Figures

Tables

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original Release	Nov 01
1.1	Added information for GPO 6, reformatting and updated specifications	Mar 03

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1. OVERVIEW

The 7721GPI-D SDI GPI-D Decoder extracts GPI data that has been embedded into a 270 Mb/s SDI video signal by the Evertz 8010 or 8010TM GPI embedder. The GPI data is decoded from the user bits on a specified VITC line and 6 general purpose optoisolated outputs are provided.

Features:

- Automatic detection of 525 and 625 line SDI video input
- Six TTL level GPO signals activate when corresponding GPI inputs on 8010 are activated
- One reclocked SDI video output
- Card edge LEDs indicate video signal and data presence and module fault.
- A composite video output with OSD (on-screen display) is provided for card edge setup.
- Timecode shown on OSD (on-screen display).
- GPO status shown on OSD (on-screen display).

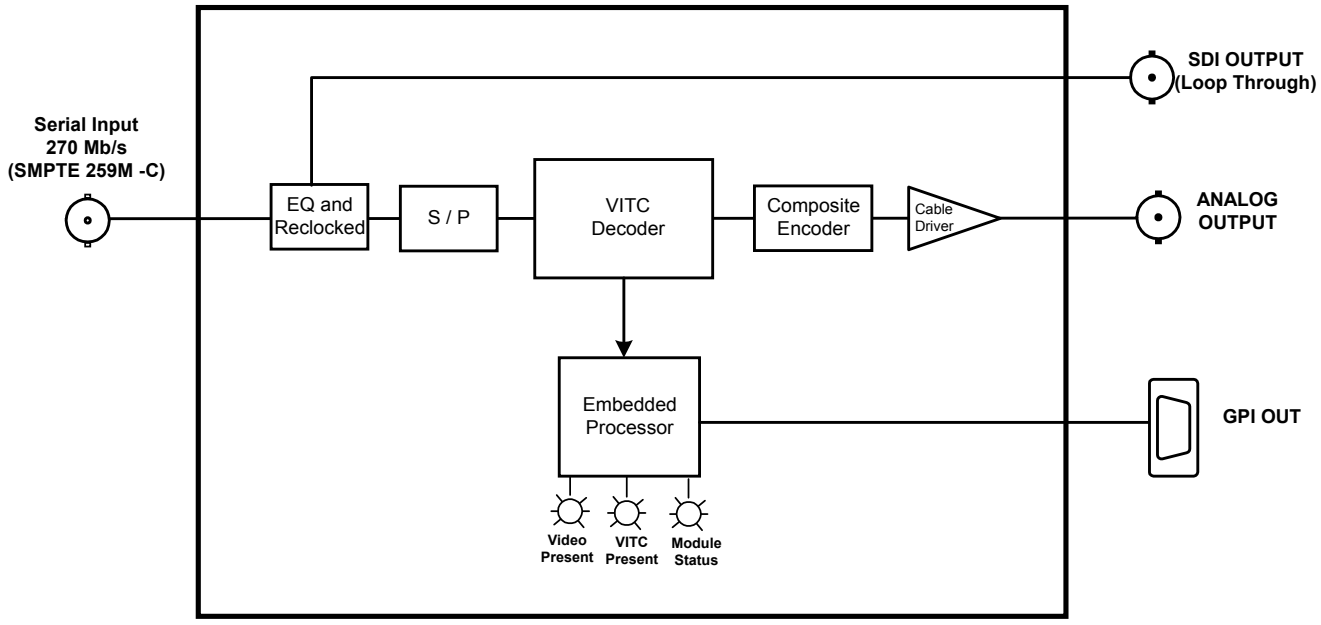

Figure 1: 7721GPI-D Block Diagram

2. INSTALLATION

The 7721GPI-D modules each come with a companion rear plate that has 3 BNCs and a high-density female DB-15 connector. For information on mounting the rear plate and inserting the module into the frame see section 3 of the 7700FR-C chapter.

