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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Original Version – preliminary	Oct 01
0.2	Update to menus, status display, minor corrections & features	Nov 01
1.0	First release version with Open Captions and updated XDS display setting menus	Jan 02
1.1	Added notes for 7760CCM-T	May 02
1.2	Added notes for 7760CCM-T communication port cable	Jun 02
1.2.1	Correction to section 5.5	Jun 02
1.2.2	Additional menu items for Grand Alliance Protocol support in 7760CCM-T; additional status windows; modifications to communication port cable specification; first release of 7760CCM-T firmware	Jun 02
1.8.40	Updated menu structure. Manual revision number matches Firmware Number	May 04
1.8	Corrections to manual. Manual revision number has been generalized to Firmware version.	Dec 04
1.8.5	Corrections to manual.	Dec 05

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1. OVERVIEW

The 7760CCM closed captioning monitoring card extends the signal monitoring capabilities of Evertz's AVM product line by focusing on closed captioning and eXtended Data Services (XDS) data packets carried within Line 21 of the Vertical Blanking Interval (VBI). Compliant with the EIA Standard EIA/CEA-608-B, the 7760CCM can be used to monitor the content of Line 21 for pre-distribution monitoring or regulatory compliance.

The 7760CCM-T Closed Captioning, XDS and EIA608-EIA708 Translator card is functionally similar to the 7760CCM card, with the additional features of a EIA608 to EIA708 Standard translator through the RS-232 serial communication port.

Both 7760CCM and 7760CCM-T are capable of decoding Line 21, fields 1 and 2 data and displaying the information on the SDI video output. One of four closed captioning channels (CC1-CC4) and one of four text service channels (T1-T4) can be simultaneously displayed on the video output. In addition, the scrolling XDS display supports all data packets. The more common packet types such as V-Chip rating, Station Name, Station ID, Program Name, Program Type, Program Description, Time of Day, and Time in Show are decoded to human-readable format. Other (less common) packets are presented as raw data bytes.

The 7760CCM-T card is equipped with CCM/CCM-T mode setting, closed captioning and text channel to 708 service mapping configuration, as well as a data delay queue used to match the delay of the data to that of the upconverted video prior to encoding.

The 7760CCM and 7760CCM-T incorporate the fault reporting capabilities inherent in the AVM product line. There are four user-configurable fault alerts that are triggered upon loss of video, loss of CC waveform, parity errors, field inversions, control codes and invalid XDS parameters. The 7760CCM is also VistaLINK™-enabled, offering remote monitoring, control and configuration capabilities via Simple Network Management Protocol (SNMP).

The single-slot, 7760CCM and 7760CCM-T modules fit conveniently into Evertz's 7700FR-C, 7701FR frames or stand alone enclosure.

7760CCM/7760CCM-T Features:

- One SD, 270 Mb/s component digital video input, 525 or 625 lines, auto-detected or manually set.
- One re-clocked SD video output.
- Decodes and displays closed captioning on fields 1 and 2 as per EIA Standard EIA/CEA-608-B.
- EIA-608 to EIA-708 translator (7760CCM-T only)
- Support for SMPTE-333M and Grand Alliance Protocol in 7760CCM-T
- User selectable closed captioning channel (1-4), text channel (1-4) and eXtended Data Services (XDS) for video "burn-in".
- Decodes Line 21 XDS packets containing Transmission Signal ID (TSID), Copy Generation Management System (CGMS), Program ID, Time in show, Program name, Program type, V-chip rating, Program description, Network name, Station ID, Time of day and Time zone.
- Store and recall up to three module configurations.
- Fits conveniently into Evertz's 7700FR-C 3RU, 7701FR 1RU frames and stand-alone enclosure.

- A comprehensive on screen display menu is available to configure the various features of the module as well as allows flexible configuration of the text window positioning.
- An extensive list of closed captioning and XDS error conditions can be enabled and monitored with on-screen fault messages triggered by exceeded timer parameters.
- Four user-configurable GPI inputs for on screen display control, closed captioning channel and text channel selection.
- Two user-configurable GPI outputs to indicate user definable fault conditions.
- RS-232 serial port output used to transmit raw closed captioning data. (Compliments VBI Bridge functionality of Evertz 8084 CC Encoders)
- HDDB-15 to DB-9 cable available to connect 7760CCM(-T) to Evertz captioning products (Evertz Part# WACCMIO-1-0-6F)
- VistaLINK™-enabled offering remote monitoring, control and configuration capabilities via SNMP. VistaLINK™ is available when modules are used with the 3RU 7700FR-C frame and a 7700FC VistaLINK™ Frame Controller module in slot 1 of the frame. (Available soon)

1.1. FUNCTIONAL DESCRIPTION

Serial digital video is converted to parallel and Line 21 closed captioning and text channels, extracting time code, program rating and description as well as other pertinent information. Line 21 status information can be displayed on-screen. The hardware mixes (keys) the on screen text display information onto the video stream. This video goes out digitally through a parallel to serial converter.

The 7760CCM and 7760CCM-T cards are also configurable to trigger fault alert messages. If decoded data from Line 21 is missing or invalid, fault alerts can be enabled to report such findings directly on to the output video display.

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

General-purpose inputs are used for remote control of several features and general-purpose outputs are generated under error conditions. GPI I/Os are available through the high-density DB-15 connector on the rear plate of the 7760CCM and 7760CCM-T.

