revision information.

Loss of video

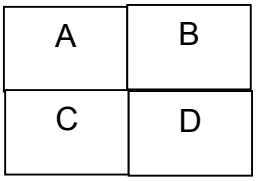
- *Pass*
- *Black*

This common Quattro™ set-up menu item is a global configuration setting to pass "video" or "black video" upon the loss of video input on any one displayed quadrant (or expanded view window).

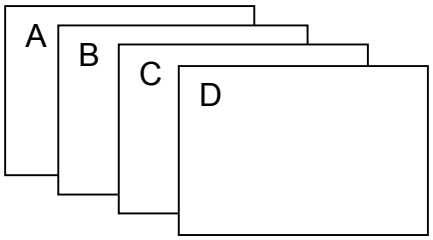
Display mode

- *Normal (4:3)*
- *Normal (16:9)*
- *Quadrant 1*
- *Quadrant 2*
- *Quadrant 3*
- *Quadrant 4*

This menu option allows the user to select whether the output will show all four quadrants (2x2 matrix) or one of the particular quadrants in full screen (or expanded view) mode. (Normal 16:9 is only available on the 7765AVM-xx-HD version.)



Normal ("Quad-split") Mode



Full-screen ("Expanded") Mode

Aspect ratio GPI select

- *16:9*
- *4:3*

In conjunction with the next menu option. when triggered via selected GPI this menu displays the quad-split windows in 4:3 or 16:9 mode.

Video aspect ratio enable

- *off*
- *on*
- *GPI1 – GPI12*

Trigger used to change the aspect ratio appearance of the quad-split windows , as selected in the previous menu item.

Quadrant fault indicator *Off* *No fault on* *No fault off* *Fault on*	While in full screen (expanded view) mode, if a fault alert condition occurs on any one or all of the other "hidden" quadrants, a fault indicator will be displayed through this menu option. The quadrant fault indicator enable menu item offers four options for fault display when in Expanded view mode: - "Off" setting disables quadrant fault indicator display - "No fault on" sets the indicator on if there is no quadrant fault, and to "blink" mode when there is a quadrant fault. - "No fault off" has the indicator off if there is no quadrant fault, and to "blink" when there is a quadrant fault. -"Fault on" means that the indicator is off if there is no quadrant fault, and on if there is a quadrant fault. There is no "blink" notification.
Video input type *Composite* *S-video*	This temporary Main menu item is used to set the input type of the 7766AVM-xx Analog Quattro™ (NTSC or PAL, full monitoring or video-only versions). Specifically, the user selects either composite analog video or S-video inputs, depending on the rear plate configuration.
NTSC setup pedestal *Enable* *Disable*	Available on the 7765AVM-4-CA and 7765AVM-4A-CA (525) versions only, this option allows the user to select whether the NTSC 7.5 IRE pedestal will be applied to or removed from the composite analog output video.
Output active window *Safe action* *Production aperture*	This menu item sets the output display of –SD and –CA Quattro™ cards to an "underscan" mode (defined as "safe action") to fit standard display monitors which may not have the overscan/underscan option built-in to the hardware.

12.2. CONFIGURING VIDEO SOURCES THROUGH "VIDEO SOURCE" MENU

Video source X	Source ID, audio and fault definition configuration for a specified video input. On any Quattro™ card, there are four (4) video source inputs, designated A, B, C and D respectively.

The *Video Source* menu is used to configure video, audio group, source ID or SID (also referred to as Under Monitor Display UMD) and fault definition parameters associated per video and audio input. The following menu options are accessed through the Video source menu.

Audio channel 1/2	This "Video source" menu item, available on all Quattro™ cards except the video-only versions is used to configure audio channel pair 1/2.
Audio channel 3/4	This "Video source" menu item, available on all Quattro™ cards except the video-only versions is used to configure audio channel pair 3/4.

Audio channel 5/6	This "Video source" menu item, available on all Quattro™ cards except the video-only versions is used to configure audio channel pair 5/6. This option is only available on the 7765AVM-4A version which displays up to 3 AES/EBU audio channels.
Source ID	This common Quattro™ menu item not only sets the line number that the Quattro™ uses for decoding embedded SID information per input video, but also is used to enable a user-entered default SID message and background tally color.
Active video *Pass* *Hide*	This menu option, which is only available on versions of the 7766AVM-xx-yy Analog Quattro™, is used to "hide" the active picture from view while maintaining audio, video and data monitoring functions. Even if active picture is hidden, it is possible to enable other on screen display elements such as audio bar graphs, status windows and fault alert messages to provide pertinent information about the monitored signal. When active video is hidden, a gray screen appears on the monitor. This feature is used to "black-out" active video displaying sensitive material.
Fault definitions	As with all AVM audio, video and data monitoring products, "fault" parameters can be defined by the user, then automatically monitored and reported by the AVM product. This menu item is used to define fault conditions, levels, thresholds, durations per Quattro™ input.
Audio source *Group 1* *Group 2* *Group 3* *Group 4* *external AES/EBU*	This menu option is used to select which audio group is de-embedded from the incoming source. Alternatively, on the 7765AVM-4A Quattro™ cards, this menu item is used to select an external AES/EBU source if provided. Subsequently, the audio information is then analyzed and displayed via configurable on screen level bar and phase graphs. This menu option is not available on 7766AVM-4A-xx Analog Quattro™ cards or any Video-only Quattro™ cards.
625 CC line *22* *10 - 25*	This menu option is used to select which line in 625 mode carries CC/subtitle data which can then be monitored for data presence. This option is only enabled on 625 firmware for the SD, CA and VGA(XGA) modules.
Clear peaks *Cancel* *Clear*	This menu option is used to clear all audio level bar graph peaks. This menu option is not available on any video-only Quattro™ cards.

12.2.1. Audio Channel Configurations Through Video Source X Menu

Video source X	Source ID, audio and fault definition configuration for a specified video input. On any Quattro™ card, there are four (4) video source inputs, designated A, B, C and D respectively.

Audio channel 1/2	This "Video source" menu item, available on all Quattro™ cards except the video-only versions is used to configure audio channel pair 1/2.
Audio channel 3/4	This "Video source" menu item, available on all Quattro™ cards except the video-only versions is used to configure audio channel pair 3/4.
Audio channel 5/6	This "Video source" menu item, available on all Quattro™ cards except the video-only versions is used to configure audio channel pair 5/6. This option is only available on the 7765AVM-4A version which displays up to 3 AES/EBU audio channels.

The "Audio channel x/y" menu items are used to select specific audio parameters as defined below:

Audio level mode *Normal* *Sum + diff*	The" Audio level mode" menu item is used to select Normal or Sum + diff modes for the applicable audio level bar graphs. In *Normal* mode, stereo bar graphs are displayed. In *Sum + diff* mode, left bar graph is the absolute value of the sum of both channels and right bar graph displays the absolute value of the magnitude of the difference of the two signals.
Headroom *0 to 30dB* *0dB*	The H*eadroom,* which is only applicable to 7765AVM-xx-yy Quattro™ cards, 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. 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. 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 colored area sizes with the *Error region* and *Warning region* controls. This menu option is not available on Analog Quattro™ cards.
Reference level *-10 to 10 dBu* *4 dBu*	This menu item, which is only available on Analog Quattro™ cards. 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

PPM mode
DIN *BBC* *Nordic N9* *AES/EBU* *Default*

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 coloring and phase graph representation. Table 6 describes the available ballistics.