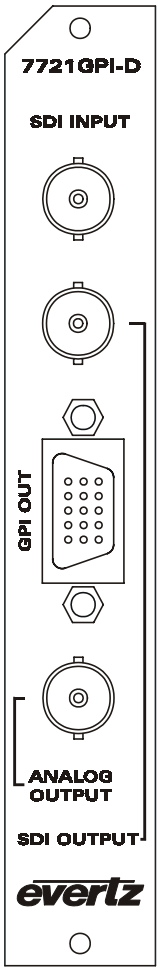

Figure 2: 7721GPI-D Rear Panel

2.1. VIDEO INPUTS AND OUTPUTS

SDI INPUT Input BNC connector for 10-bit serial digital video signals compatible with the SMPTE 259M-C standard.

SDI OUTPUT One BNC connector with reclocked serial component video output, compatible with the SMPTE 259M-C standard. This output contains a reclocked copy of the input video.

COMPOSITE OUTPUT One BNC connector with composite analog (NTSC, PAL) output with OSD (On Screen Display) for monitoring GPI and timecode status.

2.2. GENERAL PURPOSE INPUTS AND OUTPUTS

The following is the pinout of the female HD DB-15 connector labeled **GPI OUT**

DB-15	Name	Description
1	GPO4	GPI Output 4
2	N/C	Not Connected
3	GPO3	GPI Output 3
4	GPO1	GPI Output 1
5	GND	Gnd
6	N/C	Not Connected
7	N/C	Not Connected
8	GPO2	GPI Output 2
9	GND	GND
10	GP+5V	General Purpose +5V supply output
11	N/C	Not Connected
12	GND	Ground
13	GPO5	GPI Output 5
14	GPO6**	GPI Output 6
15	Vext	Ext. Voltage Input to GPIO Circuitry (input)

Table 1: Data Out DB 15 Connector Pinout

**Note: Some early versions of the 7721GPI-D only support outputs 1 to 5. These units can be upgraded to support all six outputs. Contact Evertz customer service for information on how to upgrade these units.

The GPOs are activated when the corresponding GPI inputs on the 8010 are avtivated. They can be used to pass simple contact closure information along with the video signal. The GPOs are active low with an internal pull up (10k Ohm) resistor to the Vext pin. When active, the output will go low and is able to sink up to 10mA. When inactive, the signal will go high (to the voltage applied to the Vext pin). Do not attempt to source more than 100μA from the output.

GPI	8010TM PIN (IN)	7721GPI-D PIN (OUT)	UB Data byte 1
1	1	4	81
2	2	8	82
3	3	3	84
4	4	1	88
5	5	13	90
6	7	14	A0