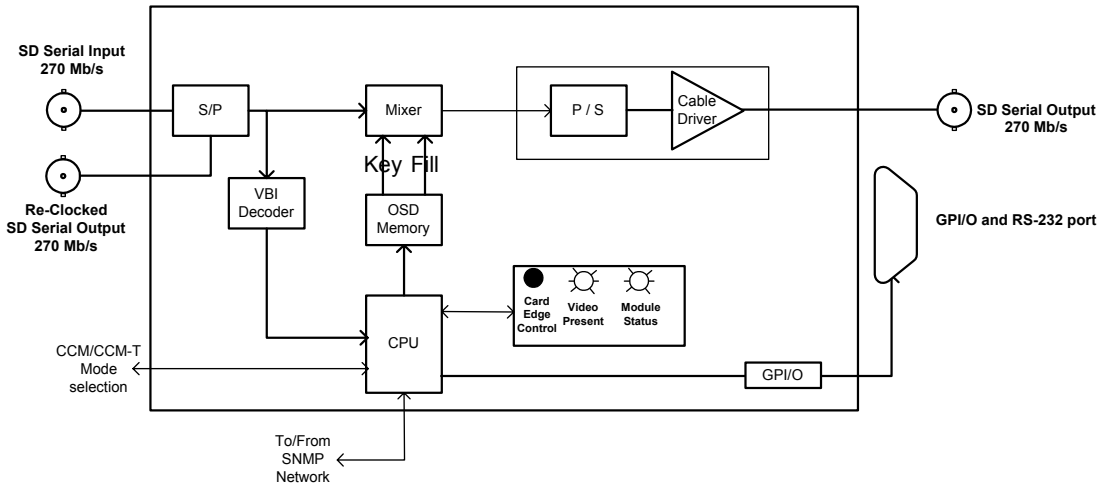

Figure 1: 7760CCM, 7760CCM-T Block Diagram

2. INSTALLATION

The 7760CCM module comes with a companion rear plate that has 3 BNC connectors and one high density female DB-15. It occupies one slot in the 7700FR-C frame. Figure 2 shows a picture of the rear plate. For information on mounting the rear plate and inserting the module into the frame see the 7700FR-C chapter (Section 3). The 7760CCM card must be inserted into slots with the correct rear plate.

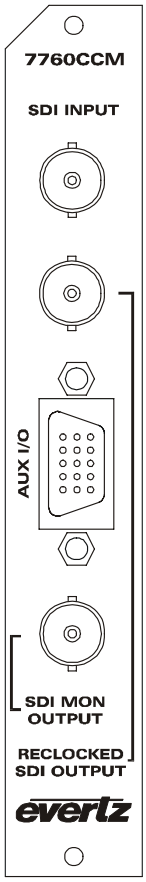

Figure 2: 7760CCM and 7760CCM-T Rear Plate

2.1. VIDEO IN AND OUT

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

2.2. AUX I/O

The GPI inputs and outputs are available on the female high density DB-15 connector labeled "AUX I/O". Figure 3 describes the pin-out of the HD-DB-15 connector.

DB-15	Name	Description
1	GPI4	GPI input 4
2	Tx	RS-232 Transmit Output
3	GPI3	GPI input 3
4	GPI1	GPI input 1
5	GND	Ground
6	Rx	RS-232 Receive Input
7	N/C	Not connected
8	GPI2	GPI input 2
9	GND	Ground
10	N/C	Not connected
11	N/C	Not connected
12	GND	Ground
13	GPO1	GPI Output 1
14	GPO2	GPI Output 2
15	N/C	Not connected
Shell	GND	Ground

Table 1: AUX I/O Pin-out

The physical layout looks like this:

			6	Rx			
1	GPI4		7	N/C		11	N/C
2	Tx		8	GPI2		12	GND
3	GPI3		9	GND		13	GPO1
4	GPI1		10	N/C		14	GPO2
5	GND					15	N/C

Connect to the shell for ground.

Table 2: AUX I/O Physical Layout

Please Note the RS232 functionality is only available on the 7760CCM-T version for Transfer of Serial EIA-708 captions.

2.2.1. General Purpose Inputs and Outputs

The GPI's are active low with internal pull up resistors (4.7k Ohms) to +5V. To make an input active, lower the signal to near ground potential (i.e. connect to shell or chassis ground). This can be done with a switch, relay, TTL drive, GPO output or other similar method. Figure 3 shows the input circuit for the General Purpose inputs.

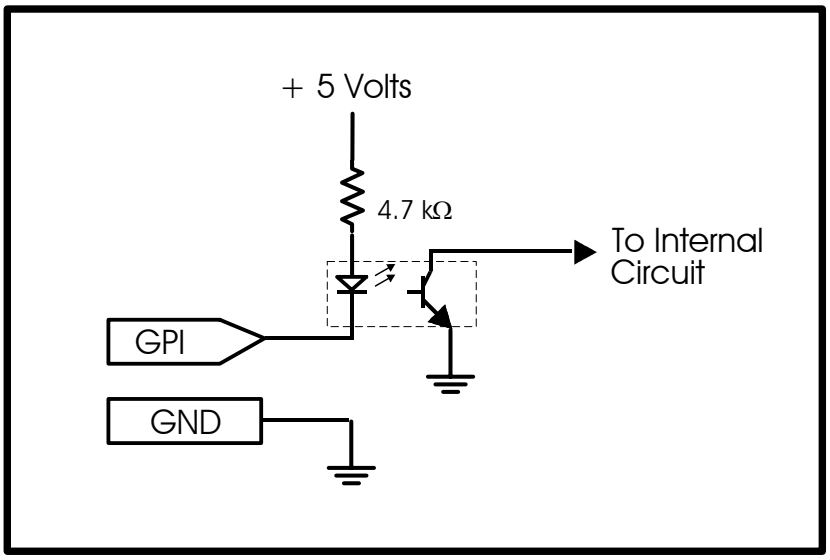

Figure 3: GPI Input Circuitry

The GPO's are software programmable active high or low with internal pull up (18kΩ) resistors to +5V. When the output goes low it is able to sink up to 10mA. When high, the signal will go high (+5V). **Do not draw more than 100μA from the output.** Figure 4 shows the circuit for the General Purpose output.

