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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.0	Preliminary	Mar 04
1.0	First release	Jun 04
2.0	-AES version added Video APL measurement added Video black and white level faults added	May 05
2.1	Audio installation instructions added	Oct 05
2.2	PAL-M support added	Jan 07
2.3	Notes about lack of audio demultiplex on SDI input added Added Jumper drawing Figure 9-1	Jul 07

WARNING: This version contains areas of gray text that are indicative of future software releases. These sections are to be used as information only and are subject to change. Some of these features may seem to work but they have not been completed and have not been verified by Evertz.

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1. OVERVIEW

The 7736CDM line of composite analog video to serial digital converters are broadcast quality decoders with an extensive list of additional features. High quality audio analog to digital conversion or AES inputs can be packaged with the decoder to create a video/audio frame synchronizer with audio embedder. In addition, Evertz fault monitoring processing will analyze and report video and audio problems via an On-Screen-Display, or remotely via VistaLINK® SNMP.

Faroudja 2D adaptive comb filtering technology has been chosen to not introduce moving artifacts from the decoding process. This makes it ideal for use in applications where the signal is destined to enter MPEG compressors. "The low level of moving artifacts reduces the bit-rate required to digitally encode the signal for a given picture quality level by up to 20%." [1]

Traditional adaptive and non-adaptive 2D comb filters can introduce artifacts in areas of high detail. However, "by using adaptive processing incorporating Faroudja's patented H-logic and V-logic interpolation algorithms to control both the comb filter itself and the narrow and wide band chroma filters, these artifacts are substantially reduced not only on horizontal and vertical edges, but on diagonal edges too. In this way, the chroma filters reduce chroma noise without blurring the signal at sharp transitions in any direction." [2]

The Features of the decoding process:

- 10 bit, 8fsc sampling of input video.
- Internal processing to maintain 10 bit digital video quality.
- Patented Faroudja adaptive 2D comb filtering technology.
- Mode for support of non-time base corrected signals.
- User configurable luma and chroma detail enhancement.
- User selectable noise reduction.
- Chroma AGC available, if desired.
- User adjustable input video processing functions: black level, gain, hue, and saturation (when chroma AGC is enabled).

The Features of all 7736CDM's are:

- Flexible input options for hybrid analog and digital plants/studios. Two input BNCs that can be configured either as; one composite analog loop input (NTSC, PAL-M or PAL-B) or a dual input with one channel of SDI and one channel of composite analog video (selectable). NOTE: There is no audio demultiplex on the SDI input.
- Four SDI 525 or 625, 270 Mb/s component digital video output WITHOUT OSD text or audio bargraphs.
- One composite analog video output with OSD text and bargraph graphics.
- EDH encoding on SDI output.
- One composite analog reference input (NTSC or PAL-B) on BNC. 75 Ohm or high-Z, jumper configurable input impedance.
- One frame video synchronizer (with +S option).
- Infinitely variable output phase (27MHz clock increments).
- Freeze modes: black, freeze

[1],[2] Faroudja Laboratories Inc., FLI2000S Data Sheet

- Adjustable free running frequency via OSD.
- VU/PPM bargraph level Indicators.
- Decodes vertical interval time code (VITC) and “burns” the time code into the picture.
- Decodes PESA format Source ID (8 characters) or Evertz format VITC Source ID (5 or 9 characters) and burns the ID into the picture.
- A comprehensive on screen display is available to configure the various features of the module.
- Flexible configuration of the text and audio bar graph information displays.
- An extensive list of error conditions can be monitored and fault conditions can be configured from these conditions.
- On screen messages can be triggered by the configured fault conditions.

The Features of "-A4" option are:

- 4 balanced analog audio inputs on 2 removable barrier strips.
- High impedance inputs (user supplies termination resistors for other impedance's)
- Analog audio input levels are adjustable. Jumpers set coarse input levels, fine input levels are set by software control.
- Audio delay equivalent video delay (with +S option).
- Additional audio delay of up to 5 seconds.
- Audio advance of up to 1 frame less 3 microseconds.
- One group (4 channels of audio) is multiplexed on the outgoing digital video.
- 2 unbalanced AES audio outputs delayed equivalently to the video delay.
- 75-Ohm coaxial (unbalanced) DARS reference input on BNC.
- Loss of video modes: pass audio, mute audio

The Features of "-AES" option are:

- 75-Ohm coaxial (unbalanced) AES inputs (2) on BNC.
- Audio delay equivalent to video delay (with +S option).
- Additional audio delay of up to 5 seconds.
- Audio advance of up to 1 frame less 3 microseconds.
- One group (2 channels of audio) is multiplexed on the outgoing digital video.
- 2 unbalanced AES audio outputs delayed equivalently to the embedded audio.
- 75-Ohm coaxial (unbalanced) DARS reference input on BNC.
- Loss of video modes: pass audio, mute audio.
- Bypass relay protection that allows removing the card without re-wiring AES audio.

1.1. FUNCTIONAL DESCRIPTION

Composite analog video is converted to 10 bit parallel data and decoded to 4:2:2 digital component using Faroudja™ patented technology. Various video processing functions (gain, saturation, noise reduction, etc) are performed during the decoding process.

VITC, closed captioning and Source ID are extracted and from this input stream. In addition, the video is monitored for black and freeze conditions.

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

In the 7736CDM-A4 version, the audio is converted from balanced analog to digital PCM audio. The 7736CDM-AES, receives the input AES audio and rate converts it to synchronous 48kHz. The digital audio is then delayed to match the delay experienced by the video in the video synchronizer (with +S option). This delayed audio (with +S option) is formatted properly and delivered to the user as unbalanced 75 Ohm AES audio on BNC. It is also formatted into one group of audio and embedded on the SDI output video.

The audio is also processed to extract level and phase 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 through two paths; a SDI parallel to serial converter and a monitoring quality composite encoder with the OSD "burn-ins".

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

The following block diagrams illustrate the processing blocks. There is no diagram for the non-audio version. It has the processing that is in the bottom (video portion) of either of the two drawings.

NOTE: There is no audio demultiplex on the SDI input.

7736CDM-A4

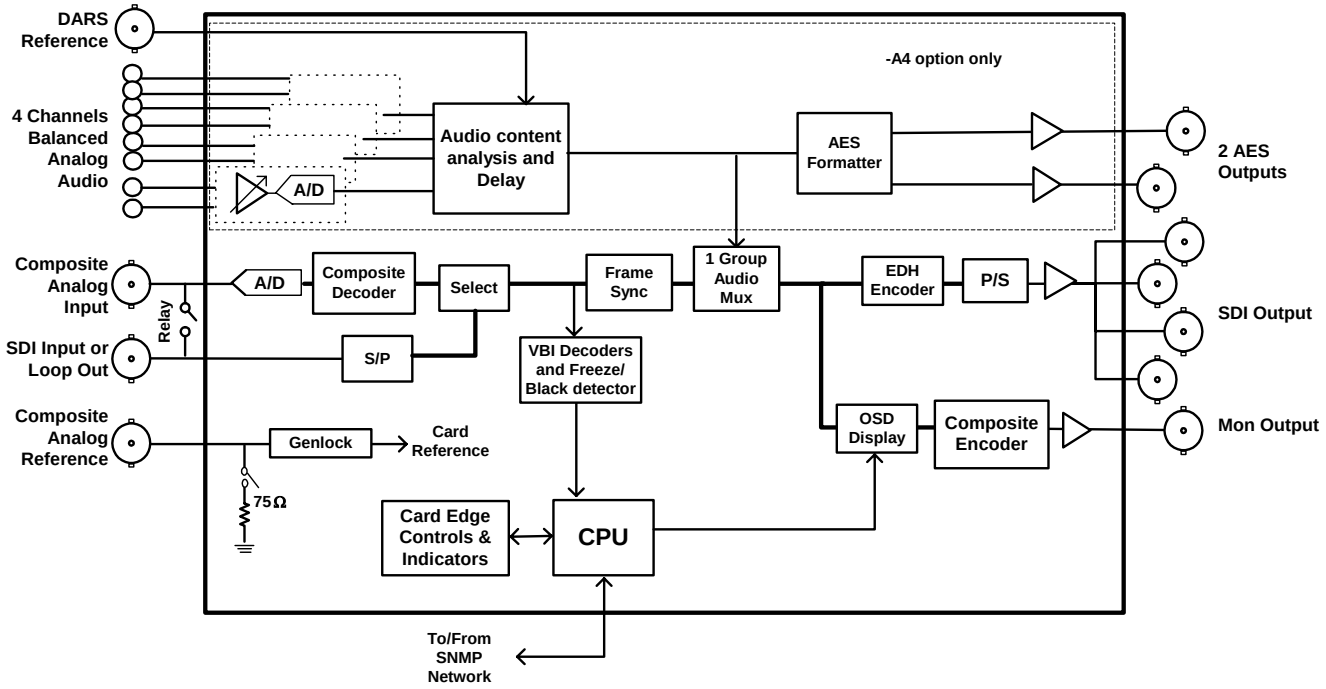

Figure 1-1: 776CDM-A4 Block Diagram

2. INSTALLATION

The 7736CDM modules come with a companion rear plate and occupy one or two slots in the 7700FR frame. Figure 2-1 shows a picture of each of the rear panels. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR chapter.

The 7736CDM cards must be inserted into slots with the correct rear panel. Some cards have physical differences and some have functional differences and the associated labels will be misleading.

