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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	May 2010

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1. OVERVIEW

The 7703PA series provide amplification of RF signals in the satellite extended L-Band range. Adjustable slope compensation is included. Typical applications include amplification and slope compensation to boost weak signals, drive long coax runs or provide a high power signal for passive distribution systems.

All models occupy one card slot and can be housed in a 1RU frame, which holds up to 3 modules, a 3 RU frame which holds up to 15 modules or a standalone enclosure, which holds a single module.

Features:

- Can be used as a wideband amplifier without slope compensation for signals from 40-2300MHz or as an amplifier with slope compensation for extended L-Band signals from 950-2150MHz
- Wide dynamic range (-10 to -60dBm)
- Protocol independent - handles all modulation formats
- Up to 0dBm output with low IMD
- Fully hot-swappable from front of frame
- Comprehensive signal and card status monitoring via four digit card edge display
- Up to 30 dB gain, adjustable in 0.5 dB steps
- AGC mode with adjustable target level to maintain a constant output level with varying input
- Cable slope compensation, adjustable up to 15dB in 1dB steps
- RF input power monitoring
- Remote monitoring through SNMP and VistaLINK® capability

7703PA:

- Single channel amplifier

7703PA-LNB:

- Single channel amplifier with built-in LNB power up to 400mA
- LNB power is 13/18VDC adjustable with built-in current limiting, current monitoring and 22KHz tone for LO control

7703PA-2:

- Dual channel amplifier

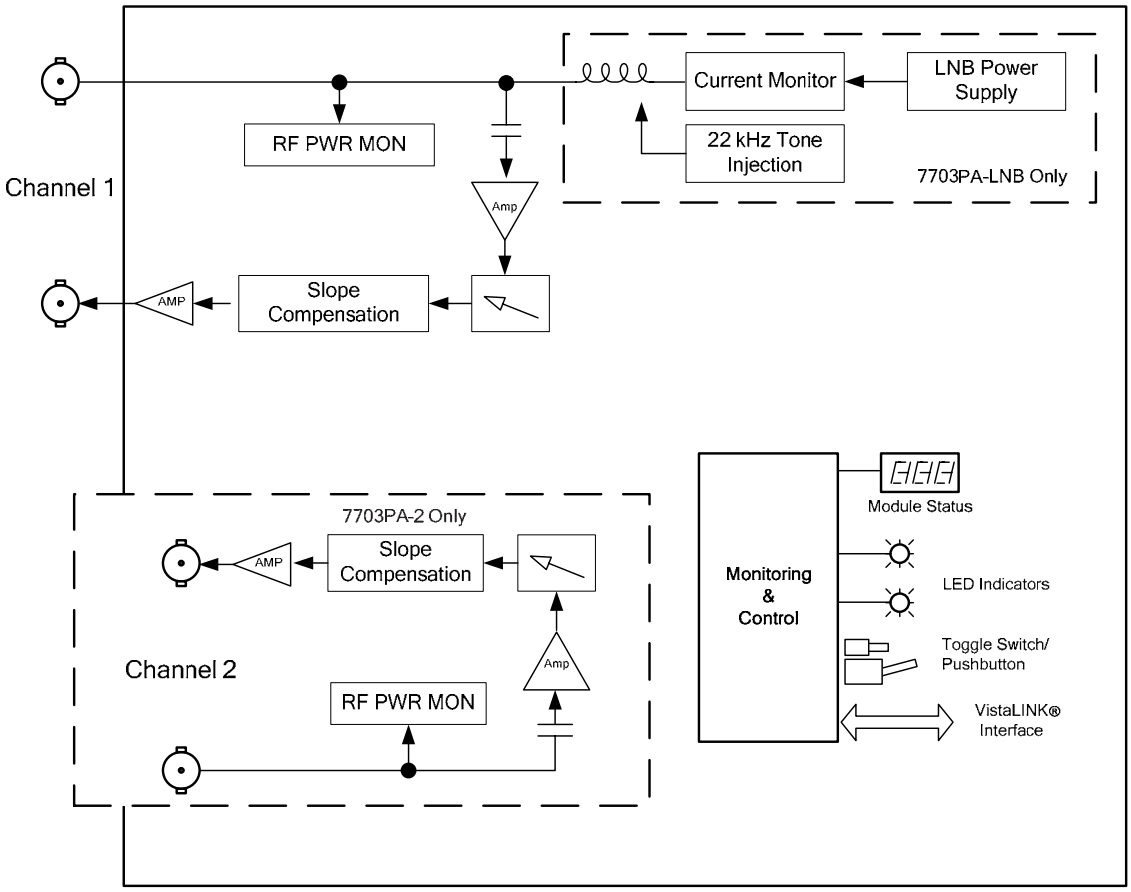

Figure 1-1: 7703PA, 7703PA-LNB, 7703PA-2 Block Diagram

2. INSTALLATION

The 7703PA and 7703PA-LNB both come with a companion rear plate that has 2 BNC type 75 Ohm connectors (F type, 50 Ohm BNC and SMA connectors are optional). The 7702PA-2 comes with a companion rear plate that has 4 connectors. For information on mounting the rear plate and inserting the module into the frame, see section 3 of the 7700FR chapter.

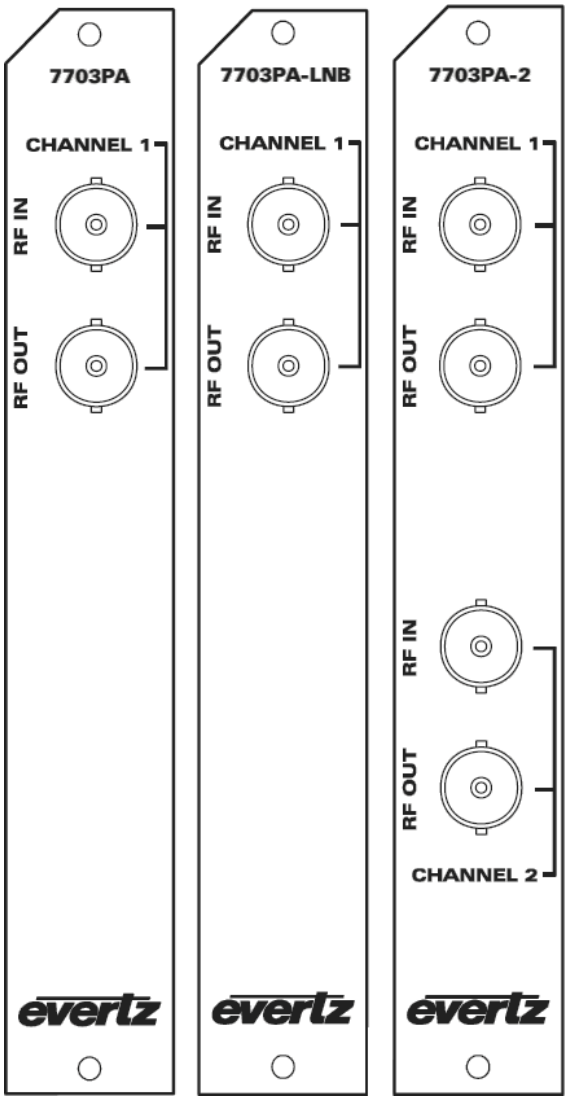

Figure 2-1: 7703PA, 7703PA-LNB and 7703PA-2 Rear Plates

RF IN: Input connector for satellite extended L-Band or wideband RF signals. This signal can be any modulation format. See section 3.1 for further details.

RF OUTPUT: One or two (7703PA-2) connectors with the output signal having applied gain and slope as set by the user.

3. SPECIFICATIONS

3.1. RF INPUT

Number of Inputs:
- **7703PA:** 1
- **7703PA-LNB:** 1
- **7703PA-2P:** 2

Connector: BNC per IEC 61169-8 Annex A (F-Type, 50 Ohm BNC and SMA optional)
Impedance: 75Ω (50Ω optional)
Frequency Range: 950-2150MHz with slope control
40-2300MHz with no slope compensation added
Return Loss:
- **950-2150MHz:** >15dB
- **40-2300MHz:** >10dB

Input Power Range: -10dBm to -60dBm
LNB Power:
- **Voltage:** 13V DC, 18V DC, off (selectable)
- **Current:** 400mA
- **Protection:** Short circuit, current limited
- **LO Control:** 22kHz on/off (selectable)