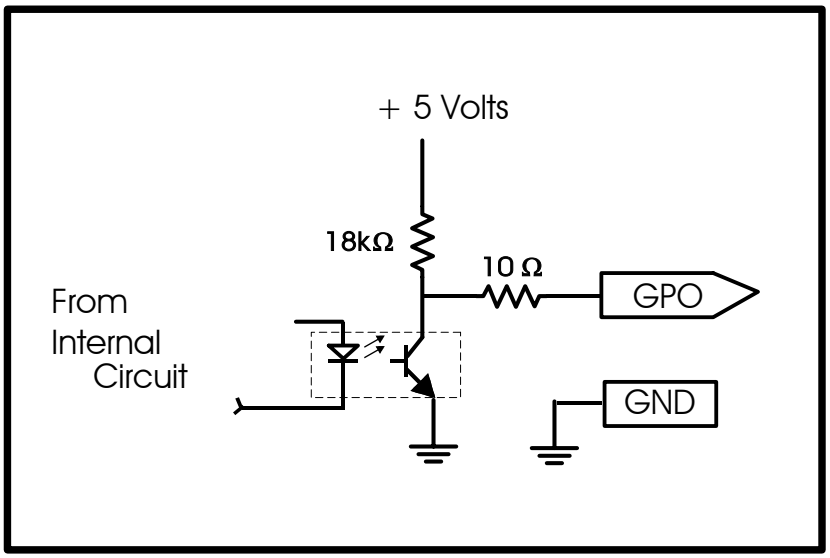

Figure 4: GPO Output Circuitry

2.3. HDDB-15 to DB-9 7760CCM-T Communications Port Cable

This cable (Evertz Part #: WPCCMTIO-0-6F) is designed to connect the Evertz 7760CCM(-T) products to a captioning product. The 7760CCM-T has a HD-DB-15 "AUX I/O" connector while the user application end will be a male DB-9 configured as a RS-232 DTE without hardware flow control.

2.3.1. 7760CCM(-T) AUX I/O Cable End

The comm port and GPI inputs/outputs are available on the female high density DB-15 connector labeled "AUX I/O". The cable must have a male connector. Table 1,2 describe the pin-out of the HD-DB-15 connector.

HB DB-15	Name	Description
1	GPI4	GPI input 4
2	TxD	RS-232 Transmit Output
3	GPI3	GPI input 3
4	GPI1	GPI input 1
5	GND	Ground
6	RxD	RS-232 Receive Input
7	N/C	Not connected
8	GPI2	GPI input 2
9	GND	Ground
10	N/C	Not connected
11	N/C	Not connected
12	GND	Ground
13	GPO1	GPI Output 1
14	GPO2	GPI Output 2
15	N/C	Not connected
Shell	GND	Ground

Table 3: 7760CCM(-T) AUX I/O Pin-out

The physical layout looks like this:

			6	RxD			
1	GPI4		7	N/C		11	N/C
2	TxD		8	GPI2		12	GND
3	GPI3		9	GND		13	GPO1
4	GPI1		10	N/C		14	GPO2
5	GND					15	N/C

Connect to the shell for ground.

Table 4: 7760CCM(-T) AUX I/O Physical Layout

2.3.2. DB-9 Communication and GPI/O Cable End

The male DB-9 connector has RS-232 DTE connections.

Name	Description	DB-9
GPI1	N/C	1
GPI2	N/C	4
GPO1	N/C	6
GPO2	N/C	9
RxD	RS-232 (from CCM to equipment)	2
TxD	RS-232 (from equipment to CCM)	3
RTS	RS-232 (tied to pin 8)	7
CTS	RS-232 (tied to pin 7)	8
Gnd	Ground	5, Shell

Table 5: COM and AUX I/O Pin-out

The physical layout looks like this:

1	N/C		6	N/C
2	TxD		7	RTS
3	RxD		8	CTS
4	N/C		9	N/C
5	Gnd			

The shell is also grounded.

Table 6: COM and AUX I/O Physical Layout

2.3.3. Cable Connections

Pins 7 and 8 are shorted together to simulate hardware flow control for those devices that need it. The connectors are connected as follows:

Name	Description	DB-9 Pin #	HD DB-15 Pin #
RxD	RS-232 (from CCM to equipment)	2	2
TxD	RS-232 (from equipment to CCM)	3	6
RTS	RS-232	7 *	NONE
CTS	RS-232	8 *	NONE
GND	Ground	5, Shell	5, Shell

Table 7: Cable Connections

3. SPECIFICATIONS

3.1. SERIAL DIGITAL VIDEO INPUT

Standard: SMPTE 259M-C – 525 or 625-line component serial digital video, 270Mb/s
Connector: 1 BNC per IEC 169-8
Termination: 75 ohm
Equalization: Automatic >225m @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss: >15dB up to 270MHz

3.2. SERIAL DIGITAL VIDEO OUTPUT

Standard: SMPTE 259M-C – 525 or 625-line component – same as input
Number of Outputs: 1 Reclocked; 1 Monitored
Connector: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 470ps nominal
Overshoot: <10% of amplitude

3.3. GENERAL PURPOSE INTERFACE (GPI) INPUT/OUTPUT

Number of Inputs: 4 (behavior is assigned via on screen menu)
Number of Outputs: 2 (behavior is assigned via on screen menu)
Type: Opto-isolated, active low with internal pull-ups to +5V
Connector: Female High Density DB-15
Signal Level: +5V nominal

3.4. CLOSED CAPTIONING TRANSMIT SERIAL PORT

Standard: RS 232
Connector: Female High Density DB-15 (see section 2.3 for cable specifications)
Baud Rate: 38400 (7760CCM-T in 708 mode); 9600 (7760CCM and 7760CCM-T in 608 mode)
Format: 8 bits, no parity, 1 stop bits and no flow control

3.5. ELECTRICAL

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

3.6. PHYSICAL

Number of slots: 1

4. STATUS LEDs

4.1. MODULE STATUS LEDs

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

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

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

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

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

(See Section 6, Figure 5 for a diagram showing the location of Modulus Status LEDs.)