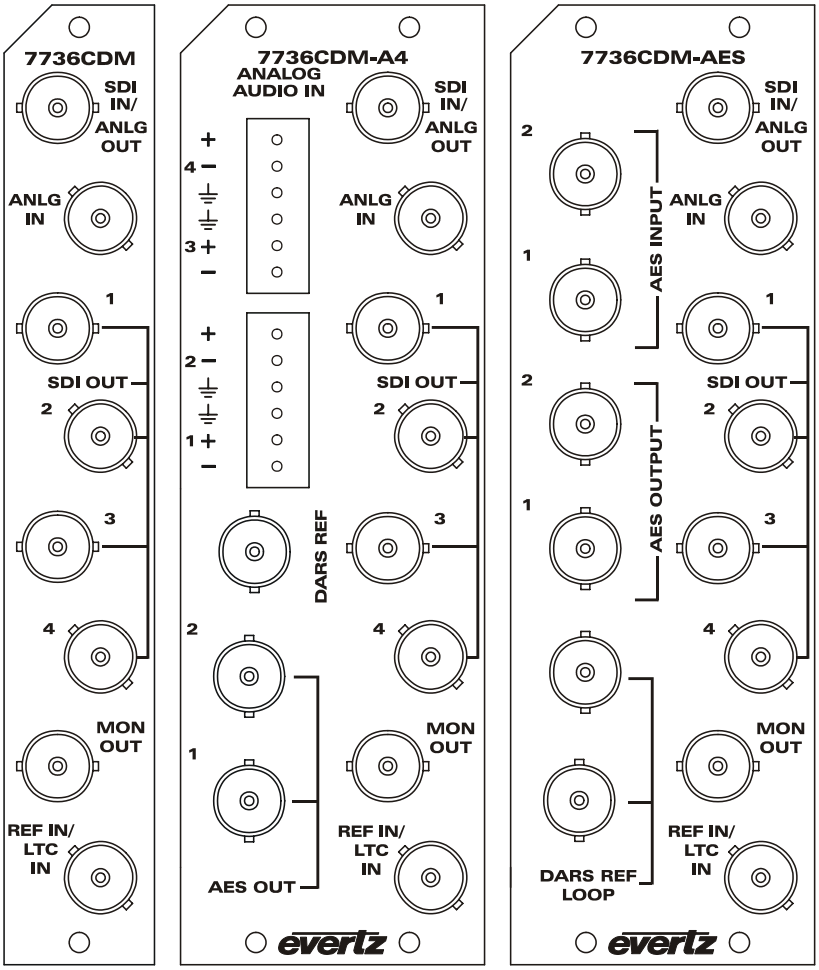

Figure 2-1: 7736CDM Rear Panels

2.1. VIDEO IN AND OUT

A relay on the rear I/O module has been used to support two possible video input configurations. A "Latching relay" is used and will stay in it's last energized position when power is lost.

In the first mode, an analog passive loop is created with the relay for supporting a high impedance passive composite analog video loop. Because the relay is physically on the rear panel I/O module, the card may even be pulled out of the frame without breaking the analog loop. In this mode, ANLG IN and SDI IN/ANLG OUT become a passive, high impedance, loop. Even though the input loop is passive, we recommend applying the analog video into the ANLG IN BNC and looping out of the SDI IN/ANLG OUT BNC.

In the second mode, dual SDI/analog inputs are supported. This means that you can apply both a composite analog signal and an SDI signal and you can choose, via card edge/OSD or VistaLINK®, which signal gets processed in the card. It should be obvious that the SDI input will bypass the composite decoder processing stage. In this mode, SDI IN/ANLG OUT is the SDI input and ANLG IN is the composite analog input.

WARNING: If operating in dual input mode with two signals running into the card, and the user switches to the passive analog loop mode, the two videos will be electrically shorted together.

Connect a reference black signal to the REF BNC.

Decoded video with embedded audio and EDH encoding is available on the SDI OUT BNCs. Decoded and re-encoded analog video with text and audio bar graphs are available on the MON OUT output BNC. If the card is not present or the power is off, there will be nothing on any of the outputs.

2.2. AUDIO IN AND OUT

The audio versions of the CDM (-A4, -AES) have audio paths through the card that are delayed/synchronized with the video. The –A4 version will perform an A to D conversion on 4 balanced analog inputs (2 stereo pair), delay the audio to match the video, and output 2 AES channels that are synchronous to the video. The –AES version has AES inputs and sample rate converters. Both versions also provide delayed/embedded audio on the output video.

On the –A4 version, pull out the removable terminal strip and, with a small screw driver, connect bare wires following the connections on the rear panel. If the audio is unbalanced (single-ended), connect the ground to both the ground input and the –ve input while the signal is connected to the +ve input. Push the terminal strip back into the rear panel making sure there is enough slack in the cabling to not put pressure on the connector.

On the –AES version, connect one or two 75 Ohm coaxial (unbalanced) AES inputs to the AES INPUT BNCs.

Both versions will drive 48kHz unbalanced 75 Ohm AES on the AES OUTPUT BNCs.

The AES outputs are always synchronous to the output video. This means that the AES is frequency/phase locked to the video with an exact relationship between the number of audio samples and the number of output video frames. If you also need the AES channel status bits aligned with an external source, apply a Digital Audio Reference Signal (DARS) with the reference phase information. The card will automatically align the channel status bits when any AES input signal is detected on the DARS input.

WARNING, the DARS signal MUST be locked to the same genlock reference signal that the CDM hardware is using. Otherwise, the channel status bits will slip in phase which may cause downstream AES equipment to detect a problem. When in doubt, do not apply a DARS signal. The OSD status screen displays DARS status information to aid in debugging a reference problem.

3. SPECIFICATIONS

3.1. ANALOG VIDEO INPUT

Standard:	NTSC, SMPTE 170M PAL, ITU624-4 PAL-M
Number of Inputs:	1
Connector:	BNC per IEC 169-8
Signal Level:	1V nominal
Frequency Lock Range:	±75ppm from nominal
Input level control range:	±5dB
Black level control range:	±5 IRE
Chroma level control range:	±20% (only available if chroma AGC enabled)
Hue control range:	±20 deg. (NTSC only)
Input Impedance:	75 Ohm or High impedance (jumper selectable)
Return Loss:	>35dB to 10MHz
Lock up time on a hot switch:	between 15 and 45 frames (may be longer with noisy signals)

3.2. SERIAL VIDEO INPUT

Standard:	SMPTE 259M-C – 525 or 625 line component.
Number of Inputs:	1
Number of re-clocked outputs:	0
Connector:	BNC per IEC 169-8
Return Loss:	>15dB to 300MHz
Embedded Audio:	SMPTE 272M-A
Frequency Lock Range:	±75ppm from nominal

3.3. REFERENCE VIDEO INPUT

Standard:	NTSC, SMPTE 170M PAL, ITU624-4
Number of Inputs:	1
Connector:	BNC per IEC 169-8
Signal Level:	1V nominal
Frequency Lock Range:	±75ppm from nominal
Input Impedance:	75 Ohm or High impedance (jumper selectable)
Return Loss:	>25dB to 10MHz

3.4. ANALOG MONITORING VIDEO OUTPUT

Standard:	NTSC, SMPTE 170M PAL, ITU624-4, PAL-M
Number of Outputs:	1
Connector:	BNC per IEC 169-8
Signal Level:	1V nominal
Output Impedance:	75 Ohm
Return Loss:	>35dB to 10MHz

3.5. SERIAL VIDEO OUTPUT

Standard:	SMPTE 259M-C – 525 or 625 line component.
Number of Outputs:	4
Connector:	BNC per IEC 169-8
Signal Level:	800mV nominal
DC Offset:	0V ±0.5V
Rise and Fall Time:	900ps nominal
Overshoot:	<10% of amplitude
Return Loss:	>15dB to 270MHz
Jitter	<0.09 UI (all outputs)
Embedded Audio:	SMPTE 272M-A

3.6. DECODER PERFORMANCE (SDI Output Only)

Frequency Response:	<±0.1dB (100kHz to 4.2MHz)
Differential Gain:	<±0.5% typical
Differential Phase:	<±0.2 deg. typical
Noise Floor:	< -56dBrms (black video, 15kHz to 5MHz) < -60dBrms (VBI lines, black video, 15kHz to 5MHz)
C/L Gain:	<±0.5%
C/L Delay:	<±9ns
Minimum Delay:	3.25 lines
Maximum Delay:	1 frame plus 3.25 lines

3.7. ANALOG AUDIO INPUT (-A4 Only)

Number of Inputs:	4
Type:	Balanced analog audio
Connector:	Removable terminal strip
Input Impedance:	20kOhm minimum (differential)
Sampling Frequency:	48kHz
Signal Level:	0dB FS => 18 or 24dBu (jumper selectable)
Level Control Range:	+/- 10dB
Frequency Response:	+/- 0.1dB (20Hz to 20kHz) (broadcast quality)
SNR:	100dB with input at -0.5dBFS
THD+N:	<0.001% (>100dB) @ 1kHz, -0.5 dB FS (rev 2) <0.001% (>100dB) @ 20Hz to 20kHz, -0.5 dB FS (input video locked to genlock video)
CMRR	>100dB @ 1kHz

3.8. AES AUDIO OUTPUTS

Number of Outputs:	2
Output Standard:	SMPTE 276M, single ended synchronous AES
Connectors:	BNC per IEC 169-8
Resolution:	24 bits
Sampling Rate:	synchronous 48kHz
Minimum I/O Delay:	2.1msec
Maximum I/O Delay:	5 seconds

3.9. AES AUDIO INPUTS (-AES only)

Number of Inputs:	2
Input Standard:	SMPTE 276M, single ended synchronous or asynchronous PCM AES
Connectors:	BNC per IEC 169-8
Resolution:	24 bits
Sampling Rate:	32kHz to 48 kHz
User Bits:	Transferred to output in a non-real-time, non-block-contiguous manner
Minimum I/O Delay:	2.5msec

3.10. ELECTRICAL

Voltage:	+ 12VDC
Power:	10 Watts CDM + 9 Watts (-A4 option) = 19 Watts total.
EMI/RFI:	Complies with FCC Part 15, class A and EU EMC directive.

3.11. PHYSICAL

7700 frame mounting:

Number of slots:	1 for non-audio version 2 for audio version

Stand Alone Enclosure:

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

4. STATUS LEDS

4.1. MODULE STATUS LEDS

The location of the status LEDs is shown in Figure 9-1.

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

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

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

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

NTSC/PAL: The NTSC/PAL Green LEDs (PAL on the top, away from the PCB and NTSC on the bottom, closest to the PCB) will indicate the video standard of the composite analog input. The NTSC LED will illuminate when PAL-M video mode is selected and video is applied. If video is removed, both LEDs will go off.

AUDIO: This Green LED will come on if any of the analog audio input channels are not silent.

GENLOCKED: This Green LED is on solid if the user selected genlock source (either external input or from the frame) is present and the user has turned on genlocking.