3.2. RF OUTPUT

Number of Outputs:
- **7703PA:** 1
- **7703PA-LNB:** 1
- **7703PA-2P:** 2

Connector: BNC per IEC 61169-8 Annex A (F-Type, 50 Ohm BNC and SMA optional)
Impedance: 75Ω (50Ω optional)
Return Loss: > 20dB
Gain: 0 - 30dB, adjustable in 1/2db steps
Slope: Adjustable, up to 15dB in 1dB steps across 950-2150MHz
IMD: < -45dBC (0dBm out, 10dB gain)
< -50dBC (0dBm out, 20dB gain)
< -55dBC (0dBm out, 30dB gain)
P1dB: +3dBm
Frequency Response (no slope applied):
950-2150MHz: ± 0.5dB
40 - 2300MHz: ± 2dB

3.3. ELECTRICAL

Voltage: +12V DC
Power:
- **7703PA:** 6 Watts
- **7703PA-LNB:** 15 Watts
- **7703PA-2:** 12 Watts

3.4. PHYSICAL (NUMBER OF SLOTS)

7700FR-C: 1
7800FR: 1
7701FR: 1

4. STATUS INDICATORS AND DISPLAY

4.1. CARD EDGE LEDS

Two large LEDs on the front of the board indicate the general health and alarm status of the module:

MODULE OK: This Green LED will be On when the module is operating properly and not extending any alarms.

LOCAL FAULT: This Red LED will be On when there is a fault in the module power supply, or any alarm conditions are present (i.e. RF input power or LNB current above or below alarm threshold settings)

There are 9 small LEDs below the two large LEDs that indicate the status of the module:

LED	Indication	Function
1	RED	RF Input Power Channel 1 is greater then or equal to the upper threshold setting.
	OFF	RF Input Power Channel 1 is less then the upper threshold setting.
2	GREEN	RF Input Power Channel 1 is less then the upper threshold setting and greater then the lower threshold setting.
	OFF	RF Input Power Channel 1 is less then the lower threshold setting or greater then the upper threshold setting.
3	YELLOW	RF Input Power Channel 1 is less then or equal to the lower threshold setting.
	OFF	RF Input Power Channel 1 is greater then the lower threshold setting.
4	RED	AGC Channel 1 is on but unable to maintain output power setting.
	GREEN	AGC Channel 1 is on and can maintain output power setting.
	OFF	AGC Channel 1 is off (manual mode).
5	RED	RF Input Power Channel 2 is greater then or equal to the upper threshold setting.
	OFF	RF Input Power Channel 2 is less then the upper threshold setting.
6	GREEN	RF Input Power Channel 2 is less then the upper threshold setting and greater then the lower threshold setting.
	OFF	RF Input Power Channel 2 is less then the lower threshold setting or greater then the upper threshold setting.

7	**YELLOW**	RF Input Power Channel 2 is less then the lower threshold setting or greater then the upper threshold setting.
	OFF	RF Input Power Channel 2 is less then the lower threshold setting or greater then the upper threshold setting.

8	**RED**	AGC Channel 2 is on but unable to maintain output power setting.
	GREEN	AGC Channel 2 is on and can maintain output power setting.
	OFF	AGC Channel 2 is off (manual mode).

9	**RED**	LNB SHORT (FAULT)
	GREEN	LNB OK (NO FAULT)
	OFF	LNB OFF

4.2. DOT-MATRIX DISPLAY

Additional signal and status monitoring and control over the card's parameters are provided via the 4-digit alphanumeric display located on the card edge. To select one of two menu display modes, press the toggle switch. To go to the sub-menu press the pushbutton once and press the toggle switch to select the sub-menu. When in a particular display mode, press the pushbutton to display the value and use the toggle switch to change values (if applicable) and to see what status is being displayed for the particular menu item. Table 4-1 provides a quick reference to the display menu structure.

Level 1	Level 2	Level 3	Level 4	Level 5	Level 6
DEFD selection	BACK				
	CTRL	BACK			
		RFTH	LWR	CH1 CH2	0 to -60 dBm Default: -60 dBm
			UPPR	CH1 CH2	0 to -60 dBm Default: 0 dBm
		MODE	CH1 CH2	MAN (default) AGC	
		GAIN (visible in manual mode only)	CH1 CH2	0 to 30dB default: 0dB	
		OUTL (visible in AGC mode only)	CH1 CH2	0 to -50dBm default: -20dBm	
		SLP	CH1 CH2	0-15 default: 0	
		LNBV (visible only on –LNB version)	18 13 OFF		
		22KT (visible only on –LNB version)	ON OFF		
		LNTH (visible only on –LNB version)	LWR	0 to 500mA default: 0	
			UPPR	0 to 500mA default: 500	
		DEFD	Fault status(default) LNBC CH1 CH2	 PWR PWR	
		DISP	HORZ VERT (default)		
	STAT	BACK			
		PWR	0 to -60dBm	CH1 CH2	
		RFTH	LWR	CH1 CH2	0 to -60 dBm
			UPPR	CH1 CH2	0 to -60 dBm
		MODE	CH1 CH2	AGC MAN	