5. ON SCREEN MENUS

5.1. NAGIVATING THE ON SCREEN MENU SYSTEM

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

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.

5.2. 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.

5.3. ON SCREEN DISPLAY – MAIN MENU

Video	Control for video processing operation
Line 21 decode	Control for decoded closed captioning, text channel and XDS information display
608-708 translator	Options only on the 7760CCM-T to map CC and text channels to 708 standard.
Fault configuration	Definition of the fault conditions. Configuration of the fault message windows.
GPI Setup	GPI trigger control menu
GPO setup	GPO trigger control menu
Utilities	Card preset management and various debug and maintenance features
Serial Link Setup	RS232 Serial output setup
Test Mode	Enable or Disable test message generation
Clear faults	Clear all detected and displayed faults

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

5.4. CONFIGURING THE VIDEO CONTROLS

The *Video* menu is used to configure parameters associated with the video input and output features.

Video standard	Selects the input video standard
Loss of video	Selects the action to take when the input video is missing

5.4.1. Setting the Video Standard

Video	
	Video standard
	525
	625
	Auto

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

5.4.2. Selecting the Action When Input Video Is Missing.

Video	
	Loss of video
	Pass
	Black

This menu item allows the user to select a “black” video output if the input SDI video is lost at the input to the 7760CCM.

5.5. CONFIGURING THE LINE 21 DECODING CAPABILITIES

The *Line 21 decode* menu is used to configure parameters associated with the closed captioning features of the 7760CCM. The chart below shows the items available in the *Line 21 decode* menu.

Open Captions	This menu item allows to user to burn-in CC-1 and offers choice of video level setting
525 VBI line	For 525 line video input, this control selects which line is decoded for CC, text and XDS data.
625 VBI line	For 625 line video input, this control selects which line is decoded for CC, text and XDS data.
On Screen Display	Set the on screen monitored parameters
GPI 1/2 function	Set the functionality of GPI's 1 and 2
CC channel	This menu item is used to select the which CC channel is decoded and displayed on the video output.
GPI 3/4 function	Set the functionality of GPI's 3 and 4
Text channel	Sets the characteristics of the displayed text channel.
Text Top Row	Set the top row of the text window displayed on screen
Text Height	Adjust height of text window displayed
XDS display	Sets the characteristics of the displayed XDS data
XDS top row	Set top row of where XDS is displayed on screen
XDS height	Adjust height of XDS window
CC/text/XDS window opacity	Adjust opacity of background window over which CC, text, and XDS is displayed
Status window opacity	Adjust opacity of background window over which status is displayed

5.5.1. Open Captions

Open captions	This menu item allows replacing line 21 (or 22 in 625/50 mode) waveform with a series of nulls, leaving the field 2 waveform untouched.
Shift generated line 21	This option allows the unit to shift the generated null caption waveform down by 7.5 IREs.

5.5.2. Setting the VBI Line Number – 525 Line Video

Line 21 decode			For 525 line video input, this control selects which line is decoded for CC, text and XDS data.
	525 VBI line		
		10 to 30 *21*	

5.5.3. Setting the VBI Line Number – 625 Line Video

Line 21 decode		
	625 VBI line	
		10 to 30
		22

For 625 line video input, this control selects which line is decoded for CC, text and XDS data.

5.5.4. Setting the On Screen Display

Line 21 Decode		
	On-screen display	
		CC/text/XDS
		Invalid XDS
		Timed XDS
		CC/text/status
		Other faults
		ATSC status

This setting allows the user to select the status information to be displayed on the monitoring output.

5.5.5. Setting GPI 1 and 2 functionality

Line 21 decode		
	GPI 1/2 function	
		Off
		OSD/faults
		CC select

This setting allows the user to select the functionality of GPI 1 and 2.

5.5.6. Setting the Closed Captioning Channel

Line 21 decode		
	CC channel	
		1
		2
		3
		4
		Off

This setting allows the user to select which closed captioning channel to decode from the incoming video and display on the outgoing video. If GPI 1/2 functionality is set for CC select, this function will be controlled via GPI 1/2

5.5.7. Setting GPI 3 and 4 functionality

Line 21 decode		
	GPI 3/4 function	
		Off
		OSD/faults
		text select

This setting allows the user to select the functionality of GPI 3 and 4.

5.5.8. Configuring Text Channel Characteristics

- *Line 21 decode*
  - *Text Channel*
    - *Off*
    - *1*
    - *2*
    - *3*
    - *4*

This setting allows the user to select which text channel to decode from the incoming video and display on the outgoing video. If GPI 3/4 functionality is set for text select, this function will be controlled via GPI 3/4

5.5.9. Configuring Text top row

- *Line 21 decode*
  - *Text top row*
    - *1-15*

This setting allows the user to select the anchor point of the text window displayed on screen. Line 1-15 can be selected.

5.5.10. Configuring Text height characteristics

- *Line 21 decode*
  - *Text height*
    - *2-15*

This setting allows the user to select the height of the text window displayed. The text box height can be adjusted from 2 to 15 rows.

5.5.11. Configuring XDS Display Characteristics

Display	This menu item enables or disables XDS data display on the video output.
Top row	This menu item selects the first row displayed in the XDS window display.
Height	This menu item selects the depth of the XDS window display thereby setting the number of rows displayed in the text window.