It is flashing if the user has turned on genlocking and the selected genlock source is not present.

It will be off if the user has turned genlocking off.

4.2. AUDIO STATUS LEDS

Four LEDs located on the lower end of the module (near the card extractor) indicate which audio channels are present. Audio channel 1 LED is located closest to the center of the module. Analog audio (on -A4 versions) presence is determined with the silence detector. Digital audio (on –AES versions) presence is determined by the AES receiver lock indicator as well as the silence detector. If the audio is not silent, the LED will be on. See the sections associated to controlling and calibrating the silence detector for details.

Audio LED	Colour	Audio Channel Status
1	Off	No channel 1 present.
	Green	Channel 1 present.
2	Off	No channel 2 present.
	Green	Channel 2 present.
3	Off	No channel 3 present.
	Green	Channel 3 present.
4	Off	No channel 4 present.
	Green	Channel 4 present.

Table 4-1: Audio Channel Status LEDs

5. AUDIO BUFFER MANAGEMENT (+S OPTION ONLY)

The audio is delayed, through a large memory buffer, by the same time value as experienced by the video through the video frame synchronizer. This is done to maintain a consistent video/audio relationship. Unfortunately, when the video frame buffer drops or repeats frames of video, we cannot do the same with the audio. The rate of the ingoing audio data is changed and over a period of time, the buffer is returned to a value that matches the video. A sample rate converter is used to change the rate of the incoming AES on the -AES version. The 48kHz sampling clock is changed slightly from it's nominal value on the analog audio input (-A4) version. This method is also used when video is first applied or there is a sudden change in either the input video phase or genlock video phase.

When the audio buffer delay needs to be changed, there are two rates used; +/- 1% and +/- 30ppm. Initially, a 1% rate change is used to quickly match the audio delay to the video delay. This correction will only take a couple of seconds but will produce a pitch change. The pitch change will be discernable, particularly on sustained musical notes. When the video/audio delays are close to each other and only small corrections are required, the audio buffer will be adjusted with a rate change of 30ppm (30 Parts-Per-Million is equivalent to 0.003%). This rate change will produce a pitch change that is near the threshold of where a human can detect it and should not be discernable with normal content.

Unfortunately, the audio buffer management relies on a sample rate converter (-AES versions only) to adjust the audio buffer size. This precludes the synchronization of non-PCM AES data (i.e. Dobly-E™). In the future, a non-sample rate converter mode may be available.

Audio A to D converters and sample rate converters have inherent delays that are much longer than what the minimum acceptable video I/O delay is. To allow the user to operate the video synchronizer with small video delays, we will hold the audio buffer delay at it's minimum value when the video is less than this minimum.

5.1. Dolby-E™ (Non-PCM) Mode

Dolby-E™ does not allow the use of a sample rate converter to adjust the data rate. When this mode is turned on, the audio buffer will initialize to the same delay as the video. It is up to the user to provide a "locked" system. This means that the user supplied input video, AES audio carrying non PCM data (i.e. Dolby-E™) and the genlock video must be frequency locked.

6. AUDIO LEVELS, HEADROOM, CLIPPING AND THE BAR GRAPHS (-A4AND –AES)

This section contains notes to understand how the 7736CDM-A4 relates analog audio levels, digital audio levels, and the displayed bar graph levels. Before you can calibrate the audio analog to digital converter, you must know a couple of system issues specific to your application. What is your analog reference level and how much headroom do you want to have in the digital audio signal? By adding these two values together, you will get the analog input level that will just begin to saturate the digital word (This is the highest level that can be represented without distortion with the digital numbers). This level is called 0dB FS (FS stands for "full scale"). For instance, if your analog program reference level is 4dBu and you want 20dB of headroom in the "digital world", then 0dB FS will correspond to an analog level of 24dBu. Once the audio input level is calibrated, when you apply a 4dBu analog signal, the digital level will be –20dB FS.

The SDI embedded audio, the AES output audio and the bargraphs are all based on the digital quantized signal. The AES/EBU bargraph ballistics mode is scaled to 0dB FS while the other modes have a user selectable headroom. For this reason, use the AES/EBU mode for calibrating input levels.

6.1. INPUT AUDIO LEVEL CALIBRATION (-A4 only)

The analog audio input circuitry has two gain control stages before the audio is digitized; a jumper settable coarse range, and a software (menu system) control. One of the two coarse ranges is optimized for when peak audio levels are above 18dBu and one for levels below. The jumpers, when not installed, allow input levels of up to 24dBu. When the jumpers are installed, best performance is achieved when input peak levels are below 18dBu. The OSD menu system has independent +/- 10dB audio level control of all four channels (See section 8.4.5 for OSD control details).

The following is an example calibration procedure:

1. Take your analog program reference level and add the amount of desired headroom in the digital signal (SMPTE standard is 20dB). If this number is greater than 18dBu, then remove the 8 jumpers near the rear of the 7735AI-master card of the 7736CDM-A4 module. If the number is less than 18dBu, then install the 8 jumpers.
2. Apply an analog audio signal of the level calculated above.
3. Apply composite analog video to the "ANALOG IN" BNC.
4. Monitor either the embedded audio or the output AES audio with appropriate level measuring gear.
5. Adjust the *level adjust* controls in the *audio* menu so that the digital level just starts to clip.
6. Verify by applying program reference level. The bargraphs should read a level that is below 0dB FS by the desired headroom level.

More information:

Without front-end jumpers in place (common +24 dBu setting) and 0 dB gain control, the conversion will transform +24 dBu analog input to 0 dBFS digital signal. Gain control will allow adjustment of this setting +/-10 dB in 0.5 dB increments (See section 8.4.5 for OSD control details). The user has to be aware that the front-end analog amps will saturate (clip) at +27 dBu independently of adjustable gain/attenuation stage and the ADC stage.

With "+18 dBu" jumpers in place and 0 dB gain control, the conversion will transform +18 dBu analog input to 0 dBFS digital signal. Gain control will allow adjustment of this setting +/-10 dB in 0.5 dB increments (See section 8.4.5 for OSD control details). The user has to be aware that the front-end analog amps will saturate (clip) at +21 dBu independently of adjustable gain/attenuation stage and the ADC stage.

7. AUDIO ALARM CALIBRATION PROCEDURE (-A4 AND –AES)

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

Some of the audio alarm detection algorithms are dependent on the state of other audio alarm detectors. For instance, the mono detection algorithm will not use periods of silence as determined by the silence detection. For this reason, the following sequence should be used to calibrate the audio alarms. The items in italics refer to menu items in the CDM. See section 8.10 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 un-correlated 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 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 exist. Decide what grouping of error conditions will generate a fault by setting the appropriate condition to *Yes* in the *Fault Condition* menu.
2. Set the *Fault Duration* to either *Until Reset* or to a time value. This is how long the condition will stay active after the conditions generating the fault go away.
3. Configure a *Fault Message*. Enter the text to display on screen, it's H and V position, and it's characteristics (opacity, colour, etc).
4. Assign the *Fault Condition* to an output contact closure (GPO) if it is desired.

8. ON SCREEN MENUS

8.1. NAVIGATING THE ON SCREEN MENU SYSTEM

A toggle switch and pushbutton allow card edge navigation of a set of on-screen menus used to configure the card.

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

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

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

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

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

8.2. CHANGING TEXT FIELDS

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

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

   ```
   SAMPLE TEXT
   ^
   ```

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

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

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

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

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

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

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

8.3. ON SCREEN DISPLAY – MAIN MENU

Audio	Configuration of the parameters associated with analog audio inputs and audio multiplexing (audio versions only).
Video/SID	Controls for the operation of video processing.
Bar graphs	Configuration of the audio level and phase bar graphs (audio versions only).
On-Screen Display Configuration	Positioning controls and the on/off state of all windows and bar graphs. Configuration of the text window colours and opacity levels. Configuration of the GPI functions and how they affect the window and bar graph displays.
Fault Definitions	Definition and calibration of the fault conditions. Configuration of the fault message windows.
Utilities	Card preset management, and various debug and maintenance features.
Frame Status Trigger	Configuration of the card edge Fault LED and global frame status error line.
Clear Faults and Peaks	An easy to access “clear fault state and bar graph peaks” command.

The OSD menu is arranged in a layered structure that groups similar configuration items together. The following section gives a brief description of the first level of menus that appear when you enter the OSD screens. Selecting one of these items will take you to the next menu level. Sections 8.4 to 8.13 provide detailed descriptions of each of the sub-menus. The tables in sections 8.4 to 8.13 are arranged in an indented structure to indicate the path taken to reach the control. Menu items or parameters that are underlined indicate the factory default values.

8.4. CONFIGURING THE AUDIO CONTROLS (Audio Versions Only)

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

Audio destination	Selects the destination group of audio
Audio freeze mode	Selects what action to take when video is gone
Audio delay	Additional, user desired, delay may be added to the audio
Audio buffer	The audio buffer management status may be monitored with this item
Ch 1 adjust	Channel 1 level control
Ch 2 adjust	Channel 2 level control
Ch 3 adjust	Channel 3 level control
Ch 4 adjust	Channel 4 level control
Ch1/ch2 processing	Controls whether channel 1 and 2 (L/R) inputs will be swapped or duplicated
Ch3/ch4 processing	Controls whether channel 3 and 4 (L/R) inputs will be swapped or duplicated
Channel pair swap	Swaps channels 1 and 2 (stereo pair) with 3 and 4 (stereo pair)

8.4.1. Selecting the Audio Destination Group

Audio *Audio destination* *Group 1* *Group 2* *Group 3* *Group 4* *None*	Up to 4 groups of audio may be embedded on SDI video. This control selects the group ID of the multiplexed output audio. The input audio will be put in this group.

8.4.2. Audio Freeze Mode

Audio *Audio freeze mode* *pass* *mute*	Two selectable actions can take place when input video is removed; pass and mute. If it is desirable to maintain audio through the composite decoder (both embedded and AES outputs), then set this control to *pass.* When set to mute, the audio will automatically be muted when video is removed.

Grey background indicate un-implemented or un-tested features

8.4.3. Additional Audio Delay

Audio
Audio delay
0 *-37ms to 5sec in 0.5ms increments*

In addition to delaying the audio the same amount that the video is being delayed (in the video frame synchronizer), additional user requested delay may be added or removed with this control.

