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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Official Release	Sept 05
1.1	Updated *Vista*LINK® description, fixed format, & removed Section 6.2 & 6.3	July 08

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1. OVERVIEW

The 7707GPS-DR GPS Data Receiver provides an economical method of transmitting two Trimble Accutime GPS data signals over a dual fiber optic link for communication with the 5600MSC Master Sync and Clock Generator or 5010-GPSII. The 7707GPS-DR Data Receiver facilitates conversion of the fiber signal back to dual GPS data signals at the destination. The 7707GPS-DR and 7707GPS-DT Data cards permit GPS data transmission of two Accutime 2000 Smart Antenna's over distances up to 2 Km, with minimal latency.

The dual fiber configuration is designed to transmit and receive over separate fibers. The optical outputs of the 7707GPS-DT and 7707GPS-DR are available in 1310nm and 1550nm wavelengths.

The 7707GPS-DR occupies a single card slot and can be housed in a 1RU Multiframe that will hold up to 3 modules, a 3RU Multiframe that will hold up to 15 modules or a standalone enclosure which will hold 1 module

Features:
- Transports GPS data signals from two Trimble Accutime 2000 Smart Antenna's simultaneously
- Allows user to run 1 or 2 Accutime 2000 GPS heads for primary and redundant links
- GPS power at +17V DC with built-in current limiting
- All configuration settings are controllable through the card-edge user interface, or *Vista*LINK®
- Comprehensive signal and status monitoring via four-digit card-edge display, or *Vista*LINK®
- Optical output wavelengths of 1310nm or 1550nm provides a 2km transmission distance of GPS signal data
- Low latency
- Supports with multi-mode and single-mode fiber optic cable
- SC/PC, ST/PC, or FC/PC fiber connector options
- Fully hot swappable from front of frame
- *Vista*LINK® enabled for remote monitoring and control via SNMP (using VistaLINK® PRO) when installed in 7700FR-C frame with 7700FC *Vista*LINK® Frame Controller
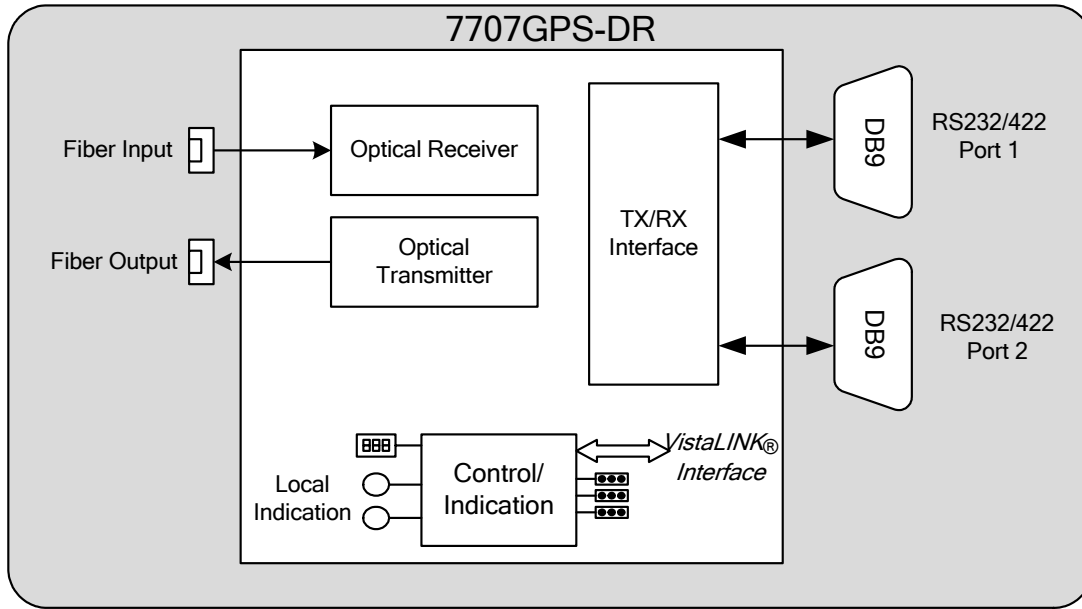
Figure 1-1: 7707GPS-DR Block Diagram