		GAIN (visible in manual mode only)	CH1 CH2	0 to 31.5dB	
		OUTL (visible in AGC mode only)	CH1 CH2	0 to -50dBm	
		SLP	CH1 CH2	0-15	
		LNBV (visible only on –LNB version)	18 13 OFF		
		22KT (visible only on –LNB version)	ON OFF		
		LNBC (visible only on –LNB version)	0 to 500mA / SHORT		
		LNTH (visible only on –LNB version)	LWR UPPR	0 to 500mA 0 to 500mA	
		VER	Firmware Version		

Table 4-1: Card Edge Menu Structure

4.2.1. Setting the Input RF Alarm Threshold Levels

The input RF level alarm thresholds can be set by entering into the *RFTH* menu. From here, the user can select either the *LWR* or *UPPR* option and the *CH1* or *CH2* option. Toggling the switch will move through a range of values in 1dBm increments. Hitting the pushbutton will select the displayed value.

CTRL
- *RFTH*
  - *LWR / UPPR*
    - *CH1 / CH2*
      - *0 to -60dBm*

LWR	Sets the lower RF threshold level. Default of -60dBm.
UPPR	Sets the upper RF threshold level. Default of 0 dBm.
CH1	Channel 1 threshold.
CH2	Channel 2 threshold.
0 to -60dBm	RF threshold range (in dBm units).

4.2.2. Setting the Gain Mode

To adjust the gain mode, enter the *Mode* menu setting. In AGC mode, the card will automatically apply up to 30dB of gain to the input signal in order to maintain the AGC target output level (see section 4.2.4 for information on setting this level). In manual gain control mode, the output level will be offset from the input level by the amount of applied gain (see section 4.2.3 for information on setting the gain).

CTRL *MODE* *CH1 / CH2* *AGC* *MAN*	*CH1* Channel 1 gain mode. *CH2* Channel 2 gain mode. *AGC* Enables Automatic Gain Control mode. *MAN* Enables manual control. (default)

4.2.3. Setting the Gain

CTRL *GAIN* *CH1 / CH2* *0 to 30dB*	Sets the fixed amount of applied gain. Visible in manual mode only. *CH1* Channel 1 gain. *CH2* Channel 2 gain. *0 to 30dB* RF gain range (in dB units). Default of 0dB.

4.2.4. Setting the AGC RF Output Target Level

The 7703PA can apply up to 30dB of gain in AGC mode and therefore will only be able to maintain the AGC output target level as long as it is not more than 30dB higher than the applied input signal. If the input signal level is outside of the AGC hold range, the card will apply maximum or minimum gain as appropriate, and the output level will track the input until the input falls back with AGC hold range.

Note that the AGC target level is based on the signal without any slope applied. Adding slope compensation will increase signal power at higher frequencies, therefore it may be necessary to lower the AGC target level to compensate and maintain the desired output composite power level.

CTRL *OUTL* *0 to -50dBm*	Sets the RF output power target in AGC mode. Visible in AGC mode only. *0 to -50dBm* RF output power range. Default of -20dBm.

4.2.5. Setting the Slope Correction Level

The applied slope is optimized for signals in the L-Band or extended L-Band range from 950-2150MHz, with the slope pivot point at 950MHz. Figure 4-1 illustrates the approximate frequency response of the 7703PA with different gain and slope levels applied.