WARNING: Both the embedded audio AND the external AES audio are delayed by this amount.

WARNING: It takes approximately 1 minute, 40 seconds to adjust the audio delay by one second. This is required by the buffer management algorithm when changing the audio buffer size at a 1% rate without muting the audio. This long buffer adjusting will happen on power-up or when a new user supplied value is set with this control. However, the audio is still usable while the buffer is being adjusted. This is good for "On-Air" adjustment of audio delays.

NOTE: Advancing audio can only happen when video is undergoing a delay that is greater than the audio. If the system configured video delay becomes too small, the audio buffer shrinks to it's smallest delay and stays at that value.

8.4.4. Monitoring the Audio Buffer Tracking

Video/SID
Audio buffer

This item displays the status of the audio tracking buffer. It can be one of these states:

- Emptying (-1%)
- Emptying (-30 ppm)
- locked
- Filling (30 ppm)
- Filling (1%)

1% filling or emptying will have a slight pitch change that is near the edge of human perception for normal audio program material. This mode will be engaged when a large amount of delay needs to be changed quickly (video frame drops/repeats).

30ppm filling or emptying will be used to make minor delay buffer changes.

"Locked" will indicate that the video and audio buffers match.

The delay of the audio through the audio buffer always tracks the video except when the video frame synchronizer drops or repeats frames of video or the user supplies a different phase of input video. Unfortunately, at these boundary conditions, we cannot simply drop or repeat sections of audio. A rate conversion process is used to fill or empty the buffer to the needed level. The process must be spread out over a period of time so that the action is not audible.

This indicator is mainly used at the Evertz factory and may also be useful to monitor to help in debugging system issues.

8.4.5. Setting the Analog Levels (-A4 only)

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

Audio
ch1 adjust
-20 to 20
0

The channel input level **(-A4 only)** is adjusted with this control. It has a range of approximately +/- 10 dB with 1/2dB resolution.

For more details about setting the input level jumpers, see section 6.1.

8.4.6. Audio Gain Control (-AES only)

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

Audio
Ch1 gain
-24dB to
24dB,
0dB

This control will adjust the level of channel 1. It has a range of +/-24 dB with 1/10 dB resolution. The displayed value is the amount of gain (+ve), or attenuation (-ve), in decibels, where 0dB corresponds to unity gain.

Warning: Whenever +ve gain is configured, there is the possibility of distortion due to clipping. If the input audio level is increased to greater than 0dB FS, by adding gain, then the output audio will be limited at 0dB FS.

Warning: This processing takes place before going to the audio routing, analysis and bargraph display section. This means that you will be monitoring the processed version of the audio and not the input audio.

8.4.7. Audio Channels 1 and 2 Processing

Audio
Ch1/ch2
Pass
Swap
Ch1 split
Ch2 split

Basic audio channel manipulation is possible with this control.

Pass, routes both input channels straight through, while *Swap*, routes the two channels to the opposite channel output of the pair.

The *Ch1,2 split*, modes take a single channel, adjust the magnitude by –6dB (i.e. in half) and duplicates it on both output channels. This mode is designed for preparing a single channel (i.e. SAP: Secondary Audio Program) for a stereo infrastructure.

Note: The audio has been level corrected and the bargraphs are displayed before it is processed with this control into it's output format.

8.4.8. Audio Channels 3 and 4 Processing

- *Audio*
  - *Ch3/ch4*
    - *Pass*
    - *Swap*
    - *Ch3 split*
    - *Ch4 split*

Basic audio channel manipulation is possible with this control.

Pass, routes both input channels straight through, while *Swap*, routes the two channels to the opposite channel output of the pair.

The *Ch3,4 split*, modes take a single channel, adjust the magnitude by –6dB (i.e. in half) and duplicates it on both output channels. This mode is designed for preparing a single channel (i.e. SAP: Secondary Audio Program) for a stereo infrastructure.

Note: The audio has been level corrected and the bargraphs are displayed before it is processed with this control into it's output format.

8.4.9. Swapping Channel Pairs

- *Audio*
  - *Channel pair swap*
    - *No*
    - *Yes*

No, routes both stereo channels straight through, while *Yes*, swaps the channel pair. This means that channels 1 and 2 are routed to channels 3 and 4 of the embedded video and to AES channel 2.

The above channel processing is applied BEFORE this control processing.

Note: The audio has been level corrected and the bargraphs are displayed before it is processed with this control into it's output format.

8.5. CONFIGURING THE VIDEO AND SOURCE ID CONTROLS

The *Video/SID* menus are used to configure parameters associated with the video processing functions and the VBI decoders. The chart below shows the items available in the *Video/SID* menu. Sections 8.5.1 to 8.5.17 give detailed information about each of the parameters.

Analog video processing	Selecting this item takes you into the *Analog* Video Processing Menu.
Digital video processing	Selecting this item takes you into the *Digital V*ideo Processing Menu.
Video standard	Selects the input video standard.
Input video config	Selects the type of input videos.
Input video source	Depending on the *Input video config*uration, above, select the desired input.
Loss of video	Selects the action to take when the input video is missing.
Genlock source	Selects the source of genlock timing including free-running.
Free-run frequency	Sets the VCXO free-running frequency.
525 H phase	Sets the horizontal phase of the output signal to the NTSC Genlock reference input.
625 H phase	Sets the horizontal phase of the output signal to the PAL Genlock reference input.
H Delay	Status display that shows the current horizontal input to output delay.
525 V phase	Sets the vertical phase of the output signal to the NTSC Genlock reference input.
625 V phase	Sets the vertical phase of the output signal to the PAL Genlock reference input.
V Delay	Status display that shows the current vertical input to output delay.
Audio buffer	Status of audio delay buffer.
525 VITC line	Sets the line number for decoding Vertical Interval Time Code in NTSC/525 line video.
625 VITC line	Sets the line number for decoding Vertical Interval Time Code in PAL/625 line video.
525 PESA line	Sets the line number for decoding PESA format Source ID in NTSC/525 line video.
625 PESA line	Sets the line number for decoding PESA format Source ID in PAL/625 line video.
Default SID mode	Selects whether the Default SID message will be shown when there is no source ID on the incoming video.
Default SID msg	Sets the message that will be shown when *Default SID mode* is enabled and the SID window is turned On.

8.5.1. Setting the Video Standard

Video/SID
- *Video standard*
  - *NTSC/525*
  - *PAL-B/625*
  - *Auto*
  - *PAL-M/525*

The video standard is selected with this control.

In *Auto* mode, the Genlock reference video standard is used to determine what standard to use. PAL-M genlock is not supported. If Genlock video is not present, the input video standard is used.

Auto mode is not available for PAL-M operation. If PAL-M video is applied, it will be mistaken as NTSC.

8.5.2. Selecting the Input Video Configuration

Video/SID
- *Input video config*
  - *Dual input,*
  - *Analog loop,*
  - *Unknown,*
  - *Cancel*

The card's two video input BNC's may be configured as either a passive loop for composite analog video (*Analog loop*), or a *dual input* with one BNC of SDI video and one BNC of composite analog video.

WARNING: Selecting *Analog loop* mode when two separate inputs are applied (i.e. SDI and composite analog video applied) will cause them to be shorted together. For this reason, if you accidentally select this parameter, you can abort the command by going to *Cancel*. Also, if you try to go into *Dual input* mode, and both SDI and analog video are present, the software will NOT energize the relay because the videos will be shorted together. This control is NOT available through VistaLINK®.

The looping function is implemented with a latching relay on the rear panel I/O module. This will maintain the analog loop if either the power to the frame is removed or the module is removed from the frame.

When the card is powered up, it is impossible for the software to know which position the relay is in. *Unknown* will be displayed until SDI input is detected. This is a sure sign that the relay is in *Dual input* mode.

8.5.3. Selecting the Input Video Source

Video/SID
- *Input video source*
  - *Auto analog,*
  - *Auto SDI,*
  - *Analog,*
  - *SDI*

The card's two video input BNC's may be configured as either a passive loop for composite analog video, or a *dual input* with one BNC of SDI video and one BNC of composite analog video (see above control).

This *Video source* control allows you to select which input to select or which input has priority if both are present. If the *Video configuration* control (above) is set to *Analog loop*, this control will be limited to selecting just *Analog*. Using this *Auto* mode, you can implement an automatic change-over feature.

When the card is powered up in a new slot, for the first time, it is impossible for the software to know which position the relay is in. Therefore, you must set the above *Video configuration* control before setting this control if you do not know what state the relay is in.

8.5.4. Selects the Action to Take When Input Video Is Missing

Video/SID
Loss of video
Freeze Black

The user can either have the output video go to black, or freeze the last good video picture at the input with this control.

8.5.5. Genlock Source Selection

Video/SID
Genlock source
Ref. 1, Ref. 2, card ref, input video, none, not available

This control allows you to select the reference video input to the frame synchronizer. The reference may either be an externally supplied colour black or you may use the input video as a reference. Optionally, the synchronizer can be free-run if the "none" option is selected.

There are three possible sources of reference video; the *card ref*erence input BNC and two reference inputs (*Ref. 1* and *Ref. 2*) on the frame (7700FR-G only).

Make sure to adjust the video H and V output phase controls to calibrate the output phase of the video.

Not available will be displayed if the +S option was not purchased.

8.5.6. Setting the Free-Running Frequency

Video/SID
Free-run freq
-256 to 256 0

This control allows you to calibrate the free-running frequency of the on-board Voltage Controlled crystal Oscillator (VCXO). This oscillator provides the time-base when either operating without a reference input (free-running) or when running with a reference and the reference video is removed.

To calibrate the free-running frequency, use this or a similar procedure:

- Turn off genlocking with the "Genlock source" control or remove reference video from the reference input. Wait for the VCXO to stabilize at it's free-running frequency.
- Apply the composite analog monitoring output video to a vector scope that is externally referenced to the signal (usually plant reference black) that you are trying to frequency match.
- Adjust this control until the vectors spin slowly.
- Turn genlocking back on or apply reference video.