2. INSTALLATION

The 7707GPS-DR series modules come with a companion rear plate that has multi-pin removable terminal block connections, and an SC/PC (shown), ST/PC or FC/PC optical connector. For information on mounting the rear plate and inserting the module into the frame see the 7700FR chapter section 3. The following diagram shows four rear plate options.
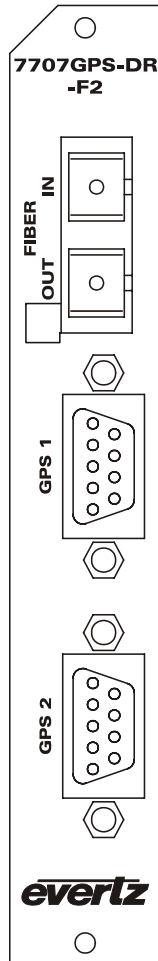
Figure 2-1: 7707GPS-DR Rear Panel

2.1.   OPTICAL CONNECTIONS

2.2.   DUAL FIBER VERSION (-F2 VERSION)

FIBER IN: There is one SC/PC (shown), ST/PC or FC/PC female connector with the optical input to the module. This connector should be connected to the FIBER OUT connector of a matching dual fiber 7707GPS-DT-F2 module at the destination end with a suitable fiber optic cable. The dual fiber 7707GPS-DR-F2 versions receive on wavelengths 1310nm and 1550nm.

FIBER OUT: There is one SC/PC (shown), ST/PC or FC/PC female connector with the optical output from the module. This optical output is available in 1310nm and 1550nm wavelengths. This connector should be connected to the FIBER IN connector of a matching dual fiber 7707GPS-DT-F2 module at the destination end with a suitable fiber optic cable. The dual fiber 7707GPS-DR-F2 version transmits on the wavelength marked on the rear panel and are designed to work with either single-mode or multi-mode fiber optic cable.

2.3.   SIGNAL CONNECTIONS

GPS DATA   The GPS data is transmitted from the Accutime GPS head to the 7707GPS-DT via 100' cable which is ordered with the 7707GPS-DT and 7707GPS-DR cards. Part number and description for the cable is WA-**T76**-100' IF cable for 5600MSC, GPSII and 7707GPS-DT.   Once the data is transmitted over fiber to the 7707GPS-DR, the data is then transmitted to the 5600MSC master clock via 100' **WA-T77** cable.
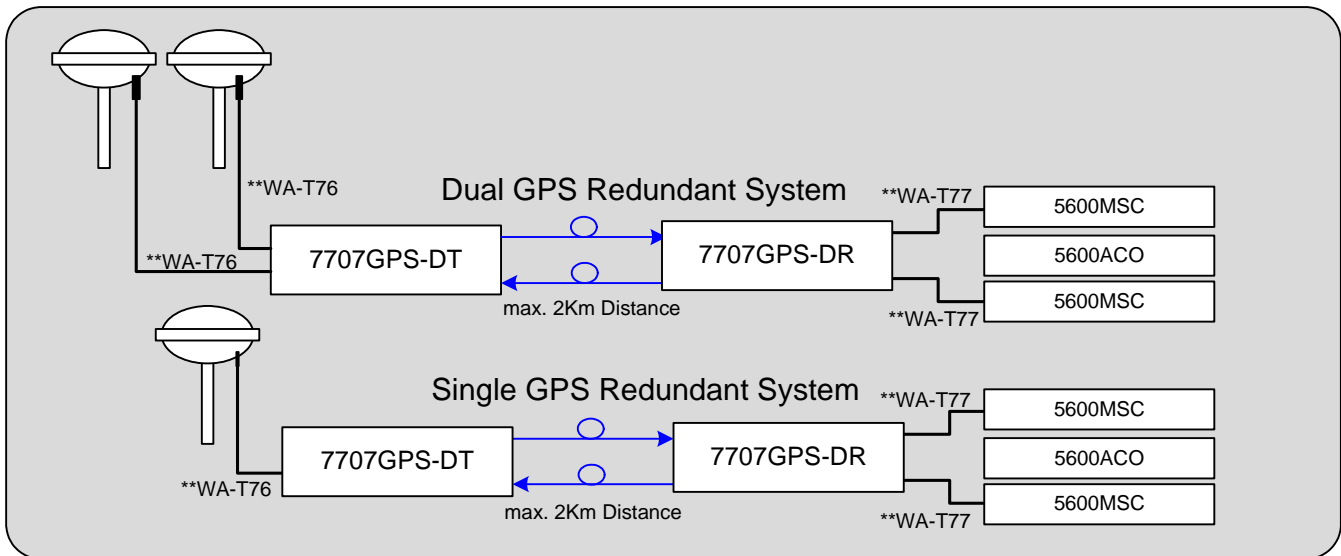
**Evertz recomends that only these cables be used for connecting the specified equipment to the 7707GPS-DT and 7707GPS-DR. See Accessories for ordering details.