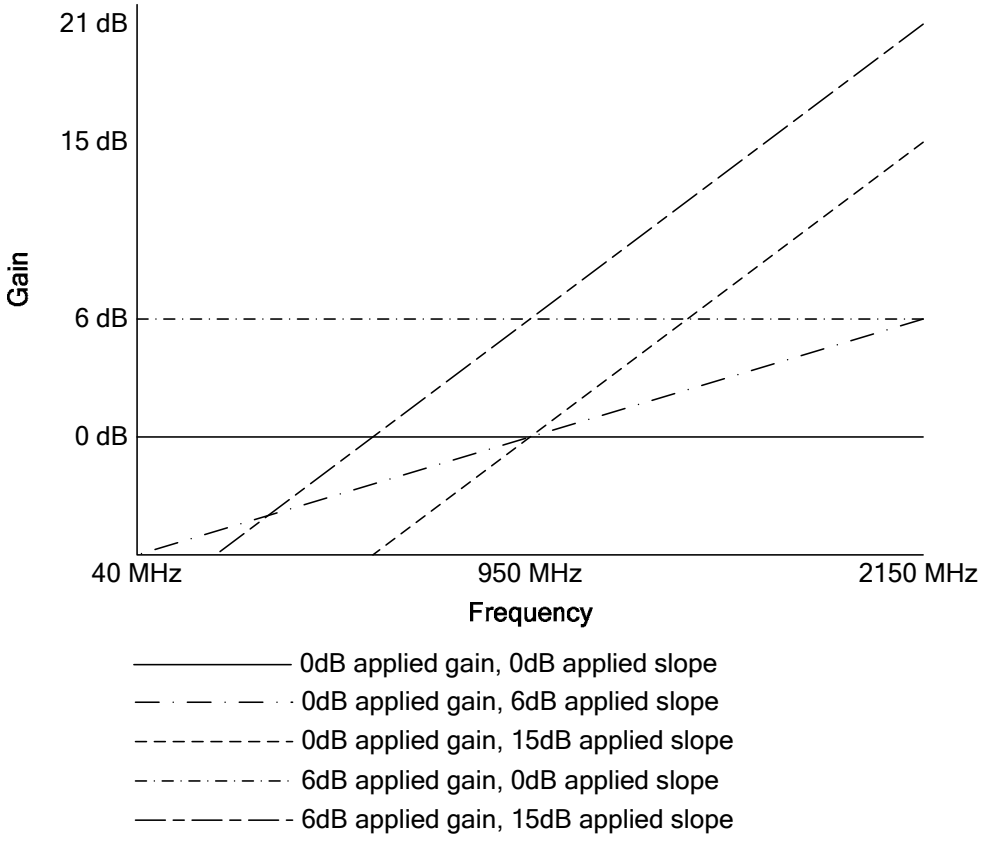

Figure 4-1: Approximate Frequency Response Characteristics with Different Slope and Gain Levels

CTRL *SLP* *CH1 / CH2* *0 to 15*	Sets the amount of RF slope correction to be added. *CH1* Channel 1 slope. *CH2* Channel 2 slope. *0 to 15* RF slope range. Default of 0.

4.2.6. LNB Voltage Level

CTRL *LNBV* *18V* *13V* *OFF*	Sets the LNB output voltage. Visible on -LNB versions only. *18V* Sets the LNB output voltage to 18 volts. *13V* Sets the LNB output voltage to 13 volts. *OFF* Disables the LNB output voltage.

4.2.7. 22KHz Tone

CTRL *22KT* *ON* *OFF*	Enables the 22KHz tone on the LNB voltage output. Visible on -LNB versions only. The default setting is *OFF*. *ON* Enables the 22KHz tone. *OFF* Disables the 22KHz tone.

4.2.8. LNB Current Threshold Levels

CTRL *LNTH* *LWR / UPPR* *0 to 500mA*	*LWR* Sets the low LNB current alarm threshold. Default of 0. *UPPR* Sets the high LNB current alarm threshold. Default of 500. *0 to 500mA* RF threshold range.

4.2.9. Default Card-Edge Display

This allows the user to select which operating condition will be the top-level item on the dot-matrix display. The default is NORM, which displays “OK” as long as local power to the board is available. The table below provides a list of alternate parameters.

CTRL *DEFD* *NORM* *LNBC* *CH 1 / CH 2* *PWR*	*NORM* Local power status. *LNBC* Measured LNB current. *CH1* RF Input Power Channel 1. *CH2* RF Input Power Channel 2. *PWR* Measured RF Input power, channel 1 or channel 2 as selected above.

4.2.10. Setting the Display Orientation

The *DISP* option allows the user to set a horizontal or vertical orientation for the card edge display. To set the display orientation, select the *CTRL* menu item in the first menu level, then use the toggle switch to show the *DISP* menu selection and use the pushbutton to select it. Use the toggle switch to change between *HORZ* and *VERT*. Press the push button to make your selection.