8.5.7. Setting the Horizontal Phase of the Output Video – NTSC/PAL-M/525 Video

Video/SID
525 H phase
0 to 1715 0

With this control, you can set the horizontal timing of the output video with respect to the Genlock reference input when operating in NTSC/525 or PAL-M/525 video mode. Setting this control to 0, keeps the monitoring output video in time with the Genlock reference. The SDI output will be a couple of microseconds advanced to the Genlock reference. Increasing the value will delay the output video in one-sample increments.

8.5.8. Setting the Horizontal Phase of the Output Video – PAL-B/625 Video

Video/SID
625 H phase
0 to 1727 0

With this control, you can set the horizontal timing of the output video with respect to the Genlock reference input when operating in PAL/625 video mode. Setting this control to 0, keeps the monitoring output video in time with the Genlock reference. The SDI output will be a couple of microseconds advanced to the Genlock reference. Increasing the value will delay the output video in one-sample increments.

8.5.9. Monitoring the Horizontal Delay between the Input and Output Video

Video/SID
H Delay

This item displays the horizontal delay between the input and output video. This value is useful to monitor while you are adjusting the H phase parameters and debugging system issues. One count is equivalent to 8 clocks of 27Mhz video.

8.5.10. Setting the Vertical Phase of the Output Video – NTSC/PAL-M/525 Video

Video/SID
525 V phase
0 to 524 0

With this control, you can set the vertical timing of the output video with respect to the Genlock reference input when operating in 525 video modes. Setting this control to 0, keeps the output video in time with the Genlock reference. Increasing the value will delay the output video in one-line increments.

8.5.11. Setting the Vertical Phase of the Output Video – PAL-B/625 Video

Video/SID
625 V phase
0 to 624 0

With this control, you can set the vertical timing of the output video with respect to the Genlock reference input when operating in 625 video mode. Setting this control to 0, keeps the output video in time with the Genlock reference. Increasing the value will delay the output video in one-line increments.

8.5.12. Monitoring the Vertical Delay between the Input and Output Video

Video/SID
V Delay

This item displays the vertical delay, measured in lines, between the input and output video. This value is useful to monitor while you are adjusting the V phase parameters and debugging system issues.

8.5.13. Monitoring the Audio Buffer Tracking

Video/SID
Audio buffer

This item displays the status of the audio tracking buffer. It can be one of these states:

- Emptying (-1%)
- Emptying (-30 ppm)
- locked
- Filling (30 ppm)
- Filling (1%)

1% filling or emptying will have a slight pitch change that is near the edge of human perception for normal audio program material. This mode will be engaged when a large amount of delay needs to be changed quickly (video frame drops/repeats).

30ppm filling or emptying will be used to make minor delay buffer changes.

"Locked" will indicate that the video and audio buffers match.

The delay of the audio through the audio buffer always tracks the video except when the video frame synchronizer drops or repeats frames of video or the user supplies a different phase of input video. Unfortunately, at these boundary conditions, we cannot simply drop or repeat sections of audio. A rate conversion process is used to fill or empty the buffer to the needed level. The process must be spread out over a period of time so that the action is not audible.

This indicator is mainly used at the Evertz factory and may also be useful to monitor in order to help in debugging system issues.

8.5.14. Setting the VITC Line Number – 525 Line Video

Video/SID
525 VITC line
10 to 32
10

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

If the VITC contains Source ID (SID) information, the CDM will automatically decode it, and turn on the SID window if the user has enabled this window

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

8.5.15. Setting the VITC Line Number – 625 Line Video

Video/SID
625 VITC line
6 to 32
10

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

If the VITC contains Source ID (SID) information, the CDM will automatically decode it, and turn on the SID window if the user has enabled this feature.

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

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

Video/SID
525 PESA line
10 to 21
11

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

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

Video/SID
625 PESA line
7 to 22
11

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

8.5.18. Setting the Default SID Mode

Video/SID
Default SID mode
Disable
Enable

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

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

Set to *Enable* to show the Default SID message in the SID window when there is no incoming source ID. The SID window must also be turned On to display the default SID message. See section 8.9.5 for information on turning the SID window On.

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

Video/SID
Default SID msg
No SID

This control sets the message that will be displayed in the SID window when there is no incoming source ID on the VITC. The text of the message can be changed. See section 8.2 for information on changing text fields.

8.6. CONFIGURING THE ANALOG VIDEO PROCESSING CONTROLS

The *Video Processing* menu is used to configure parameters associated with the composite decoder video processing. The chart below shows the items available in the *Video Processing* menu.

NTSC setup pedestal	Selects whether the NTSC 7.5 IRE pedestal will be removed from the composite analog input video
Line 21	Controls line 21 processing
Black level	Controls the input video black level
Video level	Controls the input video level
Chroma level	Controls the input video saturation
Hue	Controls the input video hue
TBC mode	On/off mode control of processing of non Time Base Corrected video
Detail threshold	Controls when the image enhancement is enabled
Detail enhancement	Controls the amount of image enhancement when threshold is exceeded
Noise reduction	Turns the noise reduction on or off

8.6.1. Removing the NTSC Setup Pedestal

Video/SID
- *Analog Video Processing*
  - *NTSC setup pedestal*
    - *Remove*
    - *Don't remove*

Composite NTSC analog video may have a 7.5 IRE pedestal while 4:2:2 SDI video does not. This control, when set to *remove*, will remove the pedestal and re-scale the video accordingly. The setup pedestal should not be present on composite video when operating in Japan.

Grey background indicate un-implemented or un-tested features

8.6.2. Line 21 Processing

Video/SID
Analog Video Processing
Line 21 setup
Remove setup,
Don't remove setup,
Blank

Closed captioning has been defined to NOT have a 7.5 IRE pedestal, but it is placed on the first active line of video where there may be a pedestal. This depends on the upstream closed captioning and/or composite encoder that generated the video. When decoding composite video with closed captioning, care must be taken to not remove a pedestal if it is not there.

This control, when set to *Don't remove setup*, will not remove 7.5 IRE pedestal from line 21. This is the default state for properly generated captioning.

When set to *Remove setup*, the 7.5 IRE pedestal will be removed from line 21. Note that this state is only valid if the preceding NTSC Setup Pedestal control is set to "Remove".

Blank is used to remove captioning from line 21. This is most useful for removing captioning when going into an up-converter.

8.6.3. Black Level

Video/SID
Analog Video Processing
Black level
-128 to 127
0

This controls the black level of the decoding process. You have greater than +/- 5 IRE range on this control.

Note: Make sure to select the proper setup pedestal removal before setting this control. Don't set the video level control until after you have set this control properly.

8.6.4. Video Level

Video/SID
Analog Video Processing
Video level
-180 to 127
0

This controls the input video level of the decoding process. You have greater than +/-?dB range on this control.

Note: Make sure to select the proper setup pedestal removal and calibrate the black level before setting this control.

8.6.5. Chroma Level

Video/SID
Analog Video Processing
Chroma level
off,
-32 to 32

The default "*off*" position of this control will, in the decoding process, correctly scale the chroma as per SMPTE-170M/125M. If you need to adjust the chroma level or want to use chroma AGC (Automatic Gain Control) to automatically adjust chroma gain based on the burst level, change the value to a numerical setting that gives you proper unity gain. The value should be near zero. You have greater than +/- 20% (+/- 1.5dB) range with this control.

8.6.6. Hue

Video/SID
Analog Video Processing
Hue
-64 to 64
0

The hue of the decoded signal can be adjusted with this control. You have greater than +/- 20 deg. range with this control.

8.6.7. TBC Mode

Video/SID
Analog Video Processing
TBC Mode
off,
on

On/off mode control of processing of non-Time Base Corrected video input signals is affected by this menu item.

When set to *"On",* the input video processing is modified to be more tolerant of non-time base corrected signals. As a sacrifice, the freezing control of the frame synchronizer will not be as sensitive to video that suddenly changes phase or is "hot-switched" to a different signal phase.

When *"Off",* non-time base corrected signals will not allow the frame synchronizer to come out of freeze due to the line length variations created by the VTR. However, time base corrected signals, when switched, will properly freeze the frame synchronizer with a good image during the switch.

8.6.8. Detail Enhancement Threshold

Video/SID
Analog Video Processing
Detail Threshold
very low,
low,
medium,
high

Experimentally, set this to a level that will apply detail/edge enhancement without enhancing the input noise.

Lower thresholds will apply enhancement to smaller edge transitions thus bringing out smaller details. Unfortunately, if the threshold is set too low, input noise will eventually be enhanced making the picture look noisier.

8.6.9. Detail Enhancement Level

Video/SID
Analog Video Processing
Detail Enhancement
off,
1..15

When an edge passes the threshold set with the previous control (Detail Enhancement Threshold), the amount of enhancement is selected with this control. Higher the number, more enhancement is applied.

8.6.11. Noise Reduction

Video/SID
Analog Video Processing
Noise Reduction
Off
On

When turned on, a small amount (~ 0.7dB RMS) of wideband noise reduction is applied to the signal. The noise reduction gracefully turns on as the signal level amplitude lowers below about –25dB RMS. Signals above this are probably image detail and not noise. Also, this graceful "turn-on" eliminates artifacts if sudden on/off application of noise reduction was applied.

8.7. CONFIGURING THE DIGITAL VIDEO PROCESSING CONTROLS

The *Digital Video Processing* menu is used to configure parameters associated with the SDI video processing. The chart below shows the items available in the *Video Processing* menu.

Black level	Controls the SDI input video black level
Y level	Controls the SDI input video Y level
Chroma level	Controls the SDI input video saturation
Hue	Controls the SDI input video hue

8.7.1. Black Level

Video/SID
Digital Video Processing
Black level
-7 to 7
0

This controls the black level of the SDI input video. The adjustment range is +/- 7 IRE with ½ IRE resolution.

It's better to set/calibrate this black level control before the Y level control is adjusted. If the Y level is adjusted first, and you need to adjust this black level control, you will have to go back and correct the Y level slightly.

8.7.2. Y Level

Video/SID
Digital Video Processing
Y level
-6 to 6
0

This controls the input Y video level of the SDI input. You have greater than +/-6dB range on this control.

It is better to calibrate the black level control before setting this control.

8.7.3. Chroma Level

Video/SID
Digital Video Processing
Chroma level
-6 to 6
0

This control is used to set the gain on the Cb and Cr channels of the SDI input video. There is +/- 6dB range with this control.