Figure 2-2: Application Diagram

2.4. GPS DATA I/O

The following is the cable wiring pinout of the WA-T77 cable for the 9-pin ports of the 7707GPS-DR card:

Male End			Female End	
Pin #	**9 pin D-Style Male** EV Part # JTDSDE-9PM0	**100' Cable (**WP9681-60**) pair #**	**9 pin D-Style Female** EV Part # JTDSDE-9SF0	**Pin #**
7	TX B +	**1**	TX B +	**7**
2	TX A -	**1**	TX A -	**2**
8	RX A -	**2**	RX A -	**8**
3	RX B +	**2**	RX B +	**3**
4	1 PPS +	**3**	1 PPS +	**4**
6	1 PPS -	**3**	1 PPS -	**6**
5	+12 V DC Unreg.	**4**	+12 V DC Unreg.	**5**
1	Ground.	**4**	Ground.	**1**
Shield	Shield	**Drain Wire**	Shield	**Shield**

2.5. CARE AND HANDLING OF OPTICAL FIBER

2.5.1. Safety

> ⚠ **Never look directly into an optical fiber. Non-reversible damage to the eye can occur in a matter of milliseconds.**

The laser modules used in the Evertz fiber optic modules are Class I, with a maximum output power of 2mW, and a wavelength of 1310nm or 1270 to 1610nm.

2.5.2. Handling and Connecting Fibers

> ✍ **Never touch the end face of an optical fiber.**

The transmission characteristics of the fiber are dependent on the shape of the optical core and therefore care must be taken to prevent fiber damage due to heavy objects or abrupt fiber bending. Evertz recommends that the user maintains a minimum bending radius of 3 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable. The Evertz fiber optic modules come with cable lockout devices, to prevent the user from damaging the fiber by installing a module into a slot in the frame that does not have a suitable I/O module. For further information about care and handling of the fiber optic cable see section 3 of the Fiber Optics System Design chapter of this manual.

3. SPECIFICATIONS

3.1. GPS SERIAL DATA

Number of Signals: 2 bi-directional GPS signals
Connector: 2 x DB-9 connectors
Signal Type: RS-232 or RS-422 (selectable)
Bit Rate (max):
   RS-422:   115Kb/s
   RS-485:   115Kb/s

3.2. OPTICAL INPUT/OUTPUT

Number of Connections: 2
Connector: Female SC/PC, ST/PC or FC/PC
Maximum Input Power: 0dBm
Input Optical Sensitivity: -22dBm
Fiber Size and Type
Dual Fiber (F2):   9µm core / single mode on TX, 62.5µm core / multi-mode on RX
Output Wavelength
Standard: 1310nm, 1550nm (nominal)

<u>**Output Power**</u>
Dual Fiber (F2)
1310nm FP (Standard):   -7dBm ±1dBm
1550nm DFB: 0dBm ±1dBm

3.3. ELECTRICAL

Voltage: 12V DC
Power (max):   6 Watts
EMI/RFI: Complies with FCC regulations for class A devices.
   Complies with EU EMC directive.