5.5.11.1. Enabling XDS Display

- *Line 21 decode*
  - *XDS display*
    - *Display*
      - *Fixed positions*
      - *Disable*
      - *Scrolling display*

Menu option to enable, either scrolling or fixed, or disable XDS data display.

5.5.11.2. Setting the XDS Window's Top Row

- *Line 21 decode*
  - *XDS display*
    - *Top row*
      - *1 – 15*
      - *1*

This menu item selects the first row displayed in the XDS window display.

5.5.11.3. Setting the XDS Window's Display Height

Line 21 decode
XDS display
Height
2 – 15
5

This menu item selects the depth of the XDS window display thereby setting the number of rows displayed in the text window.

5.5.12. Setting the CC, Text, and XDS window opacity

Line 21 decode
Cc/text/XDS Window opacity
0 – 100%
83%

This control sets the 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.

5.5.13. Setting the Status Window Opacity

Line 21 decode
Status Window opacity
0 – 100%
83%

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

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.

5.6. CONFIGURING 608-708 TRANSLATOR FUNCTIONS (ONLY ON 7760CCM-T)

CC channel	This menu item selects which CC channel is mapped to associated EIA-708 service. (x = 1 to 4)
Text channel	This menu item selects which text channel is mapped to associated EIA-708 service. (x = 1 to 4)
608-708 delay queue	Sets the data delay to coordinate with delay experienced by video through upconversion process.

5.6.1.1. Mapping Closed Captioning Channel to EIA-708 Services

608-708 translator
CC service number
Channel 1 to 4
1 - 63
Off

This setting, which is only available on the 7760CCM-T allows the user to map the specified closed caption channel to the EIA-708 service channel (1 – 63).

The same menu setting applies to CC channels 2-4.

5.6.1.2. Mapping Text Channel to EIA-708 Services

608-708 translator *T service number* *Text 1 to 4* *1 - 63* *Off*	This setting, which is only available on the 7760CCM-T allows the user to map the specified text channel to the EIA-708 service channel (1 – 63). The same menu setting applies to text channels 2-4.

5.6.1.3. Setting the Data Delay

608-708 translator *608/708 delay* *0 frames* *1-30*	This option sets the delay for the 708 translated data on the serial output to correlate with any delay encountered by the video data through the upconversion process.

5.7. CONFIGURING FAULT CONDITIONS

The *Fault configuration* menu is used to configure parameters associated with the closed captioning features of the 7760CCM. The chart below shows the items available in the *Fault configuration* menu.

Prioritized faults	Control to define high, medium and low priority durations that are then used to set search times and enable fault alerts.
CC & text missing duration	Control to set the search time for closed captioning and text channel decoding

Fault condition 1	Control used to configure the Fault Condition 1 display.
Fault condition 2	Control used to configure the Fault Condition 2 display.
Fault condition 3	Control used to configure the Fault Condition 3 display.
Fault condition 4	Control used to configure the Fault Condition 4 display.
Clear faults	Control used to clear all faults.

5.7.1. Configuring Priority Durations

High priority	Priority durations identify how soon after a fault is triggered and a fault alert message is displayed on the screen.
Medium priority	Priority durations identify how soon after a fault is triggered and a fault alert message is displayed on the screen.
Low priority	Priority durations identify how soon after a fault is triggered and a fault alert message is displayed on the screen.

5.7.1.1. Configuring The High Priority Duration

Fault configuration
Prioritized faults
High priority
1 – 900 sec
1 sec

This menu item allows the user to set a high priority time-out. All high-priority parameters must be decoded within this set amount of time. If the XDS parameter is not found within this duration, a fault alert message is displayed (if enabled).

5.7.1.2. Configuring The Medium Priority Duration

Fault configuration
Prioritized faults
Medium priority
1 – 900 sec
5 sec

This menu item allows the user to set a medium priority time-out. All medium-priority parameters must be decoded within this set amount of time. If the XDS parameter is not found within this duration, a fault alert message is displayed (if enabled).

5.7.1.3. Configuring The Low Priority Duration

Fault configuration
Prioritized faults
Low priority
1 – 900 sec
45 sec

This menu item allows the user to set a low priority time-out. All low-priority parameters must be decoded within this set amount of time. If the XDS parameter is not found within this duration, a fault alert message is displayed (if enabled).

5.7.1.4. Configuring XDS Seek Duration

Using the priority time-out high, medium and low definitions, XDS parameters can be configured to trigger a fault. The list below identified XDS parameters that can be monitored. For simplicity, *Seek program name* menu settings are described below. Other XDS seek duration parameter settings are similar.

Seek program name	Option to look for program name within Line 21.
Seek V-chip rating	Option to look for V-chip rating within Line 21.
Seek network name	Option to look for network name within Line 21.
Seek station ID	Option to look for station ID within Line 21.
Seek time-of-day	Option to look for time of day within Line 21.
Seek local time zone	Option to look for local time zone within Line 21.
Seek program ID	Option to look for program ID within Line 21.
Seek time in show	Option to look for time in show within Line 21.

Fault configuration *Prioritized faults* *Seek program name* *low priority* *medium priority* *high priority* *presence*	The 7760CCM card actively looks for XDS parameters within a given duration. If the parameter does not exist, or can not be found in the defined duration, and if enabled, a fault alert message is displayed. Controls in sections 5.7.1 to 5.7.3 define high, medium and low priority durations. For simplicity, only the Seek program name is presented in this table. Other Seek functions are set similarly.

5.7.2. Configuring CC and Text Missing Duration

CC-1 timeout	Sets the time-out parameter for detecting CC channel 1.
CC-2 timeout	Sets the time-out parameter for detecting CC channel 2.
CC-3 timeout	Sets the time-out parameter for detecting CC channel 3.
CC-4 timeout	Sets the time-out parameter for detecting CC channel 4.
Text-1 timeout	Sets the time-out parameter for detecting text channel 1.
Text-2 timeout	Sets the time-out parameter for detecting text channel 2.
Text-3 timeout	Sets the time-out parameter for detecting text channel 3.
Text-4 timeout	Sets the time-out parameter for detecting text channel 4.