Analog Quattro™ cards do not come with the "AES/EBU" PPM ballistic option. Instead they are equipped with the "Default" PPM ballistic option setting. Similarly, SDI input Quattro™ cards do not have the "Default" PPM ballistic option. Instead they have the "AES/EBU" PPM ballistic option.

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

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	
Analog Levels	?	?	User defined	Peak Level – 60dB	Peak Level	User defined	This has been left off of the first release because of the undefined nature of the ballistics. My pick is AES/EBU!
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.
Default	1 sample period	1.5 sec for 20 dB	User defined	down to –60 dBr	up to 30 dBr	Similar to AES/EBU for digital meters	

Table 6: PPM Bar Graph Characteristics

Clear peak
Off *GPI1 – GPI12*

This menu item provides a convenient method to reset audio peak holds for audio channel level bar graphs through the use of a GPI trigger. For the 7765AVM-4-xx and 7765AVM-4V-xx Quattro™ cards, up to 12 assignable GPI triggers to enable this feature. Other Quattro™ cards have up to 4 assignable GPI triggers.

12.2.2. Setting Source ID Configurations

Video source X	Source ID, audio and fault definition configuration for a specified video input. On any Quattro™ card, there are four (4) video source inputs, designated A, B, C and D respectively.

Source ID/UMD	This common Quattro™ menu item not only sets the line number that the Quattro™ uses for decoding embedded SID information per input video, but also is used to enable a user-entered default SID message and background tally color.

The Source ID/UMD menu is used to set the line number for decoding vertical blanking interval (VBI) embedded source ID. Line selections exist for both 525 (NTSC) and 625 (PAL) inputs. If there is no embedded SID/UMD on the input, the user is provided with an option to enter and enable a default SID/UMD message through this menu.

This menu option also allows the user to set the background color displayed behind the SID/UMD text. This feature can be used as a tally indicator as it can be enabled either through a supported serial communication protocol instruction or through an external GPI trigger. It is also possible to change the background color of the SID/UMD display by employing several GPI triggers for this one display thereby defining an on-air/off-air tally display application.

525 VITC line *10 to 32* *10*	With this control, set the VBI line number that contains the SID information when operating in 525 (NTSC) video mode. If the VBI contains Source ID (SID/UMD) information, the Quattro™ will automatically decode it, and display it under the active picture, if enabled. If the wrong line number is set, no SID will be decoded, even if a SID is present on another line.
625 VITC line *6 to 32* *10*	With this control, set the VBI line number that contains the SID information when operating in 625 (PAL) video mode. If the VBI contains Source ID (SID/UMD) information, the Quattro™ will automatically decode it, and display it under the active picture, if enabled. If the wrong line number is set, no time code (or SID) will be decoded, even if a SID is present on another line.
Default source ID 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 vertical blanking interval.
Default source ID message *Video source A*	This control sets the message that will be automatically displayed in the SID window when there is no incoming source ID on the VBI. The text of the message can be changed. See section 8.1.1 for information on changing text fields.

Source ID color 1 enable
Off *On* *GPI1 – GPI12*

This option allows the user to control the Source ID background color characteristics through pre-defined GPI. Actual Source ID background color is set in *On-screen display configuration* menu. *"On"* is set when controlling background SID color via protocol input. See "Serial Port" section for menu options.

For the 7765AVM-4A and all Analog Quattro™ cards, only four (4) assignable GPI triggers are available.

For simplicity, SID/UMD background color control settings for Source ID color 1 are displayed in this manual. Color settings for SID/UMD background colors 2 and 3 are similar.

12.2.3. Fault Definitions

Video source X	Source ID, audio and fault definition configuration for a specified video input. On any Quattro™ card, there are four (4) video source inputs, designated A, B, C and D respectively.

Fault definitions	As with all AVM audio, video and data monitoring products, "fault" parameters can be defined by the user, then automatically monitored and reported by the AVM product. This menu item is used to define fault conditions, levels, thresholds, durations per Quattro™ input.

The *Fault definition* menu items are used to set various levels and durations that define faults. Once a fault condition is set (through the corresponding *Fault conditions* menu under the *Quadrant* menu), and the user has enabled the Quattro™ to monitor for a certain condition, fault alert messages will be generated only if conditions are exceeded. Unless otherwise indicated, the chart below shows the items available in the *Fault definition* menu options for either the 7765AVM-4/4A and 7766AVM-4A respectively. Fault monitoring is not available on the Video-only version of the Quattro™ (7765AVM-4V-yy and 7766AVM-4V-yy).

Video error duration
0 to 900 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. In other words, this control sets the duration for which the AVM ignores glitches on the video signal thereby not displaying fault alert messages.

EDH error duration

N/A
1 to 127 fields

This menu option sets the number of consecutive fields of EDH errors to consider as a fault and is only available on the 7765AVM Quattro™ cards.

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.

For more information on Error Detection and Handling, see SMPTE RP-165.

Max APL

60 to 108 IRE
100

This parameter is used to set the maximum average picture level threshold. If this level is exceeded a fault alert is triggered (if enabled). It is only available on analog input Quattro™ (7766AVM-xx-yy) cards.

Max APL duration

0 to 900 frames
300

This parameter sets the duration for which maximum average picture level is exceeded before reporting a fault alert. It is only available on analog input Quattro™ (7766AVM-xx-yy) cards.

Min APL

0.0 to 20.0 IRE (in 0.5 increments)
7.5

This parameter is used to set the minimum average picture level. If this level is exceeded a fault alert is triggered (if enabled). It is only available on analog input Quattro™ (7766AVM-xx-yy) cards.

Min APL duration

0 to 900 frames
90

This parameter sets the duration for which minimum average picture level (APL) is exceeded before reporting a fault alert. It is only available on analog input Quattro™ (7766AVM-xx-yy) cards.

Audio invalid duration
0 to 255 frames *0*

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.

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.

Over level
-30dB to 0dB FS in 1/4dB increments *-6dB FS*
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 dB full scale (FS) for digital input 7765AVM Quattro™ cards. It 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.

For Analog Quattro™ 7766AVM-4A cards, 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.

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. This menu item s common to both digital and analog input Quattro™ cards. 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*.

Silence level	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 at least 1 second 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.
-96dB to –20dB FS *<u>-60dB FS</u>*	This control sets the audio level under which it is considered to be silent. This value is expressed in dB full scale (FS) for the digital-input 7765 Quattro™ cards, while an analog representation is provided for analog-input 7766 Quattro™ cards.
-60 dBr to 0 dBr in ¼ dB increments *<u>-40 dBr</u>*	This control sets the audio level under which it is considered to be silent for Analog Quattro™ 7766AVM-xx-yy cards. This value is expressed in dBr – relative to the reference audio level setting.

Silence duration	This control sets the amount of time the audio is silent in seconds before a fault occurs.
0.5 to 127 sec (in 0.5 second increments) *<u>10 sec</u>*	

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 at least 1 second before the fault condition will be removed.