Table 2: 8010TM to 7721GPI-D GPI I/O Mapping

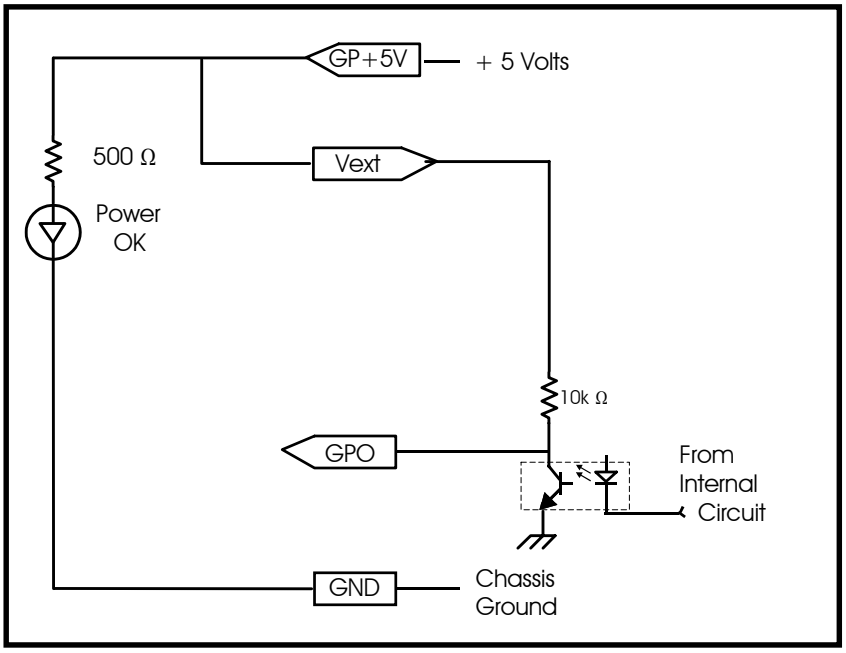

Figure 3: Powering the General Purpose Output Opto Isolators from the Module

The user can connect GP+5V supplied from the frame into the Vext pin to provide power to the GPO opto-isolator circuitry. In this configuration the GPOs will be internally pulled up to 5 volts. (See Figure 3:) Five volts is available to the user to be used for driving external circuitry. Care must be taken to limit the load to 0.5W so there is no affect on the power supply source on the module.

Alternately, the user can connect an external power source for the opto-isolator circuitry. The Vext voltage must be greater than the voltage required by the GPO by at least 5v. Figure 4 shows how to wire the GPOs from an external power supply.

Warning: Do not connect GP+5V from one module to another module's GP+5V.

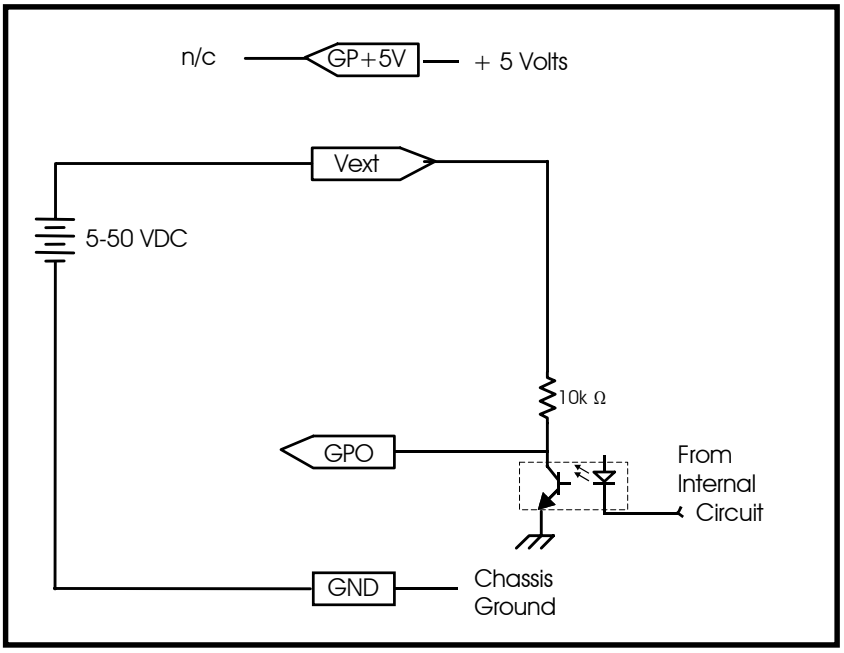

Figure 4: Powering the General Purpose Output Opto Isolators from an External Power Supply

2.3. DATA FORMAT

The 7721GPI-D decodes VITC and sends the data to the GPO ports. For data to decoded, it must be valid VITC (SMPTE 12M-1999) on the selected line (Section 5.1). The Binary Group codes must be as follows.

Binary Group	Values (Binary data)
1	9 (1001b)
2	3 (0011b)
3	8 (1000b)
4	0 (0000b)
5	8 (1000b)
6	0 (0000b)
7	GPO1 (LSB) to GPO4 (MSB)
8	GPO5 (LSB) to GPO6, MSB = 1

Table 3: Binary Group Data

3. SPECIFICATIONS

3.1. SERIAL VIDEO INPUT

Standard: SMPTE 259M-C – 525 or 625 line component.
Connector: 1 BNC per IEC 169-8
Equalization: Automatic >150m @ 270 Mb/s with Belden 8281 or equivalent cable
Return Loss: > 15 dB up to 270 Mb/s