3.4. CONNECTING CABLES (SEE ORDERING OPTIONS)

Number of cables: 2

3.5. PHYSICAL

7700 frame mounting:
   Number of Slots: 1

7701 frame mounting:
   Number of Slots: 1

4. CARD-EDGE MONITORING AND CONTROL

The 7707GPS-DR has seven LED status indicators and a 4-digit dot-matrix display on the front card-edge to show operational status of the card at a glance. The card-edge pushbutton and toggle switch are used to select various indications to the dot-matrix display and LED's. Figure 4-1 shows the locations of the indicators and pushbutton.
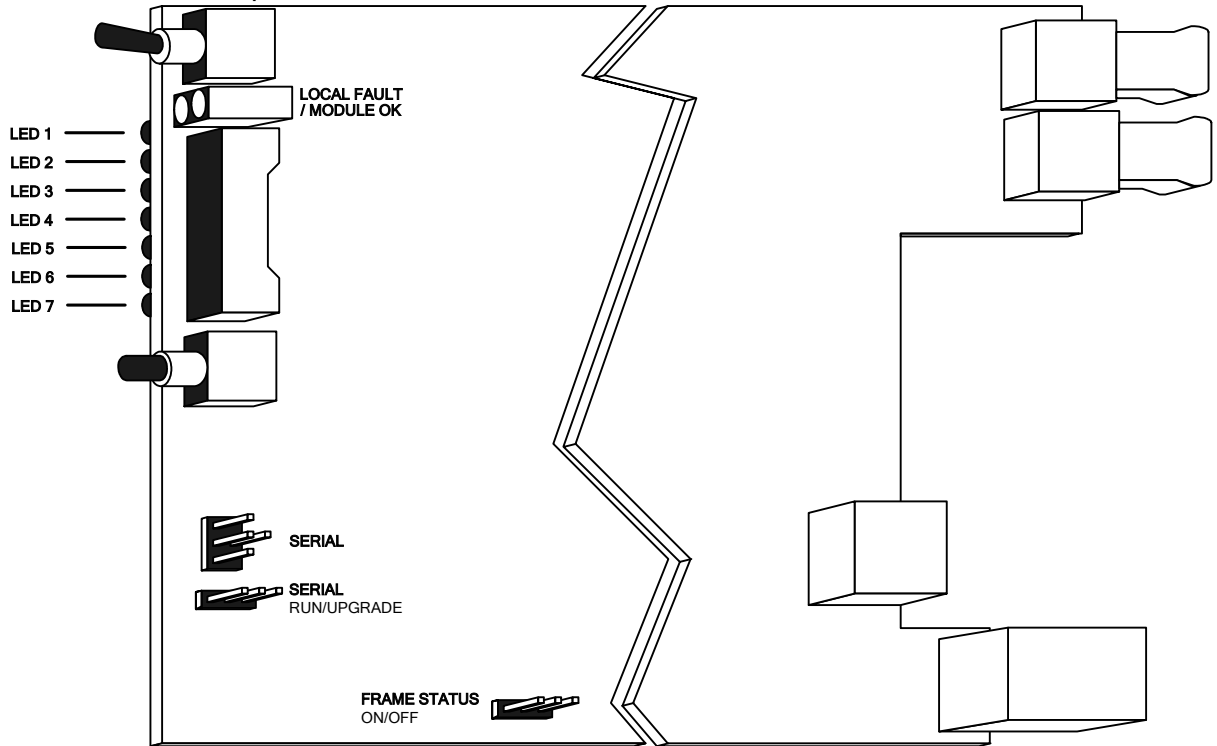
Figure 4-1: Location of Status Indicators and Jumpers

4.1. STATUS INDICATOR LEDS

LOCAL FAULT: This red LED indicates poor module health. Three conditions could cause this fault indication to be active: A link with a companion 7707GPS-DR has not been achieved, operation of the output laser is erroneous, or if a card power fault exists (i.e. a blown fuse). The LOCAL FAULT indication can also be reported to the frame by setting the FRAME STATUS jumper.

MODULE OK: This green LED indicates good module health. It will be on while a link is maintained with a companion 7707GPS-DR, the output laser is operating properly, and the card power is good.