8.7.4. Hue

Video/SID
Digital Video Processing
Hue
-20 to 20 deg
0

The hue of the SDI input video signal can be adjusted with this control. You have +/- 20 deg. range with this control.

8.8. CONFIGURING THE BAR GRAPH CONTROLS (-A4)

The *Bar Graphs* menu items deal with the configuration and operation of the audio bar graphs; modes, ballistics, display properties, etc. The chart below shows the items available in the *Bar Graphs* menu. Sections 8.8.1 to 8.8.15 give detailed information about each configuration item for the audio bar graphs. Sections 8.8.1 to 8.8.3 show the items in the bar graphs 1 and 2 menu tree. These sections apply also to the items in the bar graph 3 and 4 menu tree. Sections 8.8.13 to 8.8.15 apply globally to all bar graphs.

Note: The bargraphs display the audio after it has been level corrected but before it has been processed into it's output format.

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

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

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

8.8.1. Selecting the Bar Graph Operating Mode

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

8.8.2. Setting the Headroom

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Headroom*
      - *0 to 30db*
      - *20db*

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

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

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

8.8.3. Setting the Bar Graph Type

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

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

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

PPM with peak hold: (PPM peak)
The peak hold feature allows the user to keep track of the audio peak. A floating mark is pushed up by audio peaks and is reset with a menu command (see section 8.13).

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 a menu command (see section 8.13).

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

8.8.4. Setting the PPM Mode and Ballistics

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

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

When one of these modes is selected, a number of items are set to adhere with predefined industry standards. The items affected include; meter attack time, meter decay time, min level displayed, max level displayed, analog reference (100%) level and, in some instances, region colouring and phase graph representation. Table 8-1 illustrates the values set by the standards.

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

Table 8-1: PPM Bar Graph Characteristics

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

8.8.5. Setting the VU Display Range

Bar graphs
Bar graphs 1 and 2
VU range
Normal
Extended

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

Most VU meters have two possible ranges. These are:

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

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

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

8.8.6. Setting the Phase Bar Graph Type

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Phase type*
      - *Stereo*
      - *DIN*

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

8.8.7. Setting the Bar Graph Error Region

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

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

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

8.8.8. Setting the Bar Graph Warning Region

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

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

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

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

8.8.9. Setting the Level Bar Graph Scale Position

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

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

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

8.8.10. Setting The Phase Bar Graph Scale Position

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

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

8.8.11. Setting The Window And Bar Graph Positions

- *Bar graphs*
  - *Bar graphs 1 and 2*
    - *Window position*

This control allows you to change the window positions of all CDM windows and bar graphs. The window positions can also be set from the *Window position* menu item on the *On-screen display configuration menu.* See sections 8.9.2 to 8.9.4 for detailed information on the position of the windows and bar graphs.

8.8.12. Setting the Colours of the Bar Graphs

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

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

8.8.12.1. Setting the Level Bar Graph Region Colour

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

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

8.8.12.1.1. Selecting a Bar Graph Region Custom Colour

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

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

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

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

8.8.13. Setting the Level Bar Graph Size

Bar graphs
Size
Small,
Big

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

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

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

Bar graphs
Background opacity
0 to 64,
32

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

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

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

Bar graphs
Bars opacity
0 to 64,
64

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

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

8.9. CONFIGURING THE ON-SCREEN DISPLAY CONTROLS

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

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

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

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

8.9.1. Descriptions of the CDM On Screen Windows

8.9.1.1. Video/Audio Status

The purpose of the Video/Audio status screen is to show as much status information about the video and audio as possible in a small, concise table. Table 8-2 shows each item that may appear in the status screen. The Status window may be operated in 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 CDM fault, will be displayed using fault window properties. All other lines use the text window properties. If the Status window is enabled by an CDM fault, only those lines associated with the fault triggers that enable the fault window will be displayed using fault window properties. All other lines use text window properties.

Item	*Value(s)*	*Description*
Video	NTSC/PAL-B/PAL-M/SDI 525/SDI 625/not present/wrong standard	Input video standard selected and detected. In dual input video mode, the selected standard will be displayed. If the card is in the wrong standard, *not present* will be displayed.
Genlock	present/not present/off	Genlock presence detected. If genlock is turned on and video of the correct standard is applied, *present* will be displayed. If a *genlock source* of *off* is selected, *off* will be displayed.
Picture Content	Moving/frozen/frozen,black	Shows the status of the picture content. Shows *moving* if the picture is active, *frozen* if the card detects no motion, or *frozen,black* if the picture is black
Picture Level	# / #, over/ #, under / #, under, over	Shows the status of the picture level measurement. Shows a *value* # of the measured picture Average Picture Level, *over* if the card detects too much high white content, or *under* if the card detects too much low black content
Time Code	TC Value/not present	If present, the time code value is displayed here.
SID	SID value/not present	If present, the VITC SID or PESA SID is displayed here.
PR	Value/not present	The program rating of Closed Captioning is indicated, if present.
CC	Present/not present	The presence/absence of Closed Captioning is indicated.
Ch. 1 and 2	[(silent/over), (mono/out of phase)]	Status information about channels 1 and 2 are shown here.
Ch. 3 and 4	[(silent/over), (mono/out of phase)]	Status information about channels 3 and 4 are shown here.
DARS	Locked/lock slip/present/not present	*Locked* will be displayed if the DARS input frequency is within approx. +/- 30ppm of the genlock video. *Lock slip* indicates that a channel status 'Z' phase correction was performed on the output AES. This indicates that the DARS is not locked to genlock video but is close in frequency. *Present* is displayed if DARS is present but not frequency locked to the genlock video. *Not present* is displayed when there is no DARS input or the card is not genlocking (either free-running or no genlock is applied).

Table 8-2: Video/Audio Status Screen Items

8.9.1.2. Time Code Window

The time code window shows the vertical interval time code or longitudinal time code present at the input to the CDM module. Use the time code select and VITC line select items on the Video menu to configure the lines that the CDM will use for reading time code. (See sections 8.5.14 and 8.5.15 for information about setting the VITC line numbers.)

Warning: Because the video goes through a frame synchronizer, the time code displayed will not necessarily be the correct time code number for that particular frame of video. However, it will not be more than one frame in error.

The *TC window size* menu item controls whether the time code window will be displayed in the normal or large font size.

8.9.1.3. Program Rating Window

The Program rating window shows data decoded from the Line 21 XDS Program rating packet. This information is usually encoded by the user to control the operation of V-Chip decoders in the viewer's receiver. The *PR window size* menu item controls whether the time code window will be displayed in the normal or large font size.

8.9.1.4. CC Window

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

8.9.1.5. XDS Window

The XDS window contains 2 lines with the following information: network name, call letters, program name, 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.

8.9.1.6. Source Identification Window

The CDM module has the ability to decode source identification (SID) information from the vertical interval time code present at the input to the CDM module. When no VITC SID is encoded, the CDM module will decode SID that has been encoded in the PESA format. The Source Identification window is used to display the decoded SID information. When there is neither VITC SID or PESA SID encoded the *Default SID message* will be displayed if *Default SID mode* is enabled, otherwise the SID window will be turned off. (See sections 8.5.18 and 8.5.19 for information about setting the *Default SID message*). Use the VITC line select items on the Video menu to configure the lines that the CDM will use for reading VITC. (See sections 8.5.14 and 8.5.15 for information about setting the VITC line numbers.) Use the PESA line select items on the Video menu to configure the lines that the CDM will use for reading PESA format source ID. (See sections 8.5.16 and 8.5.17 for information about setting the VITC line numbers.) The *SID window size* menu item controls whether the time code window will be displayed in the normal or large font size.

8.9.1.7. Fault Message Windows

The Fault 1 and Fault 2 window show user text messages when the Fault 1 or Fault 2 conditions are triggered. The Fault message windows have their own set of colour, opacity and size attributes, they can be set to come on steady or blinking and they contain fully programmable messages. See section 8.10 for more information on setting up the fault conditions and configuring the fault windows.

8.9.2. Setting the Position of On Screen Windows

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

8.9.2.1. Setting the Horizontal Position of On Screen Windows

On-screen display configuration
- *Window position*
  - *Status window H*
    - *0 to 39*
    - *7*

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

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

8.9.2.2. Setting the Vertical Position of On Screen Windows

On-screen display configuration
- *Window position*
  - *Status window V*
    - *0 to 19*
    - *7*

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

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

8.9.3. Setting the Position of the Bar Graphs

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

8.9.3.1. Setting the Horizontal Position of the Bar Graphs

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

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

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

8.9.4. Setting the Vertical Position of the Bar Graphs

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

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

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

8.9.5. Selecting What Bar Graphs And Windows To Display

The following windows/items can be programmed to be displayed; Level and Phase audio bar graphs, the Status, VITC, Program Rating, SID, CC/XDS, or XDS windows. The windows and bar graphs can be turned permanently on or off or activated when a fault occurs. The *Window enable* menu item is used to program the on/off states of the text and bar graph windows. To display the Fault windows use the *Fault condition* menu item on the *Fault definitions* menu. (See section 8.10.1.4)

When you select the *Window enable* menu item you are presented with a list of the possible controls as shown in Table 8-3. Select the desired function using the pushbutton. When the toggle switch is pressed, the cell cycles through the valid values for the field. Each of the windows and bar graph displays can be set to *On*, *Off* or activated with a fault condition. When set to *On*, the corresponding window or bar graph is always displayed. When set to *Off*, the window or bar graph is always off. When set to *fault*, the window will be on when the configured *fault* is active.

Item	State	Fault 1	Fault 2
Ch ½ level bars			
Ch ¾ level bars			
Ch ½ phase bars			
Ch ¾ phase bars			
Status			
Time code			
Program Rating			
CC			
XDS			
SID			

Table 8-3: Methods of turning Windows and Bar graphs On and Off

8.9.6. Setting the Text Window Attributes

The On screen text windows can be displayed as white characters with or without a coloured background. In addition the text and background opacity or how much video picture content will be visible through the text or background is adjustable. The *Text window config* menu items are used to set these parameters for all the text windows except the Fault windows. See section 8.9.7 for information on setting the *Fault window* attributes.