3.2. SERIAL VIDEO OUTPUT

Number of Outputs: 1 (Reclocked)
Standard: same as input
Connectors: BNC per IEC 169-8
Signal Level: 800mV nominal
DC Offset: 0V ±0.5V
Rise and Fall Time: 740ps nominal
Overshoot: <10% of amplitude
Return Loss: > 15 dB up to 270 Mb/s
Wide Band Jitter: < 0.2 UI

3.3. ANALOG MONITORING VIDEO OUTPUT

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

3.4. GENERAL PURPOSE OUTPUTS

Number of Outputs: 6
Type: Opto-isolated, active low with internal pull-ups to user supplied voltage. (provides +5V which may be used for this purpose)
Connector: Female High Density DB-15
Signal Level: +5V nominal

3.5. ELECTRICAL

Voltage: + 12VDC
Power: 6 Watts.
EMI/RFI: Complies with FCC Part 15, class A and EU EMC directive.

3.6. PHYSICAL

Number of slots: 1

4. STATUS LEDS

The location of the status LEDs is shown in Figure 5.

4.1. MODULE STATUS LEDS

MODULE OK This Green LED will be ON when the module is operating properly

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

The Red LED will blink ON and OFF if the microprocessor is not running.

The Red LED will be ON solid when input video is missing, or VITC containing GPI user data is missing, or when there is a fault in the module power supply.

VIDEO PRESENT This Green LED will be ON when there is a valid video signal present at the module input.

DATA PRESENT This Green LED will be ON solid when there is a valid VITC containing GPI user data present.

5. CARD EDGE CONTROLS

The 7721GPI-D is equipped with an 8 position DIP switch to allow the user to select various functions. All positions are assigned sequentially such that the first position is located at the top of the DIP switch (farthest from to the card ejector). Sections 5.1 to 5.4 describe the assigned DIP switch functions. The On position (closed) is down, or closest to the printed circuit board. The Off position (open) is up, or farthest to the printed circuit board. Table 4 gives an overview of the DIP switch functions.

DIP Switch	Function
1	VITC reader line selection
2	
3	
4	
5	
6	Delay before resuming VITC/GPI search.
7	Controls if GPO holds last value or deactivates on missing VITC/GPI.
8	Sets normally high or low GPO level.

Table 4: DIP Switch Functions

5.1. SELECTING THE VITC READER LINE

The 7721GPI-D reads GPI encoded user bits from a user defined VITC line. This line is defined by setting DIP switches 1 to 5. The lines selected must between 10 and 31 for 525 line viedo, or between 6 and 31 for 625 line video. If DIP switches 1 to 5 are all set to Off, then the 7721GPI-D will automatically hunt for a line with valid VITC and GPI data. When the 7721GPI-D finds valid VITC with GPI data encoded it will stop searching and read from this line. If valid VITC and GPI data is removed from the selected line, then the 7721GPI-D will resume searching after a pre-defined period (Section 5.2).

DIP 1	DIP 2	DIP3	DIP 4	DIP 5	LINE (525)	LINE (625)
Off	Off	Off	Off	Off	Auto	Auto
On	Off	Off	Off	Off	Invalid line	Invalid line
Off	On	Off	Off	Off	Invalid line	Invalid line
On	On	Off	Off	Off	Invalid line	Invalid line
Off	Off	On	Off	Off	Invalid line	Invalid line
On	Off	On	Off	Off	Invalid line	Invalid line
Off	On	On	Off	Off	Invalid line	6
On	On	On	Off	Off	Invalid line	7
Off	Off	Off	On	Off	Invalid line	8
On	Off	Off	On	Off	Invalid line	9
Off	On	Off	On	Off	10	10
On	On	Off	On	Off	11	11
Off	Off	On	On	Off	12	12
On	Off	On	On	Off	13	13
Off	On	On	On	Off	14	14
On	On	On	On	Off	15	15
Off	Off	Off	Off	On	16	16
On	Off	Off	Off	On	17	17
Off	On	Off	Off	On	18	18
On	On	Off	Off	On	19	19
Off	Off	On	Off	On	20	20
On	Off	On	Off	On	21	21
Off	On	On	Off	On	22	22
On	On	On	Off	On	23	23
Off	Off	Off	On	On	24	24
On	Off	Off	On	On	25	25
Off	On	Off	On	On	26	26
On	On	Off	On	On	27	27
Off	Off	On	On	On	28	28
On	Off	On	On	On	29	29
Off	On	On	On	On	30	30
On	On	On	On	On	31	31