CTRL *DISP* *HORZ* *VERT*	*HORZ* Horizontal display used when the module is housed in the one-rack unit 7701FR frame or the stand-alone enclosure. *VERT* Vertical display used when the module is housed in the three-rack unit 7800FR frame.

4.2.11. Displaying the RF Input Power

The 7703PA detects the RF input power level and displays this on the four-digit card edge display. Note that this power level is a measure of the total composite signal power entering the card.

- *STAT*
  - *PWR*
    - *0 to -60dBm*
      - *CH 1 / CH 2*

Displays the RF input power level.

0 to -60dBm	RF input power range (in dBm units).
CH1	RF Input Power Channel 1.
CH2	RF Input Power Channel 2.

4.2.12. Displaying the RF Input Alarm Thresholds

- *STAT*
  - *RFTH*
    - *LWR / UPPR*
      - *0 to -60dBm*
        - *CH 1 / CH 2*

LWR	Indicates the low RF alarm threshold level.
UPPR	Indicates the high RF alarm threshold level.
0 to -60dBm	RF threshold range (in dBm units).
CH1	Channel 1 threshold.
CH2	Channel 2 threshold.

4.2.13. Displaying the Gain Mode Setting

- *STAT*
  - *MODE*
    - *CH 1 / CH 2*
      - *AGC*
      - *MAN*

Indicates whether the gain mode setting is in AGC or manual.

CH1	Channel 1 gain mode.
CH2	Channel 2 gain mode.

4.2.14. Displaying the Gain Setting

- *STAT*
  - *GAIN*
    - *CH 1 / CH 2*
      - *0 to 31.5 dB*

Indicates the amount of gain applied to the input signal. Visible in manual mode only.

CH1	Channel 1 gain.
CH2	Channel 2 gain.
0 to 31.5 dB	RF gain range (in dB units).

4.2.15. Displaying the AGC Output Power Target Level

STAT *OUTL* *CH 1 / CH 2* *0 to -50dBm*	Indicates the RF output power target in AGC mode. Visible in AGC mode only. *CH1* Channel 1 AGC target. *CH2* Channel 2 AGC target. *0 to -50dBm* RF output power range.

4.2.16. Displaying the Slope Correction Level

CTRL *SLP* *CH1 / CH2* *0 to 15*	Displays the RF slope correction level. *CH1* Channel 1 slope. *CH2* Channel 2 slope. *0 to 15* Slope range in dB.

4.2.17. Displaying the LNB Voltage Level

STAT *LNBV* *18V* *13V* *OFF*	Indicates the LNB output voltage. *18V* LNB output voltage is set to 18 volts. *13V* LNB output voltage is set to 13 volts. *OFF* LNB output voltage is disabled.

4.2.18. 22KHz Tone Status

STAT *22KT* *ON* *OFF*	Indicates whether the 22KHz tone on LNB output is enabled or disabled. Visible on -LNB versions only. *ON* 22KHz tone is enabled. *OFF* 22KHz tone is disabled.

4.2.19. Displaying the LNB Current

STAT *LNBC* *0 to 500mA* *Short*	Indicates the LNB current. Visible for -LNB versions only. *0 to 500mA* LNB current range. *Short* Short on LNB DC supply.

4.2.20. Displaying the LNB Current Threshold Level

STAT	*LWR*	Indicates the lower LNB current threshold level.
LNTH	*UPPR*	Indicates the upper LNB current threshold level.
LWR / UPPR		
0 to 500	*0 to 500mA*	LNB current threshold range.

4.2.21. Displaying the Firmware Version

The *VER* display shows the firmware version and build number of the 7703PA(-LNB)(-2) firmware. The message will scroll across the display.