Phase reversal level	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.
0.5 to 1 (in 0.01 increments) *<u>0.90</u>*	

Phase reversal duration
0.5 to 127 sec (in 0.5 second increments) *10 sec*

This control sets the period (in seconds) 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.

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 level* and *Mono duration* controls are used to detect when two audio channels are considered to be mono. The *Mono level* control sets the threshold that decides whether the signals are the same. The audio difference must be less than the *Mono 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 level* amount for at least 1 second 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.

Mono threshold level
0.2 to 0.5 (in 0.01 increments) *0.20*

Sets the level of L/R audio difference under which is considered mono.

Mono duration
0.5 to 127 sec (in 0.5 s increments) *10 sec*

Sets the duration of mono audio (in seconds) considered to be a fault.
This control sets the duration of mono audio in seconds, which is considered a fault.

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.

Loss of program rating 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.

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.

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.

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 can't however detect both this type of freeze and a freeze from a link that has added noise to the picture

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 (considerable noise on top of the frozen picture)

Freeze duration
6 to 902 frames *300 frames*

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

For Analog Quattro™ cards, the maximum freeze duration is 9000 frames. For configuration convenience, the configuration frame range is split into three groups:

- 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

Black video duration
4 to 900 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 7 black level and remains for the specified duration.

For Analog Quattro™ cards, the black video duration range is 6 - 9000 frames. For configuration convenience, the configuration frame range is split into three groups:

- 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

12.3. VIDEO QUADRANT CONFIGURATION THROUGH “QUADRANT” MENU

The Quadrant menus are used to configure audio bar graphs, on screen displays and fault condition parameters associated with the specific quadrants. The chart below shows the items available in the Quadrant menus. There are four quadrants to configure. For simplicity only the menu items for *Quadrant 1* will be shown in the manual.

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: A B C D

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. These menu options are not supported by the video-only Quattro™ cards.

When many windows are enabled, 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

Bar graph 1/2	This menu option is used to set audio bar graph parameters for audio channels 1/2.
Bar graph 3/4	This menu option is used to set audio bar graph parameters for audio channels 3/4. Refer to *Bar graph 1/2* for menu options and descriptions.
Bar graph 5/6	This menu option is used to set audio bar graph parameters for audio channels 5/6. This option is only available on the 7765AVM-4A-xx Quattro™ cards which support up to 3 AES/EBU audio channels per video input. Refer to *Bar graph 1/2* for menu options and descriptions.
Burn-in configuration	This menu item is used to enable and adjust positions of on-screen display windows, for both quadrant-view and expanded-view modes. This menu item is not used to configure fault alert messages. See *Fault conditions* menu for fault alert message configuration options.

Fault conditions	This menu item is used to set and enable fault conditions and fault message parameters. This menu option is not available on video-only Quattro™ products.
Video source *A* *B* *C* *D*	Any one of the four video inputs can be selected to appear in Quadrant 1 through this menu item. By default, Quadrant 1 is set to display video source input (or Video source) A. Similarly… Quadrant 2 – B Quadrant 3 – C Quadrant 4 – D
Expanded view *Off* *GPI1 – GPI12* *Fault 1* *Fault 2* *Fault 3* *Fault 4* *Any fault*	This menu item is used to set the quadrant in expanded view mode through an external GPI trigger or upon a valid fault condition. The fault trigger options are not available on the video-only Quattro™ cards. As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.
H/V delay *Off* *On* *GPI1 – GPI12*	H/V delay, or phasing control, allows the user to optimize video input and output delays, thereby configuring the active picture display. Configuring H/V delay also allows the user to view either HANC or VANC. This control enables H/V delay viewing manually through Off/On or to have external GPI trigger H/V delay enabling. As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.
Clear faults *Cancel* *Clear*	This menu item on the top level menu provides a convenient method to clear any fault conditions through the on-screen menu. This option is not available on the video-only Quattro™ cards.
Disable on-screen faults *Off* *On* *GPI1 – GPI12*	This menu option is used to turn off OSD fault messages through selectable GPI triggers. This option is not available on the video-only Quattro™ cards. As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

12.3.1. Setting Bar Graph Parameters

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: A | B C | D
Bar graph 1/2	This menu option is used to set audio bar graph parameters for audio channels 1/2.
Bar graph properties	This is a quick link to the *On screen display properties*, *Bar graphs* menu.

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 corresponding to program reference level.

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.

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).

Error region

This menu option is used to define the region at which audio becomes unacceptable. There are different range values for either digital input and analog input Quattro™ cards.

-20 to –1dB FS
<u>-6dB FS</u>

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.

If the error region is set to a value less than the warning region, the warning region value will be set equal to the error region.

Warning:
Some bar graph types (and ballistics) have this region defined. When you select one of these types, the error region value is preset. However, the this value can be adjusted further.

0 to 20 dBr
<u>16 dBr</u>

For the Analog Quattro™ cards, this menu item is used to set the “floor” of the Error region. The peak signal level input of the 7766AVM cards 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.

Warning region

This menu option is used in the 7765AVM Quattro™ cards only, to define the region between the audio OK and audio error regions. 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.

-40 to –2 dB FS
<u>-20 dB FS</u>

If the warning region is set to a value greater than the error region, the error region value will be set equal to the warning region.

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

12.3.2. Configuring The On-Screen Display Controls Through Burn-in Configuration Menu

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: A B C D

Burn-in configuration	This menu item is used to enable and adjust positions of on-screen display windows, for both quadrant-view and expanded-view modes. This menu item is not used to configure fault alert messages. See *Fault conditions* menu for fault alert message configuration options.

The *Burn-in 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 *Burn-in configuration* menu.

On-screen display configuration	A quick link menu item to *On screen display configuration* menu (see On-screen display configuration section for more information).
Burn-in enable	This menu option is used to assign GPI triggers to enable/disable certain text window and bar graph display states.
4:3 quadrant burn-in position	A menu option to set the position of on screen display text if viewing on a 4:3 aspect ration output.
16:9 quadrant burn-in position	A menu option to set the position of on screen display text if viewing on a 4:3 aspect ration output. This menu option is only supported on the 7765AVM-4-HD and 7765AVM-4A-HD Quattro™ cards.
Expanded view burn-in position	A menu option to set the position of on screen display text if viewing a particular quadrant in expanded mode (full screen).
Status burn-in mode *Normal* *Fault*	This menu enables status window display information. Under default *Normal*, the Status window text (while in Expanded view mode) background color and opacity appears as defined through the O*n-screen display configuration* menu. Selecting *Fault* enables the inclusion of fault text configuration into the Status window. This configuration is also set in the *On-screen display configuration* menu. This option is not available on video-only Quattro™ cards.

12.3.2.1. Enabling On-Screen Displays

Quadrant Y

Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu.

On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram:

A	B
C	D

Burn-in configuration

This menu item is used to enable and adjust positions of on-screen display windows, for both quadrant-view and expanded-view modes. This menu item is not used to configure fault alert messages. See *Fault conditions* menu for fault alert message configuration options.

Burn-in enable

This menu option is used to assign GPI triggers to enable/disable certain text window and bar graph display states.