Fault configuration *CC & text missing duration* *CC-1 timeout* *0 – 999 seconds* *300 sec*	This menu option sets the time-out for closed caption channel 1. If CC-1 is not decoded within the set duration, and the fault condition is enabled, a fault alert message will be displayed. CC-2 to CC-4, and Text-1 to Text-4 durations are similarly configured.

5.7.3. Configuring Fault Conditions

The *Fault condition* menu is used to define and enable fault alert messages associated with missing or invalid VBI line data. For simplicity , the following chart below shows the items available in the *Fault condition 1* menu. *Fault condition 2-4* menus are similar.

Message	Setting used to enable/disable fault alert message
Enable	Control to enable fault message to blink on screen
Duration	Horizontal location of fault message
Row	Vertical location of fault message
Column	Option to configure fault alert message
Blink	Set the duration that the fault message remains after triggered on the screen.

5.7.3.1. Enabling Fault Condition Messages

Fault configuration
- *Fault condition 1*
  - *Message*

This control allows the user to rename the fault message.

5.7.3.2. Setting the Blink Mode of the Fault Windows

Fault configuration
- *Fault condition 1*
  - *Enable*
    - *Disable*
    - *Enable*

This controls determines if the Fault condition is enabled or disabled.

5.7.3.3. Setting the Fault Duration

Fault configuration
- *Fault condition 1*
  - *Fault duration*
    - *0 – 990 frames (in 10 frame intervals)*
    - *Until reset*

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

5.7.3.4. Positioning Fault Windows – Horizontal Position

Fault configuration
- *Fault condition 1*
  - *Row*

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.

5.7.3.5. Positioning Fault Windows – Vertical Position

Fault configuration
Fault condition 1
Column

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.

5.7.3.6. Setting Fault Message

Fault configuration
Fault condition 1
Blink

This control parameter allows the user to select if the fault message will blink or stay on solid.

5.7.3.7. Determining What Items Will Generate Fault Conditions

The *Fault Condition* 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 Condition* menu.

Video absent		Trigger fault when video absent or incorrect standard at input.
CC waveform absent		Trigger fault when closed captioning absent from input video signal.
CC-1 missing		Trigger fault when closed captioning channel 1 is missing.
CC-2 missing		Trigger fault when closed captioning channel 2 is missing.
CC-3 missing		Trigger fault when closed captioning channel 3 is missing.

CC-4 missing	Trigger fault when closed captioning channel 4 is missing.
Text-1 missing	Trigger fault when text channel 1 is missing.
Text-2 missing	Trigger fault when text channel 2 is missing.
Text-3 missing	Trigger fault when text channel 3 is missing.
Text-4 missing	Trigger fault when text channel 4 is missing.
Parity error	Trigger fault for failed parity check
Checksum error	Trigger fault for invalid checksum
Dupl codes in field 1	Trigger fault when Field 1 has duplicate control codes
Dupl codes in field 2	Trigger fault when Field 2 has duplicate control codes
No dupl codes in field 1	Trigger fault when Field 1 is missing duplicate control codes
No dupl codes in field 2	Trigger fault when Field 2 is missing duplicate control codes
Invalid code in field 1	Trigger fault when Field 1 has invalid control code
Invalid code in field 2	Trigger fault when Field 2 has invalid control code
Partial code pair	Trigger fault if incomplete control pair in the frame
Invalid program ID	Trigger fault on invalid program ID.
Invalid time-in-show	Trigger fault on invalid time-in-show
Invalid program name	Trigger fault on invalid program name
Invalid program type	Trigger fault on invalid program type
Invalid V-chip rating	Trigger fault on invalid V-chip rating
Invalid program description	Trigger fault on invalid program description
Invalid network name	Trigger fault on invalid network name
Invalid station ID	Trigger fault on invalid station ID
Invalid time-of-day	Trigger fault on invalid time of day
Invalid time zone	Trigger fault on invalid time zone information.

Seek program ID	Trigger fault if Program ID is not seen in set priority time out.
Seek time-in-show	Trigger fault if Time-in-show is not seen in set priority time out.
Seek program name	Trigger fault if Program Name is not seen in set priority time out.
Seek V-chip rating	Trigger fault if V-chip Rating is not seen in set priority time out.
Seek network name	Trigger fault if Network Name is not seen in set priority time out.
Seek station ID	Trigger fault if Station ID is not seen in set priority time out.
Seek time-of-day	Trigger fault if Time-of-day is not seen in set priority time out.
Seek local time zone	Trigger fault if time zone is not seen in set priority time out.

Table 8: Possible Error Conditions to Produce a Fault

5.7.4. Clearing Faults

Fault configuration
- *Clear faults*
  - *Clear*
  - *Cancel*

This menu item provides a convenient method to clear any fault conditions.

5.8. GENERAL PURPOSE INPUT SETUP

The 7760CCM card has General Purpose inputs available on the high-density DB-15 connector which can be used to control configurations or signal conditions to the user. GPI inputs can be configured to be level or edge sensitive.