LED1 – Red: Distance   LED will light if the length of fiber between the cards is too long. The cards must be connected by two fibers of equal length, with each fiber being less than 2 km long.

LED2 – Green: MSCA   LED will light when an MSC is connected to MSC port A.

LED3 – Green: MSCB   LED will light when an MSC is connected to MSC port A.

LED4 – Green: <u>GPSA</u>   LED will light when GPS timing pulses are detected coming from GPS port A on the GPS-DT. This indication is not affected by the values selected in the SRC menu.

LED5 – Green: <u>GPSB</u>   LED will light when GPS timing pulses are detected coming from GPS port B on the GPS-DT. This indication is not affected by the values selected in the SRC menu.

LED6 – Red: <u>PWRA</u>   LED will light when a power fault has been detected on GPS port A. This indication is not affected by the values selected in the SRC menu.

LED7 – Red: <u>PWRB</u>   LED will light when a power fault has been detected on GPS port B. This indication is not affected by the values selected in the SRC menu.

4.2.   CARD-EDGE DISPLAY AND CONTROLS

Additional signal and status monitoring is provided via the 4-digit dot-matrix display located at the card-edge. The card-edge pushbutton and toggle-switch are used to navigate through the display menu. Figure 4-2 provides a quick reference to the display menu structure.

Pressing the pushbutton advances the display to the next menu level. The toggle-switch may then be used to move up or down through selections of that menu level. Select BACK to return to previous menu level.

If a specific menu selection has a configuration value associated with it, then this may be changed using the toggle switch. Pressing the pushbutton will apply the displayed value and will return the user to the previous menu level.

The most recent user selection will be maintained in non-volatile memory in the event of power loss to the module.

	Menu Level 1	Menu Level 2	Menu Level 3	Menu Level 4
	Pushbutton⇨	Pushbutton⇨	Pushbutton⇨	Pushbutton⇨
	Menu Selections	Menu Selections:		
		BACK	Return to Level 1	
		PWR (Optical Power)	**Configuration Values:** **-40** to **+5** (dBm)	Return to Level 2
Toggle Switch	**LASR…ERR** (Laser Error) Overrides **LINK…LOS** (Link Loss) Overrides **OK**	**SRCA** (MSC-A Signal Source)	**Configuration Values** **GPSA** **GPSB**	Return to Level 2
		SRCB (MSC-B Signal Source)	**Configuration Values** **GPSA** **GPSB**	Return to Level 2
		VER (Version)	Version Information	Return to Level 2
		DISP (Display Direction)	**Configuration Values** **VERT** **HORZ**	Return to Level 2

Figure 4-2: Card-edge Menu Quick Reference

4.2.1. Displaying the Optical Power

The 7707GPS-DR can measure and display optical power over a range of –40 to +5dBm in 1dBm increments.

Please read the maximum optical input power specification for the specific product option you possess. Optical power monitoring is accommodated through the card-edge interface or *Vista*LINK®. To display the optical power to the card-edge select the PWR indication in menu level 1. The following list describes all possible indications for this menu selection:

–40 to **5**	Optical input power in dBm units
<–40	Optical input powers below –40dBm
>0	Optical input powers exceeding 0dBm
LINK…LOS	Link fault condition exists. Overrides other indications
LASR…ERR	Laser fault condition exists. Overrides other indications

4.3. SRCA AND SRCB GPS SIGNAL SOURCE SELECTION (7707GPS-DR)

To support the redundancy features of the 7707GPS cards, a number of options to select the GPS timing source output are available on the 7707GPS-DR card-edge or through *Vista*LINK®. These are accessed through the SRCA and SRCB options. There are four possible combinations outlined below:

Legend:
PPS Pulse and RX Lines (GPS->MSC):   – – – – – – – →

TX Serial Line (MSC->GPS):   ←————————

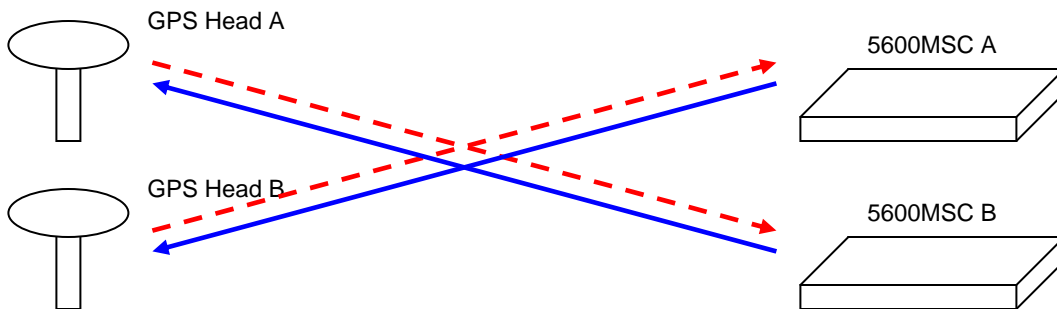### 4.3.1. Combination 1 Source Selections:

SRCA = GPSA, SRCB = GPSB
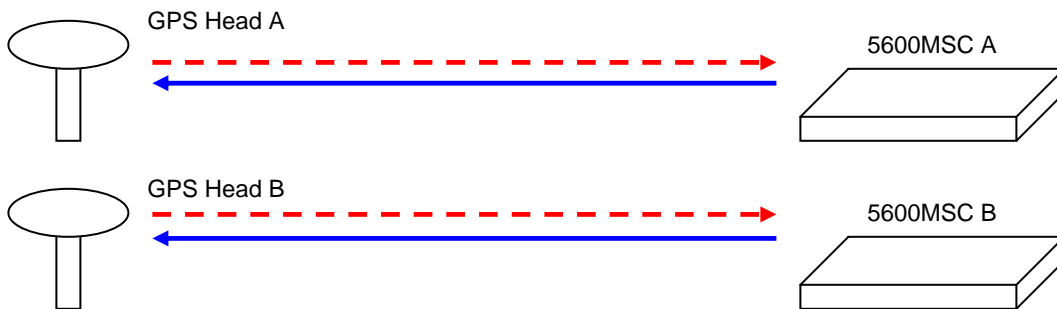
Comments: The default configuration; each GPS head is operational.

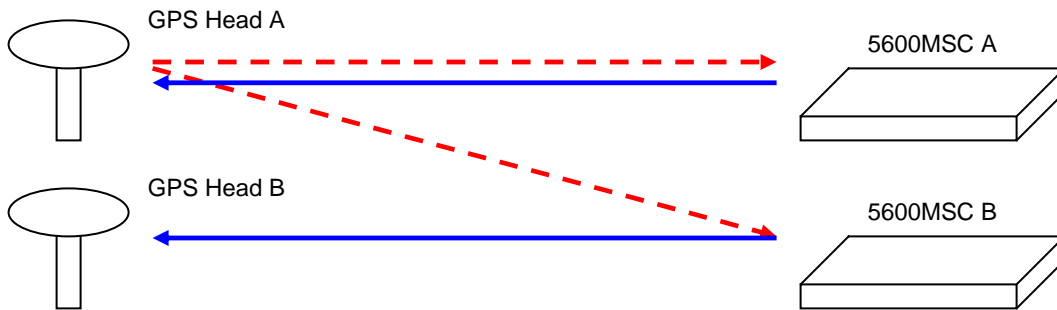
4.3.2. Combination 2 Source Selections:

SRCA = GPSB, SRCB = GPSA

Comments: The swapped configuration; all signal paths between GPS heads and 5600MSCs are swapped.


4.3.3. Combination 3 Source Selections:

SRCA = GPSA, SRCB = GPSA

GPS Head A

5600MSC A

GPS Head B

5600MSC B

Comments: GPS Head A is outputting timing signals to both 5600MSC units. Control signals from the 5600MSC units are going to their respective GPS heads. This configuration would be used if GPS Head B has had a hardware failure.