Ch 1/2 level bars

Off
On
GPI1 – GPI12

This menu item enables audio channels 1/2 level bar graphs. By selecting “On”, the bar graphs will always be displayed. Selecting a GPI enables the level bar graphs only upon the module receiving an active GPI signal. Level bar graphs will always appear to the side of the active video window.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Ch 3/4 level bars

Off
On
GPI1 – GPI12

This menu item enables audio channels 3/4 level bar graphs. By selecting “On”, the bar graphs will always be displayed. Selecting a GPI enables the level bar graphs only upon the module receiving an active GPI signal. Level bar graphs will always appear to the side of the active video window.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Ch 5/6 level bars

Off
On
GPI1 – GPI4

This menu item enables audio channels 5/6 level bar graphs. By selecting “On”, the bar graphs will always be displayed. Selecting a GPI enables the level bar graphs only upon the module receiving an active GPI signal. Level bar graphs will always appear to the side of the active video window.

This option is only available for the 7765AVM-4A versions of Quattro™.

Ch 1/2 phase bars

- *Off*
- *On*
- *GPI1 – GPI12*

This menu item enables audio channels 1/2 phase bar graph. By selecting “On”, the bar graphs will always be displayed. Selecting a GPI enables the phase bar graph only upon the module receiving an active GPI signal. Phase bar graphs will always appear to the side of the active video window.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Ch 3/4 phase bars

- *Off*
- *On*
- *GPI1 – GPI12*

This menu item enables audio channels 3/4 phase bar graph. By selecting “On”, the bar graphs will always be displayed. Selecting a GPI enables the phase bar graph only upon the module receiving an active GPI signal. Phase bar graphs will always appear to the side of the active video window.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Ch 5/6 phase bars

- *Off*
- *On*
- *GPI1 – GPI4*

This menu item enables audio channels 5/6 phase bar graph. By selecting “On”, the bar graphs will always be displayed. Selecting a GPI enables the phase bar graph only upon the module receiving an active GPI signal. Phase bar graphs will always appear to the side of the active video window.

This option is only available for the 7765AVM-4A versions of Quattro™.

Status

- *Off*
- *On*
- *GPI1 – GPI12*
- *Fault 1*
- *Fault 2*
- *Fault 3*
- *Fault 4*
- *Any fault*

This menu item enables the status display window. By selecting “On”, the status window is always displayed, or alternatively, the status display is also enabled by an external, pre-defined GPI trigger. The status window is also triggered by a specific or any individual fault conditions (1 to 4). **Although configurable for each Quadrant, the signal status window is only displayed if that particular quadrant is in Expanded View Mode.**

The purpose of the Video/Audio status screen is to show as much status information about the video and audio as possible in a 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.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs. In addition, video-only Quattro™ cards do not have the “Fault” trigger options available.

Item	*Value(s)*	*Description*
Video	525 625 not present	Input video standard detected regardless of what the card is configured to process (digital input Quattro™ cards)
Video	NTSC PAL not present	Input video standard detected regardless of what the card is configured to process (analog input Quattro™ cards)
Picture content	active frozen black frozen, black	Shows the status of the picture content: *moving* if picture is active, *frozen* no motion detected, or *frozen, black* if the picture is black
EDH	(FF: checksum, AP: checksum) not present	EDH checksums are periodically sampled and displayed. This is only available in the digital input Quattro™ cards
APL	Value	Average picture level is calculated and displayed. This option is only available on Analog Quattro™ cards.
VITC	TC value not present	If present, the time code value is displayed
SID	VBI value not present	If present, the embedded SID is displayed
CC	present not present	Shows presence/absence of closed captioning
PR	value Not present	Shows program rating if present
Audio groups	N/A 1,2,3,4	Audio groups that are present are displayed. This option is only available on the digital input Quattro™ cards.
Audio channels	N/A or 1,2,3,4 none or AES1,AES2 (if external AES/EBU is selected)	Audio channels that are present are displayed
Ch. 1 and 2	N/A present silent, over, mono, out of phase (show all conditions that are true. Silence and overs are mutually exclusive, and so are mono and output phase)	Displays status information about channels 1 & 2
Ch. 3 and 4	NA present silent, over, mono, out of phase (show all conditions that are true. Silence and overs are mutually exclusive, and so are mono and output phase)	Displays status information about channels 3 & 4
Ch. 5 and 6	NA present silent, over, mono, out of phase (show all conditions that are true. Silence and overs are mutually exclusive, and so are mono and output phase)	Displays status information about channels 5 & 6. This option is only available on the 7765AVM-4A-xx Quattro™ cards.

Ch. 1	NA/silent/over mono/out of phase	Displays status information for Analog Quattro™ audio input channel 1
Ch. 2	NA/silent/over mono/out of phase	Displays status information for Analog Quattro™ audio input channel 2
Ch. 3	NA/silent/over mono/out of phase	Displays status information for Analog Quattro™ audio input channel 3
Ch. 4	NA/silent/over mono/out of phase	Displays status information for Analog Quattro™ audio input channel 4

Table 7: Video/Audio/Data Status Screen Items

Time code

Off
On
GPI1 – GPI12

This menu item enables Time Code (TC) display. By selecting "On", time code will always be displayed. Selecting a GPI also enables time code but only upon the module receiving an active GPI signal. Time code display position is configurable for both quadrant and expanded views through the *TC window H and V* menu item controls.

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.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Program rating

Off
On
GPI1 – GPI12

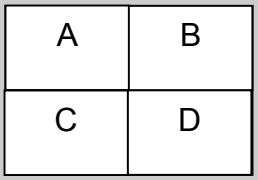
This menu item enables Program Rating (PR) display. By selecting "On", Program rating will always be displayed. Selecting a GPI also enables program rating but only upon the module receiving an active GPI signal. Program rating display position is configurable for both quadrant and expanded views through the *PR window H and V* menu item controls.

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. Canadian French and English program ratings are also supported.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

XDS *Off* *On* *GPI1 – GPI12*	This menu item enables Extended Data Services (XDS) display. By selecting "On", XDS will always be displayed. Selecting a GPI also enables XDS but only upon the module receiving an active GPI signal. XDS display position is configurable for both quadrant and expanded views through the *XDS window H and V* menu controls. 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. As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.
Source ID *Off* *On* *GPI1 – GPI12*	The Quattro module has the ability to decode source identification (SID) information from the VBI. When no VBI SID is detected, the Quattro™ cards display the *Default SID message* if enabled, otherwise the SID window will be turned off. The *Source ID* is always displayed in the Under Monitor Display (UMD) location. As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

12.3.2.2. Configuring Quadrant Burn-In Positions

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: 
Burn-in configuration	This menu item is used to enable and adjust positions of on-screen display windows, for both quadrant-view and expanded-view modes. This menu item is not used to configure fault alert messages. See *Fault conditions* menu for fault alert message configuration options.

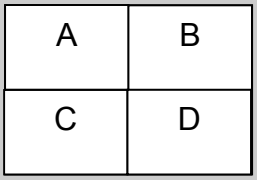
4:3 quadrant burn-in position	A menu option to set the position of on screen display text if viewing on a 4:3 aspect ration output. This parameters are common to the specific output-type Quattro™ card as listed. Fault window display parameters are not supported in the video-only Quattro™ versions.