GPI 1/2 function	Controls the function of GPI 1 and 2
GPI 1 active level	Controls whether the general-purpose input trigger is active high or low
GPI 1 trigger sensitivity	Controls whether the general-purpose input trigger is level or edge sensitive
GPI 2 active level	Controls whether the general-purpose input trigger is active high or low
GPI 2 trigger sensitivity	Controls whether the general-purpose input trigger is level or edge sensitive
GPI 3/4 function	Controls the function of GPI 3 and 4
GPI 3 active level	Controls whether the general-purpose input trigger is active high or low
GPI 3 trigger sensitivity	Controls whether the general-purpose input trigger is level or edge sensitive
GPI 4 active level	Controls whether the general-purpose input trigger is active high or low
GPI 4 trigger sensitivity	Controls whether the general-purpose input trigger is level or edge sensitive

5.8.1. Setting the General Input function

5.8.1.1. Setting function of GPI 1 and 2

GPI setup		This control associates GPI1 and GPI2 inputs with a display function. When the *CC select* option is chosen, GPI1 and GPI2 are binary encoded to identify which of the four CC channels are decoded and displayed. CC Channel 1 – GPI1 and GPI2 are low CC Channel 2 – GPI1 is low and GPI2 is high CC Channel 3 – GPI1 is high and GPI2 is low CC Channel 4 – GPI1 and GPI2 are high The factory default is set to *OSD off/reset faults*. This option relates GPI1 to turning-off the on-screen display and GPI2 to resetting fault alert messages.
	GPI 1/2 function	
		Off *OSD/faults* *CC select*

5.8.1.2. Setting function of GPI 3 and 4

GPIO setup
GPI trigger
GPI ¾
Text select OSD off/reset faults

This control associates GPI3 and GPI4 inputs with a display function.

When the *Text select* option is chosen, GPI3 and GPI4 are binary encoded to identify which of the four Text channels are decoded and displayed.

Text Channel 1 – GPI3 and GPI4 are low
Text Channel 2 – GPI3 is low and GPI4 is high
Text Channel 3 – GPI3 is high and GPI4 is low
Text Channel 4 – GPI3 and GPI4 are high

The factory default is set to *OSD off/reset faults*. This option relates GPI3 to turning-off the on-screen display and GPI4 to resetting fault alert messages.

5.8.2. Setting the General Purpose Input Active State

GPI setup
GPI active level
High Low

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

For simplicity only GPI1 is shown here.

5.8.3. Setting the General Purpose Input Trigger Sensitivity

GPIO setup
GPI trigger sensitivity
GPI1
Level sensitive Edge sensitive

This control sets the sensitivity trigger for active state of the General Purpose input. It can be set to trigger for level or edge shifts.

For simplicity, only GPI1 is shown here. GPI2-4 are set in the same manner.

5.9. GENERAL PURPOSE OUTPUT SETUP

GPO 1 trigger	Selects the condition that will activate the GPO
GPO 1 active level	Controls whether the general-purpose output trigger is active high or low
GPO 2 trigger	Selects the condition that will activate the GPO
GPO 2 active level	Controls whether the general-purpose output trigger is active high or low
Frame Status Trigger	Selects the conditions that activate the frame status line

5.9.1. Configuring what Condition will Activate the General Purpose Output

- *GPO setup*
  - *GPO triggers*
    - *GPO1 trigger*
      - *None*
      - *Fault condition 1*
      - *Fault condition 2*
      - *Fault condition 3*
      - *Fault condition 4*
      - *Fault condition 1 or 2*
      - *Fault condition 1 or 3*
      - *Fault condition 1 or 4*
      - *Fault condition 2 or 3*
      - *Fault condition 2 or 4*
      - *Fault condition 3 or 4*
      - *Fault condition 1 or 2 or 3*
      - *Fault condition 1 or 2 or 4*
      - *Fault condition 1 or 3 or 4*
      - *Fault condition 2 or 3 or 4*
      - *Fault condition 1 or 2 or 3 or 4*

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

5.9.2. Setting the General Purpose Output Active State

- *GPO setup*
  - *GPO active level*
    - *GPO1*
      - *High*
      - *Low*

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

For simplicity, only GPO1 is shown here. GPO 2 is set in the same manner.

5.9.3. Frame Status Fault Trigger Condition

- *GPIO setup*
  - *Frame status trigger*
    - *None*
    - *Fault condition 1*
    - *Fault condition 2*
    - *Fault condition 3*
    - *Fault condition 4*
    - *Fault condition 1 or 2*
    - *Fault condition 1 or 3*
    - *Fault condition 1 or 4*
    - *Fault condition 2 or 3*
    - *Fault condition 2 or 4*
    - *Fault condition 3 or 4*
    - *Fault condition 1 or 2 or 3*
    - *Fault condition 1 or 2 or 4*
    - *Fault condition 1 or 3 or 4*
    - *Fault condition 2 or 3 or 4*
    - *Fault condition 1 or 2 or 3 or 4*

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

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

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

5.10. UTILITIES

5.10.1. Accessing Information About this Module and its Firmware

Utilities
About…

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

5.10.2. Saving And Recalling 7760CCM Configurations

The 7760CCM modules provide three 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.

5.10.2.1. Storing 7760CCM 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.

5.10.2.2. Recalling CCM Configurations from the User Presets

Utilities
Recall preset 1
Load
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.

5.10.3. 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.

5.10.4. Restoring to 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.

5.11. SERIAL LINK SETUP (OPTION ON 7760CCM-T ONLY)

This menu option allows the user to configure the function of serial port. This option is only available on the 7760CCM-T product.

Serial link setup
608 transmit
SMPTE 333M
Grand alliance

This menu item on the 7760CCM-T allows the user to configure the serial port for 608 transmission, SMPTE 333M or Grand Alliance Protocol for server to encoder interfacing.

5.12. TEST MODE SELECTION

Test Mode
Enable
Disable

This menu item enables the built-in test mode on the 7760CCM and 7760CCM-T module.

5.13. CLEARING FAULTS

Clear faults
Clear
Cancel

This menu item on the top level menu provides a convenient method to clear any fault conditions.