8.9.6.1. Turning on the Text Window Backgrounds

On-screen display configuration
- *Text windows*
  - *Text window config*
    - *Text type*
      - *White on bkgrn*
      - *White with no bkgrnd*

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

Grey background indicate un-implemented or un-tested features

8.9.6.2. Setting the Text Window Background Colours

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

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

8.9.6.3. Setting the Text Window Background Opacity

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

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

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

8.9.6.4. Setting the Text Window Text Opacity

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

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

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

8.9.6.5. Setting the Time Code Window Font Size

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

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

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

8.9.6.6. Setting the Program Rating Window Font Size

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

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

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

8.9.6.7. Setting the Source ID Window Font Size

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

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

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

8.9.6.8. Setting the Status Window Mode

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

This control determines the display properties of the status window.

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

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

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

8.9.7. Setting the Fault Window Attributes

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

8.9.7.1. Turning on the Fault Window Backgrounds

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

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

8.9.7.2. Setting the Fault Window Background Colours

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

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

8.9.7.3. Setting the Fault Window Background Opacity

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

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

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

8.9.7.4. Setting the Fault Window Text Opacity

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

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

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

8.9.7.5. Setting the Fault Window Font Size

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

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

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

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

8.9.7.6. Setting the Blink Mode of the Fault Windows

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

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

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

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

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

8.10. Fault Definitions

When many windows are turned on, the on-screen information can get very crowded. The bar graphs and text windows are layered to keep the most important information from being covered by other not-so important windows. The Fault windows have the highest priority. The priority of the other windows is shown in section 8.9.

The *Fault definition* menu items are used to configure the fault settings, and the presentation of the fault conditions. The chart below shows the items available in the *Fault definition* menu. This section does not indicate which items do not apply on the different version of the 7736CDM. Do not attempt to use audio faults on the video only version. Sections 8.10.1 to 8.10.12 give detailed information about each configuration item for the fault definitions.

Fault condition 1	Controls used to configure the Fault Condition 1 display.
Fault condition 2	Controls used to configure the Fault Condition 2 display.
Fault window config	Controls used to set the Fault Window text style, background colour and opacity. These parameters may also be set using the *On-screen Display Text window* menu.
Video error duration	Sets the time period that video must disappear before it is considered missing or invalid.
Audio invalid duration	Sets the time period that audio must disappear before it is considered missing or invalid (-AES only).
Over level	Sets the level of audio over which is considered a fault or error condition.
Over duration	Sets the duration of audio, over the above level which is considered a fault.
Silence level	Sets the level of audio under which is considered silence.
Silence duration	Sets the duration of audio in seconds under the above level which is considered a fault.
Phase reversal level	Sets the level of L/R audio difference over which is considered phase reversal.
Phase reversal duration	Sets the duration of audio in seconds over the above phase reversal level which is considered a fault.
Mono threshold level	Sets the level of L/R audio difference under which is considered mono.
Mono duration	Sets the duration of mono audio in seconds which is considered a fault.
Loss of CC duration	Sets the duration, of no primary CC1 captions, in seconds which is considered a fault.
Loss of PR duration	Sets the duration, of no program rating XDS packet, in seconds which is considered a fault.
Picture noise level	Sets the expected amount of noise on the incoming video.
Freeze Duration	Sets the duration, of no picture activity above the *Picture noise level*, in seconds which is considered a fault.
Black Duration	Sets the duration, of no active picture content above 7 IRE, in seconds which is considered a fault.
White threshold	Sets the video level over which is considered a fault or error condition.
Black threshold	Sets the video level under which is considered a fault or error condition.
Over/Under Level quantity	Sets the percentage of video which is over/under limits that is considered a fault or error condition.

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

The CDM has two fault conditions that can be configured to warn the user of numerous conditions. The *Fault condition 1* and *Fault condition 2* menu items are used to configure when fault 1 or fault 2 are triggered, and how the fault should be presented. The controls for each fault condition operate the same way so, for simplicity, the manual shows only the menu items for *Fault condition 1*.

8.10.1.1. Fault Status

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

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

8.10.1.2. Setting the Position of the Fault Windows

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

This control allows you to change the window positions of all CDM windows and bar graphs. The window positions can also be set from the *Window position* menu item on the *On-screen display configuration menu.* See sections 8.9.2 to 8.9.4 for detailed information on positioning the windows and bar graphs.

8.10.1.3. Setting the Message Associated with a Fault

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

This control sets the message to display when the fault condition is active. The text of the message can be changed. See section 8.2 for information on changing text fields.

8.10.1.4. Determining If the Fault Message Will Be Displayed

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

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

When enabled, the fault message will be displayed until the condition is reset. When disabled, it will never be displayed. See section 8.10.1.5 for information on setting the duration of the fault condition.

8.10.1.5. Setting the Duration of the Fault Condition

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

This control sets how long the fault condition will be held. The fault display will be displayed as long as the fault condition is active and the *Fault mode* is set to *Enable*. The fault condition can either be held until the user clears the condition or until a programmable timer expires.

8.10.1.6. Determining What Items Will Generate the Fault Condition

Fault definitions
Fault condition 1

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

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

Input video error	Video absent or wrong standard
Genlock error	Reference absent or wrong standard
DARS invalid	DARS reference absent or not locked to video
Loss of audio ½	Audio 1 and 2 absent (-AES version only)
Loss of audio ¾	Audio 3 and 4 absent (-AES version only)
Phase reversal ½	Audio 1 and 2 out of phase
Phase reversal ¾	Audio 3 and 4 out of phase
Audio over ½	Audio 1 or 2 over level
Audio over ¾	Audio 3 or 4 over level
Audio silence ½	Audio 1 and 2 silent
Audio silence ¾	Audio 3 and 4 silent
Audio mono ½	Audio 1 and 2 mono
Audio mono ¾	Audio 3 and 4 mono
Loss of VITC	VITC absent
Loss of SID	SID absent
Loss of program rating	Program rating absent
Loss of CC	Primary CC1 Closed captioning absent
Picture Freeze	No activity above preset noise level in active picture
Picture Black	No active picture above 7 IRE
Video Over White	Sufficient video above a white level threshold
Video Under Black	Sufficient video under a black level threshold
Video White Level Warning	Insufficient amount of video above a bright gray level for a defined duration
Video Black Level Warning	Insufficient amount of video below a black level for a defined duration

Table 8-4: Possible Error Conditions to Produce a Fault

8.10.2. Setting the Fault Window Attributes

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

Fault definitions
- *Fault window config*

This control is used to change the fault window colours. These parameters can also be set using the *Fault window config* menu items on the *On screen display* menu. See section 8.9.7 for a complete description of the *Fault window config* menu items.

8.10.3. Setting the Loss of Video Duration

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

This control sets the duration, in number of consecutive frames of video, that video needs to disappear before the *Video error* fault condition exists.

This control is included so that you can have a few frames of missing/bad video before the fault occurs. This is useful to eliminate fault generation when upstream non-synchronous switching occurs.

8.10.4. Setting the Loss of Audio Duration (-AES only)

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

This control sets the duration, in number of consecutive frames of video, that audio needs to disappear before the *Audio error* fault condition exists.

This control is included so that you can have a few frames of missing/bad audio before the fault occurs. This is useful to eliminate fault generation when upstream non-synchronous video and audio switching occurs.

8.10.5. Detecting Audio Over Level Faults

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

8.10.5.1. Setting the Audio Over Level

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

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

8.10.5.2. Setting the Audio Over Duration

Fault definitions
Over duration
3 to 255 SAMPLES
3

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

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

8.10.6. Detecting Audio Silence Faults

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

8.10.6.1. Setting the Audio Silence Level

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

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

8.10.6.2. Setting the Audio Silence Duration

Fault definitions
Silence duration
0.5 to 127 sec
10 sec

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

8.10.7. Detecting Audio Phase Reversal Faults

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

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

8.10.7.1. Setting the Audio Phase Reversal Level

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

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

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

8.10.7.2. Setting the Audio Phase Reversal Duration

Fault definitions
Phase reversal duration
0.5 to 127 sec *10 sec*

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

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

8.10.8. Detecting Audio Mono Faults

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

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

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

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

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

8.10.8.1. Setting the Audio Mono Threshold Level

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

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

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

8.10.8.2. Setting the Audio Mono Duration

Fault definitions
Mono duration
0.5 to 127 sec *10 sec*

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

8.10.9. Detecting Loss of Primary Captioning

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

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

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

8.10.10. Detecting Loss of Program Rating Duration

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

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

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

8.10.11. Detecting Picture Freeze

The *Picture noise level* and *Picture freeze duration* controls are used to detect when a video picture is considered to be 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.

8.10.11.1. Setting the Picture Noise Level

Fault definitions
Picture noise level
1 to 10 *7*

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.

For noisy video feeds, higher numbers are needed.

As a guide, the following chart is the approximate picture noise level that starts to be interpreted as motion for each of the *Picture noise level* settings:

Picture noise level	Noise that starts to be interpreted as motion * (dBrms)
1	-43
2	-42
3	-41
4	-39
5	-38
6	-37
7	-36
8	-34
9	-31
10	-28

* RMS noise relative to 714mV, 15kHz to 4.2Mhz bandwidth, VHF noise added to a static test signal, noise duration set to 30 frames.

8.10.11.2. Setting the Picture Freeze Duration

Fault definitions
- *Picture freeze duration*
  - *6 to 902 frames*
  - *302 frames*

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

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

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

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

Setting this time as high as tolerable has two benefits:

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

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

If the 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 CDM. The user should note that because of the random nature of noise, the freeze alarm may be intermittent at some *Picture noise level* settings. The optimal *Picture noise level* setting is obtained when the loss of freeze alarm in the CDM occurs no more then once every 5 minutes.

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

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

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

8.10.12. Detecting Picture Black Duration

Fault definitions
Picture black duration
4 to 900 frames *88 frames*

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

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

8.10.13. Detecting Video Level Problems

The active video picture is analyzed for content that is whiter than it should be and/or blacker than it should be. Faults can be configured to fire when these conditions exist.

The active video picture is also analyzed for content that does indeed vary between low levels (near black) and gray levels (below white). If the video does not reach near black or does go towards white for some defined period, the video content and/or upstream processing may be in error. Faults can be configured to capture these conditions.