Burn-in Enable 4:3 Display	HD output Quattro™	VGA output Quattro™ (625 version in brackets)	SD output Quattro™ (625 version in brackets)	CA output Quattro™ (625 version in brackets)
Time code window row	0 to 8 4	0 to 8(9) 4	0 to 8(9) 4	0 to 8(9) 4
Time code window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0
Program rating window row	0 to 8 5	0 to 8(9) 5	0 to 8(9) 5	0 to 8(9) 5
Program rating window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0
XDS window row	0 to 8 6	0 to 8(9) 6	0 to 8(9) 6	0 to 8(9) 6
XDS window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0
Fault 1 window row	0 to 8 0	0 to 8(9) 0	0 to 8(9) 0	0 to 8(9) 0
Fault 1 window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0
Fault 2 window row	0 to 8 1	0 to 8(9) 1	0 to 8(9) 1	0 to 8(9) 1
Fault 2 window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0
Fault 3 window row	0 to 8 2	0 to 8(9) 2	0 to 8(9) 2	0 to 8(9) 2
Fault 3 window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0
Fault 4 window row	0 to 8 3	0 to 8(9) 3	0 to 8(9) 3	0 to 8(9) 3
Fault 4 window col	0 to 19 0	0 to 25 0	0 to 21 0	0 to 21 0

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: A B C D
Burn-in configuration	This menu item is used to enable and adjust positions of on-screen display windows, for both quadrant-view and expanded-view modes. This menu item is not used to configure fault alert messages. See *Fault conditions* menu for fault alert message configuration options.
16:9 quadrant burn-in position	A menu option to set the position of on screen display text if viewing on a 16:9 aspect ration output. This option is only available on the 7765AVM-4-HD and 7765AVM-4A-HD Quattro™ cards.

Burn-in Enable 16:9 Display	7765AVM-4-HD 7765AVM-4A-HD	Burn-in Enable 16:9 Display	7765AVM-4-HD 7765AVM-4A-HD
Time code window row	0 to 8 4	Fault 1 window row	0 to 8 0
Time code window col	0 to 25 0	Fault 1 window col	0 to 25 0
Program rating window row	0 to 8 5	Fault 2 window row	0 to 8 1
Program rating window col	0 to 25 0	Fault 2 window col	0 to 25 0
XDS window row	0 to 8 6	Fault 3 window row	0 to 8 2
XDS window col	0 to 25 0	Fault 3 window col	0 to 25 0
		Fault 4 window row	0 to 8 3

12.3.2.3. Configuring Expanded View Burn-In Positions

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: 
Burn-in configuration	This menu item is used to enable and adjust positions of on-screen display windows, for both quadrant-view and expanded-view modes. This menu item is not used to configure fault alert messages. See *Fault conditions* menu for fault alert message configuration options.
Expanded view burn-in position	Once enabled, monitoring tools can be also positioned horizontally and vertically when the specific video quadrant is selected for expanded view. As the dimensions of the screen increase, there is additional space to position the monitoring tools. The following menu identifies the available positions.

Burn-in Enable 4:3 Display	**HD output Quattro™**	**VGA output Quattro™ (625 version in brackets)**	**SD output Quattro™ (625 version in brackets)**	**CA output Quattro™ (625 version in brackets)**
Status window row	0 to 17 2	0 to 17(20) 2	0 to 17(20) 2	0 to 17(20) 2
Status window col	0 to 43 0	0 to 43 0	0 to 44 0	0 to 44 0
Time code window row	0 to 17 13	0 to 17(20) 13	0 to 17(20) 13	0 to 17(20) 13
Time code window col	0 to 43 0	0 to 43 0	0 to 44 0	0 to 44 0
Program rating window row	0 to 17 14	0 to 17(20) 14	0 to 17(20) 14	0 to 17(20) 14
Program rating window col	0 to 43 0	0 to 43 0	0 to 44 0	0 to 44 0
XDS window row	0 to 17 15	0 to 17(20) 15	0 to 17(20) 15	0 to 17(20) 15
XDS window col	0 to 43 0	0 to 43 0	0 to 44 0	0 to 44 0
Fault 1 window row	0 to 17 0	0 to 17(20) 0	0 to 17(20) 0	0 to 17(20) 0
Fault 1 window col	0 to 43 3	0 to 43 3	0 to 44 3	0 to 44 3
Fault 2 window row	0 to 17 0	0 to 17(20) 0	0 to 17(20) 0	0 to 17(20) 0

Fault 2 window col	0 to 43 23	0 to 43 23	0 to 44 23	0 to 44 23
Fault 3 window row	0 to 17 1	0 to 17(20) 1	0 to 17(20) 1	0 to 17(20) 1
Fault 3 window col	0 to 43 3	0 to 43 3	0 to 44 3	0 to 44 3
Fault 4 window row	0 to 17 1	0 to 17(20) 1	0 to 17(20) 1	0 to 17(20) 1
Fault 4 window col	0 to 43 23	0 to 43 23	0 to 44 23	0 to 44 23

12.3.3. Setting Fault Condition Parameters

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: A | B C | D

Fault conditions	This menu item is used to set and enable fault conditions and fault message parameters. This menu option is not available on video-only Quattro™ products.

Quattro™ cards have four configurable fault conditions per quadrant (except for the video-only Quattro™ cards, which do not support fault monitoring). The *Fault condition 1, Fault condition 2, Fault condition 3* and *Fault condition 4* menu items are used to configure fault triggering, and how the fault alert message is 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 definition is inactive. The controls for each fault condition operate the same way so, for simplicity, the manual shows only the menu items for *Quadrant 1*, *Fault condition 1*.

Fault burn-in properties	This quick link menu to Fault burn-in properties menu. Used to set the global (all quadrants) background colors and opacities as well as text opacities of fault condition messages.
Fault condition 1	Adjusts specific fault 1 condition alert display parameters

Fault condition 2	Adjusts specific fault 2 condition alert display parameters
Fault condition 3	Adjusts specific fault 3 condition alert display parameters
Fault condition 4	Adjusts specific fault 4 condition alert display parameters

12.3.3.1. Configuring Fault Condition Parameters

Quadrant Y	Quadrant-specific on-screen display enabling, including audio bar graph configuration, text windows and fault alert conditions are set through this menu option. In addition, control for expanded and H/V delay mode viewing is also accessed through this set-up menu. On every Quattro™ card, in the default display mode, four (4) quadrants are shown on the screen at the same time. These quadrants are identified, by factory default, as depicted in the following diagram: A | B C | D
Fault conditions	This menu item is used to set and enable fault conditions and fault message parameters. This menu option is not available on video-only Quattro™ products.
Fault condition 1	Adjusts specific fault 1 condition alert display parameters. Adjustments for Fault conditions 2-4 are similar.
Fault status	This menu item displays a snap shot of the current status for a particular quadrant. There are no configurable options within this selection.
4:3 quadrant burn-in position	Quick link to *Burn-in configuration* menu, then *Quadrant burn-in position* sub-menu. Fault condition 1 parameters for quadrant view may be set from either location.
16:9 quadrant burn-in position	Quick link to *Burn-in configuration* menu, then *Quadrant burn-in position* sub-menu. Fault condition 1 parameters for quadrant view may be set from either location (when available on module).
Expanded view burn-in position	Quick link to *Burn-in configuration* menu, then *Expanded view burn-in position* sub-menu. Fault condition 1 parameters for expanded view may be set from either location.