Table 5: VITC Reader Line Selection Switch Settings

5.2. SELECTING DELAY BEFORE RESUMING VITC/GPI SEARCH

When the VITC reader is in the *auto line select mode* (DIP switches 1 to 5 are all in the Off position), DIP switch 6 is used to select the delay before resuming a search for valid VITC and GPI data when a loss of VITC and GPI data is experienced.

DIP 6	Time Delay
Off	1 Second
On	5 Seconds

Table 6: DIP Switch 6 Settings

5.3. REMOVE GPO ON LOSS OF SIGNAL

DIP switch 7 is used control whether the GPO outputs will hold their last value or deactivate when VITC with encoded GPI data is not present.

DIP 7	GPO Ouptuts
Off	Keep last value
On	Deactivate

Table 7: DIP Switch 7 Settings

5.4. SELECTING THE ACTIVE LEVEL OF THE GPO OUTPUTS

DIP switch 8 is used to control whether the GPO outputs will be active high or active low.

DIP 8	Output level
Off	Acitve low
On	Active high

Table 8: DIP Switch 8 Settings

6. JUMPERS

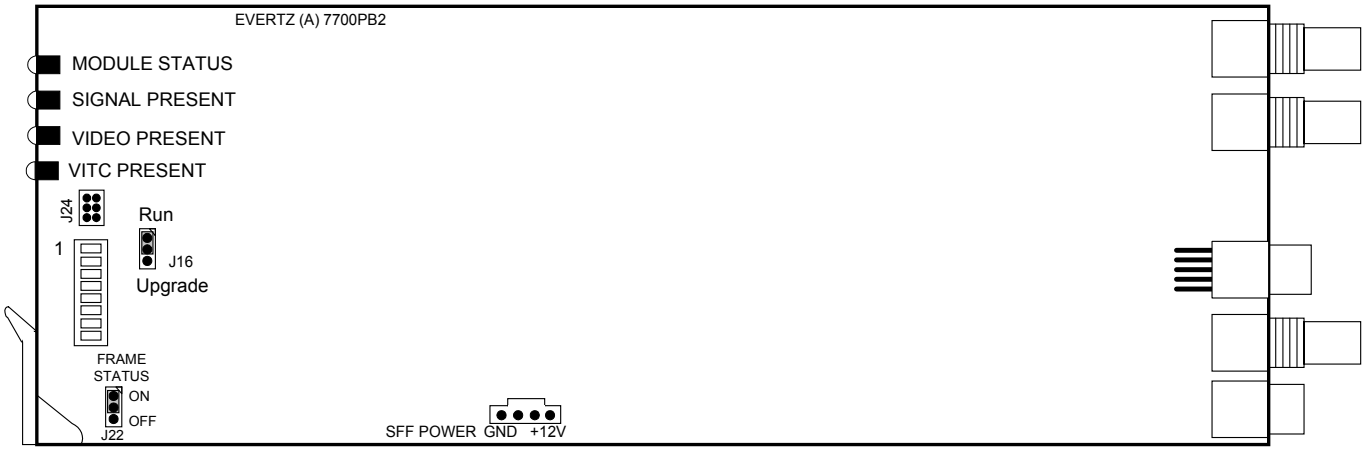

Figure 5: Location of Jumpers and LEDs

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

FRAME STATUS

The FRAME STATUS jumper 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 in the On position. (Default)

When this jumper is installed in the Off position, local faults on this module will not be monitored.

6.2. CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

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* chapter in the front of the manual binder 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* chapter 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.