In addition, the Active Picture Level (APL) is also calculated for display on the status screen and is accessible through VistaLINK®. The following controls are used to customize the fault generation.

8.10.13.1. Setting White Level Error Threshold

Fault definitions
White threshold
896 to 1019 *962*

This control sets the amplitude, in decimal video numbers, of active picture content above which is considered too white.

109 % = 1019
102.5 % = 962
100 % = 940
95 % = 896

The center section of active picture of a field of video is analyzed and a total number of samples above this level is calculated. A Fault is generated when the video level is above this level for at least a specific number of samples (specified below).

8.10.13.2. Setting Black Level Error Threshold

Fault definitions
Black threshold
4 to 127 *42*

This control sets the amplitude, in decimal video numbers, of active picture content below which is considered too black.

0 IRE = 64
-2.5 IRE = 42
-6.8 IRE = 4

The center section of active picture of a field of video is analyzed and a total number of samples below this level is calculated. A Fault is generated when the video level is below this level for at least a specific number of samples (specified below).

8.10.13.3. Setting Level Error Quantity

Fault definitions
Over/Under error quantity
Any, 0.01%, 0.1%, 1%, 10%, 20% *1%*

This control sets the quantity, in percentage, of active picture content too white (over) or too black (under) which is considered an error. *Any* will cause a fault if any video sample is over/under the set threshold (specified above).

The center section of active picture of a field of video is analyzed and a total number of samples in error is calculated. A Fault is generated when the error quantity is above this level.

8.10.13.4. Setting White Warning Level

Fault definitions
White warning level
400 to 895 *502*

This control sets the amplitude, in decimal video numbers, of active picture content above which is considered to be a normal white level that is present on all input video sources.

50 % = 502
60 % = 525
95 % = 896

The center section of active picture of a field of video is analyzed and a total number of samples above this level is calculated. A Fault is generated when the video level is NOT above this level for at least a specific number of samples (specified above: "*Setting Level Error Quantity*") and for a duration (specified below: "*Video Level Monitoring Duration*").

8.10.13.5. Setting Black Warning Level

Fault definitions
Black warning level
128 to 399
195

This control sets the amplitude, in decimal video numbers, of active picture content below which is considered to be a normal black level that is present on all input video sources.

7.3 IRE = 128
15 IRE = 195

The center section of active picture of a field of video is analyzed and a total number of samples below this level is calculated. A Fault is generated when the video level is NOT below this level for at least a specific number of samples (specified above: "*Setting Level Error Quantity*") and for a duration (specified below: "*Video Level Monitoring Duration*").

8.10.13.6. Setting Video Level Monitoring Duration

Fault definitions
Warning duration
1 to 127 seconds
20

This control sets the duration, in seconds, to wait when the video is constantly above the *Black warning level* or below the *White warning level* before generating a fault condition.

Note: This duration does not apply to the *Black level error* or *White level error* conditions.

8.11. UTILITIES

8.11.1. Accessing Information About this Module and its Firmware

Utilities
About…

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

8.11.2. Saving And Recalling CDM Configurations

The CDM 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.

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

8.11.2.1. Storing CDM Configurations to the User Presets

Utilities
Store preset 1
Store
Cancel

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

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

8.11.2.2. Recall CDM Configurations from the User Presets

Utilities
Recall preset 1
Recall,
Cancel

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

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

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

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

8.11.3. Initiating a Software Upgrade

Utilities
Upgrade
Yes
Cancel

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

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

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

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

8.11.4. Restoring the CDM to its Factory Default Configuration

Utilities
Factory reset
Yes
Cancel

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

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

8.12. Frame Status Fault Trigger

Frame status trigger
None
Fault 1
Fault 2
Fault 1 or 2

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

If it is desired to use this feature, the frame status jumper J3 (located near the card extractor of the bottom board) must also be set to the *On* position. See section 9.2.

The Red *Local Fault* LED will be On when the global status line is active regardless of the position of jumper J3.

8.13. CLEAR FAULTS AND PEAKS

Clear faults and peaks
Clear,
Cancel

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

9. JUMPERS

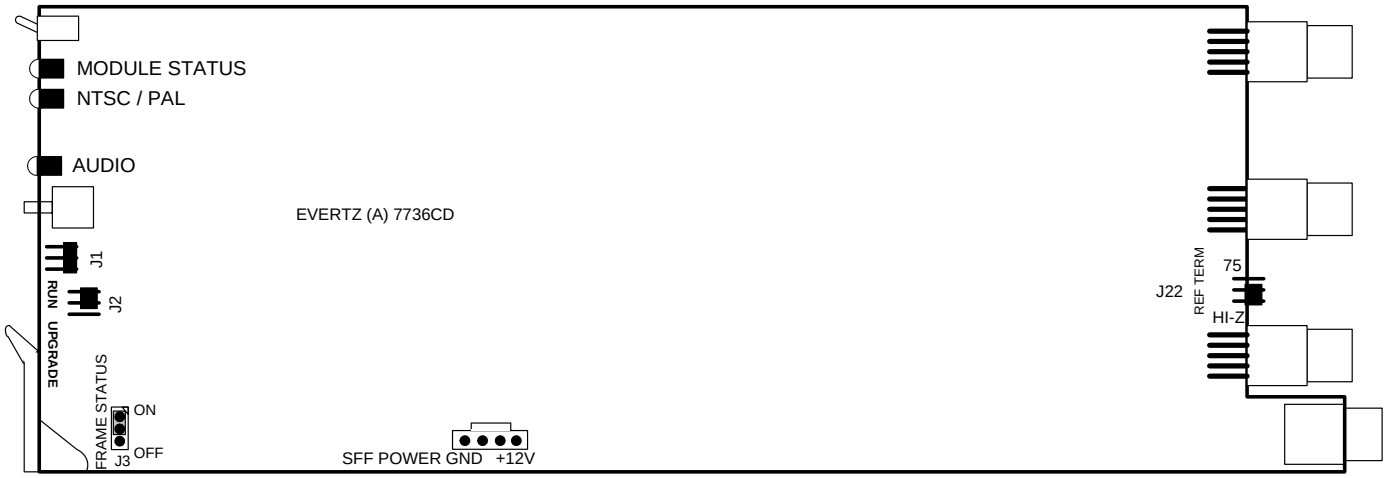

Figure 9-1: Location of Jumpers on 7736CD Main Board

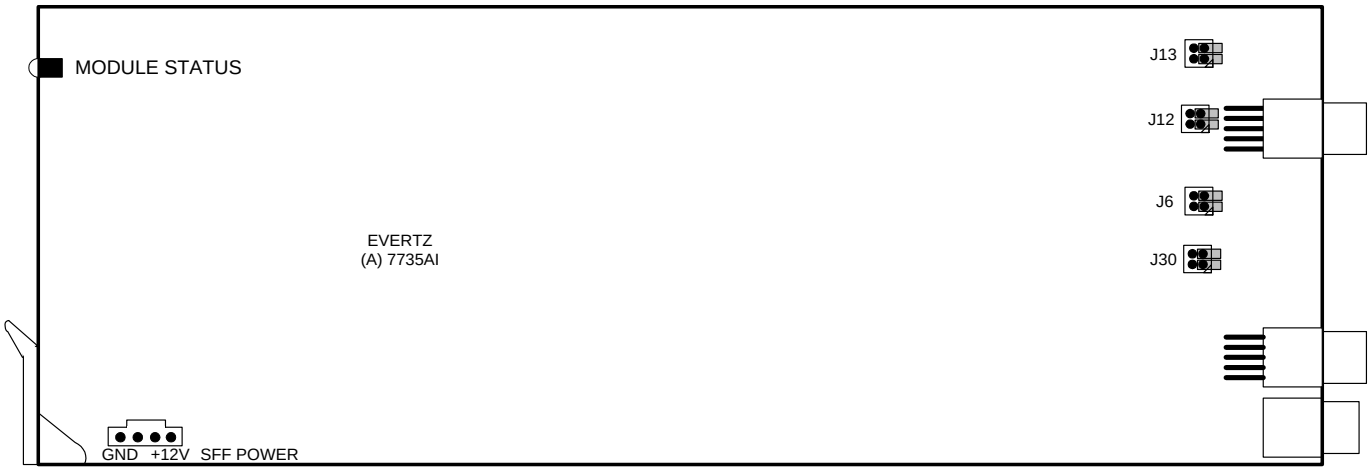

Figure 9-2: Location of Jumpers on 7735AI Submodule

9.1. TERMINATION JUMPERS

REF TERM The REF TERM jumper J22 located on the rear of the 7736CD board near the white multi-pin connectors, selects the reference video termination impedance. Either 75Ω or a high-Z (27kΩ) termination impedance can be selected by placing the jumper in the "75" (top justified) or "HI-Z" (bottom justified) positions, respectively.

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

FRAME STATUS

The FRAME STATUS jumper J3 located at the front of the module, on the 7736CD board (bottom board), determines whether local faults (as shown by the Local Fault indicator) will be connected to the 7700FR frame's global status bus.

To monitor faults on this module with the frame status indicators (on the PS FRAME STATUS LED's and on the Frame's Fault Tally output) install this jumper. (Default) When this jumper is moved to the *off* position, local faults on this module will not be monitored.

The *Frame stat trigger* menu item is used to configure whether *Fault condition 1* and/or *Fault condition 2* will assert the frame status fault line. Power supply faults will always assert the frame status fault line when J3 is installed.

9.3. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

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

UPGRADE

The UPGRADE jumper J2, located at the front edge of the 7736CD board above the card extractor, 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 J2 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto header J1 at the card edge. Re-install the module into the frame. Run the upgrade as described in the *Upgrading Firmware* section of this manual. Once the upgrade is completed, remove the module from the frame, move J2 into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

9.4. SETTING THE COARSE ANALOG INPUT GAIN RANGE

J13, J12, J6, J30

Eight Jumpers located near the rear of the 7735AI sub-module are used to set a coarse gain level.

When the jumpers are not installed (or installed so that only one side is connected), the input range is optimized for when peak audio levels up to 24dBu. (Default)

When the jumpers are installed, best performance is achieved when input peak levels are below 18dBu.

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