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 8.1.1 for information on changing text fields.

For Fault condition 2, default message is "*AUDIO ERROR*".
For Fault condition 3, default message is "*VIDEO FROZEN*".
For Fault condition 4, default message is "*NO PROG RATING*".

Mode
Enable
Disable
GPI1 – GPI12

This control enables or disables Fault condition 1 message display. When enabled, the fault message will be displayed until the condition is reset. When disabled, it will never be displayed.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Logic
Or
And

This menu option allows the user to group several fault triggers to produce an on-screen fault message. For example, if this menu option is set to AND, and both "Loss of audio" and "Frozen video" are selected from the list of fault triggers below, then the OSD Fault Condition message will only appear if both Loss of audio AND Frozen video thresholds/durations occur. If this menu option is set to OR, then the unit reports fault conditions on individual triggers, as they occur (standard operating mode). This menu feature is not VistaLINK™ enabled.

Color
Background1 (color)
Background2 (color)

This setting displays the background color selections made in the "Fault burn-in properties" menu. Having two colors allows the user to identify between critical and non-critical faults.

Blink
Disable
Enable

This control determines if the Fault condition 1 alert message will blink or remain solid when the fault is active. When *Disable* is selected the Fault condition message alert remains solid. When it is set to *Enable* the fault alert message blinks upon activation.

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.

Clear fault
Off
GPI1 – GPI12

This control allows the user to externally clear the fault through a pre-defined GPI.

As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Video error	Video error based on fault definitions Factory default: Fault condition 1
Max APL over	APL above threshold for certain time duration (7766 Quattro™ cards only)
Min APL under	APL below threshold for certain time duration (7766 Quattro™ cards only)
Loss of audio	Audio absent on channels ½ AND ¾ Factory default: Fault condition 2
Loss of audio channel 1/2	Audio absent on channels 1/2
Loss of audio channel 3/4	Audio absent on channels 3/4
Loss of audio channel 5/6	Audio absent on channels 5/6. (7765AVM-4A Quattro™ only)
AP EDH errors	Active picture EDH errors present (7765 Quattro™ cards only)
FF EDH errors	Full Field EDH errors present (7765 Quattro™ cards only)
Phase reversal 1/2	Audio 1 and 2 out of phase
Phase reversal 3/4	Audio 3 and 4 out of phase
Phase reversal 5/6	Audio 5 and 6 out of phase (7765AVM-4A Quattro™ only)

Audio over 1/2	Audio 1 or 2 over level (7766 Analog Quattro™ breaks out audio channels 1 and 2 as two separate fault entities)
Audio over 3/4	Audio 3 or 4 over level (7766 Analog Quattro™ breaks out audio channels 3 and 4 as two separate fault entities)
Audio silence 1/2	Audio 1 and 2 silent (7766 Analog Quattro™ breaks out audio channels 1 and 2 as two separate fault entities)
Audio silence 3/4	Audio 3 and 4 silent (7766 Analog Quattro™ breaks out audio channels 3 and 4 as two separate fault entities)
Audio mono 1/2	Audio 1 and 2 mono
Audio mono 3/4	Audio 3 and 4 mono
Audio mono 5/6	Audio 5 and 6 mono (7765AVM-4A Quattro™ only)
Loss of VITC	VITC absent
Loss of SID	SID absent
Loss of web tv url	Web TV URL present/absent (implement later)
Loss of program rating	Program rating absent Factory default: Fault condition 4
Loss of CC	Primary CC1 Closed captioning absent
Picture freeze	No activity above preset noise level in active picture Factory default: Fault condition 3
Picture black	No active picture above 7 IRE
GPI1-12	General purpose input 1 to 12 closed to ground. External trigger customized by user. As well, the number of available GPI triggers depends on the Quattro™ module. The 7765AVM-4-xx has up to 12 GPI inputs, while the 7765AVM-4A-xx and the Analog Quattro™ cards have up to 4 GPI inputs.

Table 8: Possible Error Triggers to Produce Faults

12.4. ON-SCREEN DISPLAY CONFIGURATION

On-screen display configuration	This set-up menu is used to configure general on-screen display properties such as colors and opacities for audio bar graphs, text windows and fault message displays.

Bar graph properties

Use this menu item to adjust on screen display audio level bar graph parameters. This menu option is not supported by the video-only Quattro™ cards.

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.

Text burn-in properties

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 burn-in configuration* menu items are used to set these parameters for all the text windows except the Fault windows.

Fault burn-in properties

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 *Fault burn-in configuration* menu items are used to set these parameters for all the text windows except the Fault windows.

This menu option is not supported by the video-only Quattro™ cards.

12.4.1. Setting Audio Level Bar Graph Properties

On-screen display configuration	This set-up menu is used to configure general on-screen display properties such as colors and opacities for audio bar graphs, text windows and fault message displays.

Bar graph properties	Use this menu item to adjust on screen display audio level bar graph parameters. This menu option is not supported by the video-only Quattro™ cards. **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.

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.

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.

In addition, 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 Region* will be shown in the manual. 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.

OK region

Custom ok red:
0 to 255
0

This control defines the red component color 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.

OK region

Custom ok green:
0 to 255
192

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

OK region
Custom ok blue: *0 to 255* *0*

This control defines the blue component color for a custom color for one of the regions of level 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.

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.

12.4.2. Setting Text Window Display Properties

On-screen display configuration	This set-up menu is used to configure general on-screen display properties such as colors and opacities for audio bar graphs, text windows and fault message displays.

Text burn-in properties	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 burn-in configuration* menu items are used to set these parameters for all the text windows except the Fault windows.

Source ID color 1
Black *Grey* *Yellow* *Red* *Green* *Blue* *Orange*

Select the desired SID/UMD color around the text.

The second and third Source ID/UMD background colors are set through similar menus.

Default background color
Black
Grey
Yellow
Red
Green
Blue
Orange

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

Background opacity
0 to 64
64

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.

White text without any background can be configured by setting the background opacity to 0.

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.

12.4.3. Setting Fault Burn-in Properties

On-screen display configuration	This set-up menu is used to configure general on-screen display properties such as colors and opacities for audio bar graphs, text windows and fault message displays.

Fault burn-in properties	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 *Fault burn-in configuration* menu items are used to set these parameters for all the text windows except the Fault windows. This menu option is not supported by the video-only Quattro™ cards.

Background color 1
Black *Grey* *Yellow* *Red* *Green* *Blue* *Orange*

Select the desired background color around the text in the Fault window.

Background color 2
Black *Grey* *Yellow* *Red* *Green* *Blue* *Orange*

Select the desired background color around the text in the Fault window.

Background opacity
0 to 64 *64*

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. White text without any background can be configured by setting the background opacity to 0.

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.

12.5. GPO CONFIGURATION

GPO configuration	Unlike the *GPI configuration* menu option, this GPO set-up option allows the user to define what circumstances will trigger one of four General Purpose Interface outputs (GPO) as well as the Frame Status output. The number of GPOs is fixed at four (4) across all Quattro™ cards.