6. JUMPERS

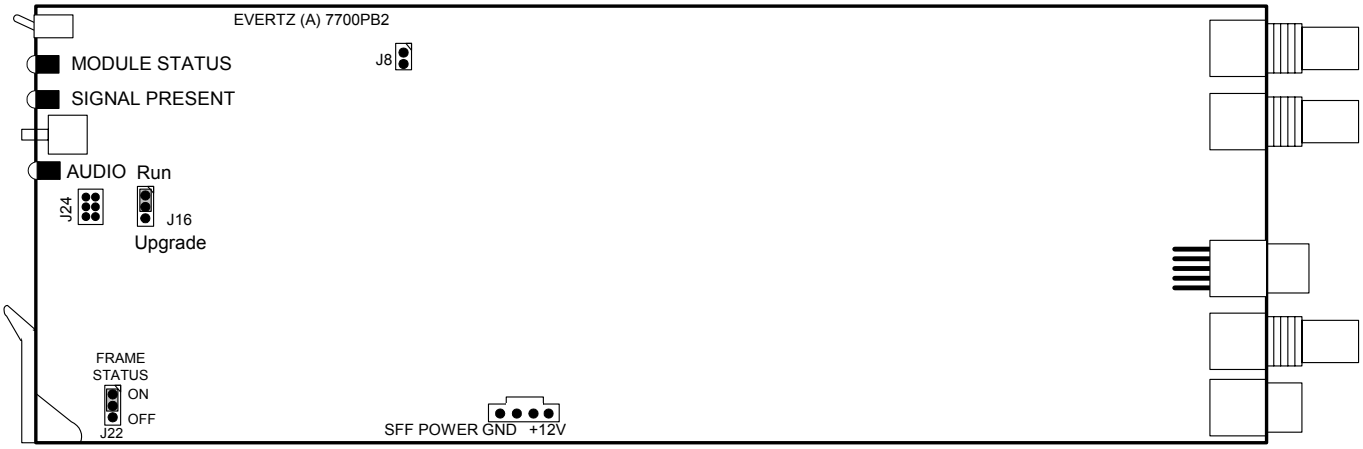

Figure 5: Location of Jumpers on 7700PB2 Boards

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

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

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

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

6.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

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

UPGRADE

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

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

7. Menu Quick Reference

Video
- **Video standard**
- **Loss of video**

Line 21 decode
- **Open Captions**
- **525 VBI line**
- **625 VBI line**
- **On Screen Display**
- **GPI 1/2 function**
- **CC channel**
- **GPI 3/4 function**
- **Text channel**
- **Text Top Row**
- **Text Height**
- **XDS display**
- **XDS Top Row**
- **XDS Height**
- **CC/Text/XDS window opacity**
- **Status Window opacity**

608-708 Translator
(only on 7760CCM-T)
- **CC Channel**
  - Channel 1 to 708
  - Channel 2 to 708
  - Channel 3 to 708
  - Channel 4 to 708
- **Text Channel**
  - Channel 1 to 708
  - Channel 2 to 708
  - Channel 3 to 708
  - Channel 4 to 708
- **608/708 delay queue**

Fault configuration
- **Prioritized faults**
  - High priority
  - Medium priority
  - Low priority
  - Seek program name
  - Seek V-Chip rating
  - Seek network name
  - Seek station ID
  - Seek time-of-day
  - Seek local time zone
  - Seek program ID
  - Seek time-in-show
- **CC & text missing duration**
  - CC-1 timeout
  - CC-2 timeout
  - CC-3 timeout
  - CC-4 timeout
  - Text-1 timeout
  - Text-2 timeout
  - Text-3 timeout
  - Text-4 timeout
- **Fault condition 1**
  - Fault condition
  - Fault blink
  - Fault window H
  - Fault window V
  - Fault message
  - Fault duration
  - Fault definition
    - *Video absent*
    - *CC waveform absent*
    - *CC-1 missing*
    - *CC-2 missing*
    - *CC-3 missing*
    - *CC-4 missing*
    - *Text-1 missing*
    - *Text-2 missing*
    - *Text-3 missing*
    - *Text-4 missing*
    - *Parity error*
    - *Checksum error*
    - *Duplicate codes in field 1*
    - *Duplicate codes in field 2*
    - *No duplicate codes in field 1*
    - *No duplicate codes in field 2*
    - *Invalid code in field 1*
    - *Invalid code in field 2*
    - *Partial code pair*
    - *Invalid program ID*
    - *Invalid time-in-show*
    - *Invalid program name*
    - *Invalid program type*
    - *Invalid V-chip rating*
    - *Invalid program desc*
    - *Invalid network name*
    - *Invalid station ID*
    - *Invalid time-of-day*
    - *Invalid time zone*
    - *Seek program name*
    - *Seek V-Chip rating*
    - *Seek network name*
    - *Seek station ID*
    - *Seek time-of-day*
    - *Seek local time zone*
    - *Seek program ID*
    - *Seek time-in-show*
- **Fault condition 2**
  - same as Fault condition 1
- **Fault condition 3**
  - Same as Fault condition 1
- **Fault condition 4**
  - Same as Fault condition 1
- **Clear faults**

GPI setup
- **GPI 1/2 function**
- **GPI 1 Active level**
- **GPI 1 trigger sensitivity**
- **GPI 3/4 function**
- **GPI 3 active level**
- **GPI 3 trigger sensitivity**
- **GPI 4 active level**
- **GPI 4 trigger sensitivity**

GPO setup
- **GPO 1 trigger**
- **GPO 1 active level**
- **GPO 2 trigger**
- **GPO 2 active level**
- **Frame status trigger**

Utilities
- **About…**
- **Store preset 1**
- **Store preset 2**
- **Store preset 3**
- **Recall preset 1**
- **Recall preset 2**
- **Recall preset 3**
- **Upgrade**
- **Factory reset**

Serial link setup

Test mode

Clear faults