4.3.4. Combination 4 Source Selections:

SRCA = GPSB, SRCB = GPSB

GPS Head A

5600MSC A
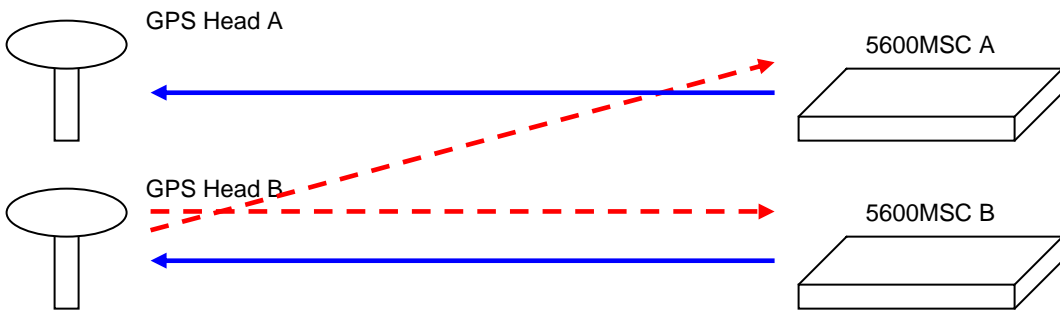
GPS Head B

5600MSC B

Comments: GPS Head B is outputting timing signals to both 5600MSC units. Control signals from the 5600MSC units are going to their respective GPS heads. This configuration would be used if GPS Head A has had a hardware failure.

4.3.5. Displaying Firmware Version

Scroll to the VER menu option on the card edge and select. The installed firmware version will be displayed on the card edge.

4.3.6. Card edge display orientation

The display configuration of th card edge can be configured for 3RU frame or 1RU frame. Scroll the card edge menu to DISP and select. The card edge can be the configured for VERT (verticle) or HORZ (horizontal) orientation.

5.   JUMPER CONTROLS

Several jumpers, located at the front of the module are used to preset various operating modes. Figure 4-1 shows the locations of the jumpers.

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

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

FRAME STATUS: To monitor faults on this module with the frame status indicators (on the Power Supply 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.

5.2.   CONFIGURING THE MODULE FOR FIRMWARE UPGRADES

RUN/UPGRADE: The RUN/UPGRADE jumper 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 binder for more information.

To upgrade the firmware in the module unit pull it out of the frame. Move the RUN/UPGRADE jumper J16 into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of the binder) onto SERIAL header J27 at the card edge. Re-install the module into the frame. Run the upgrade as described in *Upgrading Firmware* chapter in the front of the binder. 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.

6. *VISTA*LINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® is Evertz' remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. *Vista*LINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through *Vista*LINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, *Vista*LINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. An SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VL-Fiber demo Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz *Vista*LINK® enabled fiber optic products.

2. Managed devices, (such as 7707EO and 7707OE cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz *Vista*LINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC *Vista*LINK® frame controller module, which serves as the Agent.

3. A virtual database, known as the Management information Base (MIB), lists all the variables being monitored which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

For more information on connecting and configuring the *Vista*LINK® network, see the 7700FC Frame Controller chapter.

6.2. *VISTA*LINK® TRAPS

Fiber Link Loss	Indicates the loss of a valid optical link with a 7707CVDR module.
Loss of Video	Indicates the loss of a valid video input signal.
Laser Fault	Indicates deficient operation of the optical output laser (the state of the LASER FAULT LED).
Carrier Weak	Indicates the optical power is approaching optical receiver sensitivity limits.

Table 6-1: *Vista*LINK® Traps –All versions

Audio Silence 1	Indicates the silence of an Audio 1 input signal (the counter state of the AUDIO 1 PRESENT LED).
Audio Silence 2	Indicates the silence of an Audio 2 input signal (the counter state of the AUDIO 2 PRESENT LED).
Audio Silence 3	Indicates the silence of an Audio 3 input signal (the counter state of the AUDIO 3 PRESENT LED).
Audio Silence 4	Indicates the silence of an Audio 4 input signal (the counter state of the AUDIO 4 PRESENT LED).

Table 6-2: *Vista*LINK® **Traps –A4 version**