The Quattro™ cards have four General Purpose Interface outputs (GPO) available through the DB-25 connector which can be used to signal several conditions to the user. In addition, these outputs can be configured to be active high or low. Since the video-only Quattro™ cards have no defined fault structure,

the following GPO menu options are not applicable. Therefore, the menu options below are only supported by the 7765AVM-4, 7765AVM-4A, 7766AVM-4A and 7766AVM-S4A Quattro™ versions.

The 7700FR-C frame also has a fault monitoring LED and general-purpose output, which the user can configure to trigger onto the frame status system. The *GPO configuration* menu contains the controls used to configure the GPOs. For simplicity, only menu items for GPO1 is described below.

GPOx
- *GPO active state*
  - *High*
  - *Low*
  - *Quadrant y fault z*
- *Yes*
- *No*

This menu item controls whether the General purpose output is active *High* or *Low*. Also, setting the GPO to trigger upon a fault condition 1 or fault condition 2 alert in a particular quadrant is also controlled in this menu. (x = 1 to 4, y = 1 to 4, z = 1 to 4)

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.

Frame status trigger
- *Quadrant x fault y*
  - *Yes*
  - *No*

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. (x = 1 to 4, y = 1 to 4)

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 13.1

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

12.6. Setting H/V Delay Line and Pixel Variables

H/V delay

H/V delay or “Pulse Cross” settings through this menu option allow the user to view the blanking intervals by setting the viewable start line and sample.

525 start line number
- *8 to 262*
- *120*

Control to set starting line with 525 line input

625 start line number
- *5 to 312*
- *140*

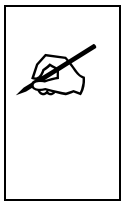
Control to set starting line with 625 line input (when module is pre-loaded with 625 version firmware.)

525 start pixel	Control to set the starting pixel with a 525 line input.
0 to 856 (in 2 sample increments) <u>*574*</u>	

625 start pixel	Control to set the starting pixel with a 625 line input (when module is pre-loaded with 625 version firmware).
0 to 862 (in 2 sample increments) <u>*574*</u>	

12.7. SERIAL PORT CONFIGURATION

Serial Port	This common Quattro™ set-up menu item allows the user to set-up data logging of fault alert conditions recorded by the Quattro™, separately from any VistaLINK™ application. Alternatively, this set-up menu item also allows the user to enable and configure third-party UMD/SID and tally sources through supported protocols. A list of supported protocols is provided in the "Features" section of this product manual.



The Quattro™ cards are equipped with a single serial communication port, jumper-designated RS-232 or RS-422. Subsequently, data logging and UMD protocol support will not work simultaneously.

If both features are required, it is suggested to use VistaLINK™ PRO network management software to log all status and fault conditions, while using the serial communication ports for interfacing to common UMD protocols.

Data logging	A standard feature on all Quattro™ cards, this menu option allows the user to configure the output serial port for fault data logging to a connected printer. The serial communication port uses Evertz's Serial Communications Protocol document that can be ordered through your Evertz representative.

Image video protocol	Configuration menu options for Image Video UMD protocol support. This menu option is only supported in the 7765AVM-4-xx and 7765AVM-4V-xx Quattro™ cards as it requires 8 GPI inputs to set the tally states (as per Image Video protocol).

TSL protocol	Configuration menu options for TSL (Television Systems Ltd.) UMD protocol support. This menu item allows the user to set the TSL protocol address identifying where the Quattro must look to decode the UMD information. For simplicity, only "A" menu is shown here. Sources "B", "C" and "D" are set in a similar manner, with default addresses set to "1", "2" and "3" respectively.
Video source A address = <u>*0*</u> *to 126*	

Serial port configuration
Data logging
TSL protocol
Probel protocol
Image video protocol

This menu item defines the function of the serial port on the back of the Quattro rear plate module. For Data logging, the module itself can be left in RS-232 mode (via jumper). For TSL, Probel or Image Video protocol (7765AVM-4 versions only) UMD mode, the jumper must be moved to RS-422 position.

The jumper/header position is located on the top "CC" board (Figure 7), along its top edge. In positions 1-2, or is left open the serial port will function as an RS-232 port. If pins 2-3 are connected, the port will communicate via RS-422 type protocols.

12.7.1. Data Logging

Serial Port	This common Quattro™ set-up menu item allows the user to set-up data logging of fault alert conditions recorded by the Quattro™, separately from any VistaLINK™ application. Alternatively, this set-up menu item also allows the user to enable and configure third-party UMD/SID and tally sources through supported protocols. A list of supported protocols is provided in the "Features" section of this product manual.
Data logging	A standard feature on all Quattro™ cards, this menu option allows the user to configure the output serial port for fault data logging to a connected printer. The serial communication port uses Evertz's Serial Communications Protocol document that can be ordered through your Evertz representative.

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 an internal clock. The data logging serial port (RS-232) operates at 57600 baud, 8 bits, no parity, 2 stop bits and no flow control.

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

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.

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 card are sent out the serial port at the poll rate specified in the *Status poll rate* menu item.

Card ID
7765AVM-4

This menu item identifies the specific Quattro™ card. This label will appear on the data log along with associated fault and status information.

Event stamp
Current time

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

Poll rate
1 to 60 min (1 min increments) *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.

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.

12.7.2. Serial Port Connections for UMD Support

Figure 9 depicts a simple serial port connection for under monitor display (UMD) support. Once the equipment is wired, the proper configuration setting, via OSD menu or through VistaLINK™, must be made to each Quattro as defined through the menu options below.

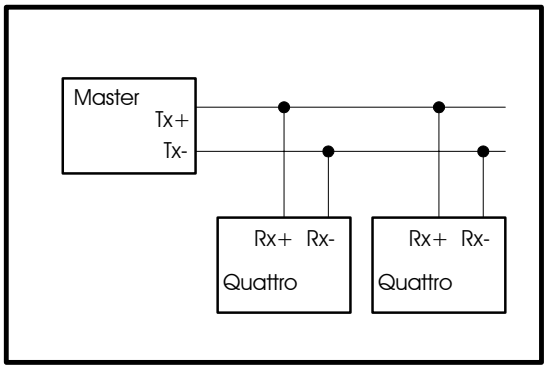


Figure 10: Serial Communications Port Connections for UMD Protocol Support

12.7.3. Image Video Protocol

Serial Port	This common Quattro™ set-up menu item allows the user to set-up data logging of fault alert conditions recorded by the Quattro™, separately from any VistaLINK™ application. Alternatively, this set-up menu item also allows the user to enable and configure third-party UMD/SID and tally sources through supported protocols. A list of supported protocols is provided in the "Features" section of this product manual.
Image video protocol	Configuration menu options for Image Video UMD protocol support. This menu option is only supported in the 7765AVM-4-xx and 7765AVM-4V-xx Quattro™ cards as it requires 8 GPI inputs to set the tally states (as per Image Video protocol).
Video source A	Menu item to configure the UMD for video source A of the Quattro, based on the Image Video UMD protocol. Video sources B, C and D are configured in a similar manner for all Quattro™ cards.

Baud rate

This menu item is used to select the baud rate of the serial interface between the Image Video UMD device and the Quattro.

30
600
1200
2400
4800
9600
19.2k
38.4k

12.7.3.1. Image Video UMD Video Source A Menu Options

Serial Port	This common Quattro™ set-up menu item allows the user to set-up data logging of fault alert conditions recorded by the Quattro™, separately from any VistaLINK™ application. Alternatively, this set-up menu item also allows the user to enable and configure third-party UMD/SID and tally sources through supported protocols. A list of supported protocols is provided in the "Features" section of this product manual.
Image video protocol	Configuration menu options for Image Video UMD protocol support. This menu option is only supported in the 7765AVM-4-xx and 7765AVM-4V-xx Quattro™ cards as it requires 8 GPI inputs to set the tally states (as per Image Video protocol).
Video source A	Menu item to configure the UMD for video source A of the Quattro, based on the Image Video UMD protocol. Video sources B, C and D are configured in a similar manner for all Quattro™ cards.

Identification number
0 to 255 *<u>0 (video A)</u>*

This menu item identifies a video source/input address to an Image Video UMD address.

For simplicity, only “Video source A” menu is shown here. “Video sources B” through “Video sources D” are set in a similar manner. For Video source B = 1, Video source C = 2 and Video source D = 3

Tally mode
T1T2 *T2T1* *T1-* *T2-* *T1T2-* *T2T1-* *T2* *<u>T1</u>*

The Image Video UMD has two tallys. This menu item defines how the two tallys co-exist in order to drive the tally state.

Power-up line 1
None *<u>Message 1</u>*

This menu item identifies a video source/input address to an Image Video UMD address.

For simplicity, only “Power up line 1” is shown here. Similarly, defaults “Power up line 2 = Message 2” and “Power up line 3 = Message 3.”

Message 1
<u>Message 1</u>

This 16 character string contains the particular message. One of these messages is loaded into one or more of the lines at power-up.

For simplicity, only Message 1 is shown here. Message 2 menu default is set to “Message 2” and Message 3 default is set to “Message 3” respectively.

Identification string
<u>7765AVM-4</u>

This 16 character string is the UMD string address. Its default setting is “Quattro”. This message can also be loaded into one or more lines at power up and, if used, is identified as “Message 4”.

Message 1 duration
<u>Forever</u> *0.05 – 12.75 sec (increment of 0.05 secs.)*

This menu item defines the length of time that a message is displayed if it is loaded into one or more lines.

For simplicity, only Message 1 duration is shown here.

Tally 1
<u>GPI1</u>

This item selects identifies the GPI that drives the Image Video tally. An active GPI results in an individual tally state of 0. An inactive GPI results in an individual tally state of 1 (GPIs are initially set to active low).

For simplicity, only Tally 1 is shown here. Tally 2 default is GPI2.

12.8. UTILITIES

Utilities	If not using the VistaLINK™ configuration capabilities, it is possible to store and recall Quattro™ card configuration presets through this main menu item. In addition, the *Utilities* menu contains an upgrade utility, factory reset option and product firmware revision information.

About…	This menu item lists the particulars about this module including the hardware, and software revisions. This item can be used to determine if an upgrade to the module is required.

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.

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. Similarly, Store preset 2 is can also be used to save the card's current configuration.

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. Similarly, Recall preset 2 is can also be used to re-load the previously stored card configuration.

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.

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.

13. JUMPERS

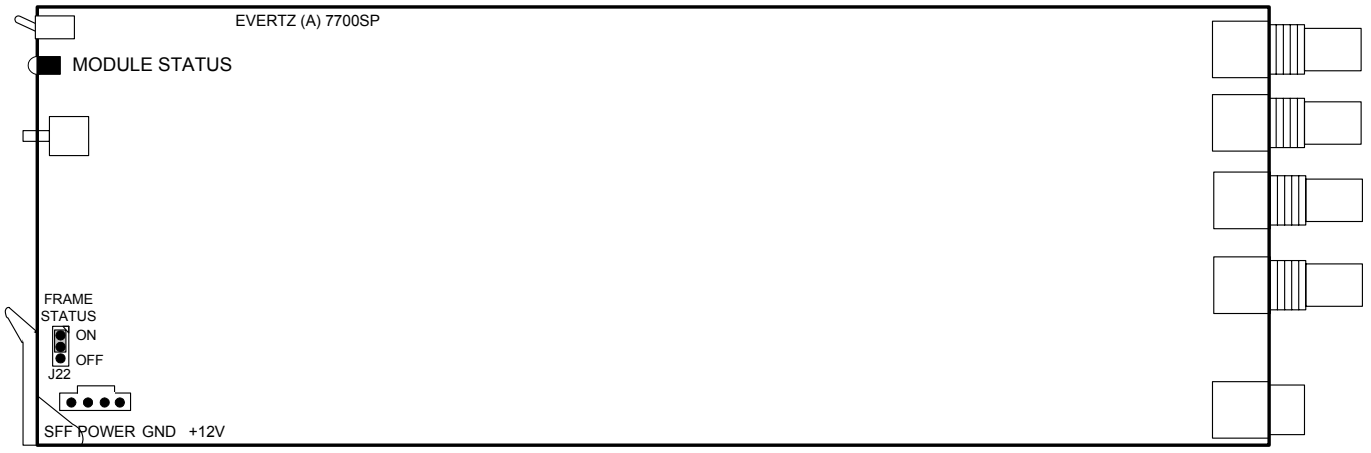


Figure 11: Location of Jumpers on 7700SP Boards

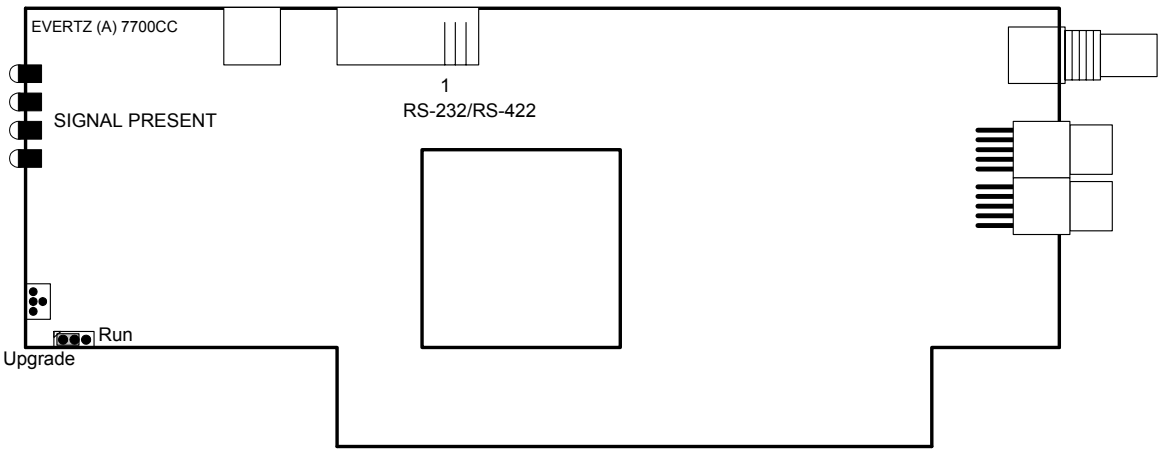


Figure 12: Location of Jumpers on 7700CC Boards

13.1. 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-C 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 J22 is installed.

13.2. 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 located on the top module at the bottom, front 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 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header 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 Jumper into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.