For example: *VER 1.0 BLD 067*

5. JUMPERS AND USER ADJUSTMENTS

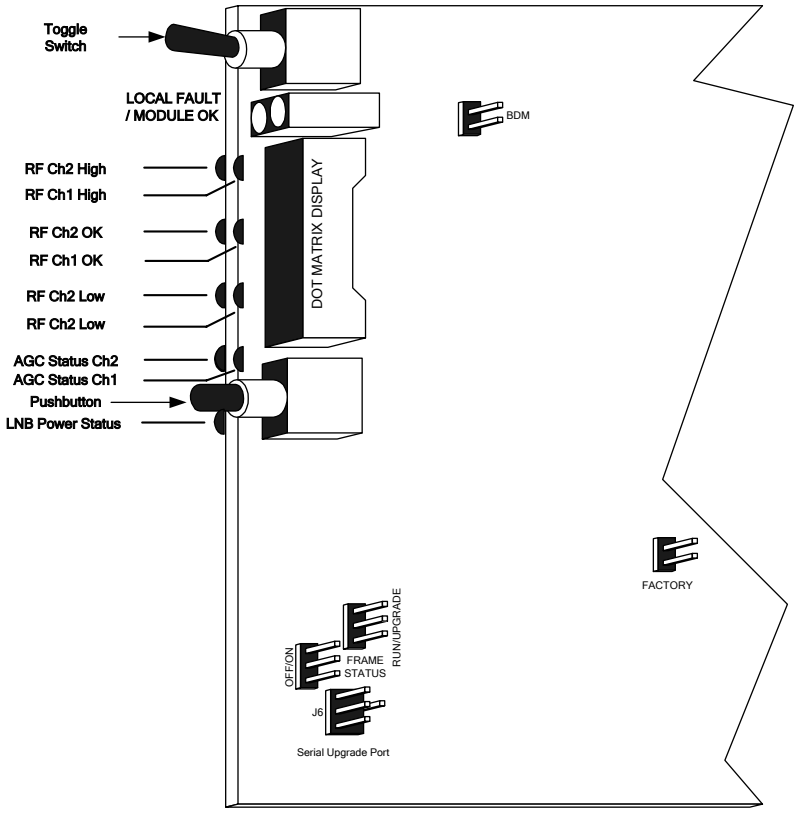

Figure 5-1: Jumper / LED Locations

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

The FRAME STATUS jumper J3, 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.

FRAME STATUS: 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. On Rev 1 and A boards install the jumper. (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

UPGRADE: The UPGRADE jumper J5 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 the UPGRADE jumper into the *UPGRADE* position. Install the Upgrade cable provided (located in the vinyl pouch in the front of this manual) onto the SERIAL header J14 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 the UPGRADE jumper into the *RUN* position, remove the upgrade cable and re-install the module. The module is now ready for normal operation.

5.3. FACTORY AND BDM JUMPERS

When shipped from the Evertz facility, the FACTORY and BDM jumpers will not be installed. These jumpers ***should not*** be installed for any reason. If jumpers are on these positions they should be removed.

6. VISTALINK® REMOTE MONITORING/CONTROL

6.1. WHAT IS VISTALINK®?

VistaLINK® is Evertz's 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. VistaLINK® 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 VistaLINK® 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, VistaLINK® 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 VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.

2. Managed devices (such as 7703PA(-LNB)(-2) cards), each with a unique address (OID), communicate with the NMS through an SNMP Agent. Evertz VistaLINK® enabled 7700 series modules reside in the 3RU 7700FR-C MultiFrame and communicate with the manager via the 7700FC VistaLINK® 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 VistaLINK® network, see the 7700FC Frame Controller chapter.

6.2. VISTALINK® MONITORED PARAMETERS

The following parameters can be remotely monitored through the VistaLINK® interface.

Parameter	Description
RF Input Power	A range of values describing received RF power at the input.
RF Input Power Threshold	A range of values indicating the lower/upper RF threshold levels.
Gain Mode	Indicates RF mode setting.
RF Gain	A range of values indicating RF gain setting.
RF Output Level	A range of values indicating RF power target setting.
Slope Correction	Displays the RF slope correction level.
LNB Voltage Level	Indicates LNB voltage levels.
22KHz Tone	Indicates the on/off status of the 22KHz tone.
LNB Current	A range of values indicating the LNB current.
LNB Current Threshold	A range of values indicating the LNB current threshold.
Firmware Version	Displays firmware version number.

Table 6-1: VistaLINK® Monitored Parameters

6.3. VISTALINK® CONTROLLED PARAMETERS

The following parameter can be remotely controlled through the VistaLINK® interface.

Parameter	Description
RF Input Power Threshold	Sets the value of the input upper/lower thresholds.
Gain Mode	Sets the mode level.
RF Gain	Sets the gain level.
RF Output Level	Sets the RF power target level.
Slope Correction	Sets the RF slope correction level.
LNB Voltage Level	Sets the LNB voltage level.
22KHz Tone	Enables the 22KHz tone.
LNB Current Threshold	Sets the LNB threshold level.
Display	Sets the horizontal/vertical display orientation.

Table 6-2: VistaLINK® Controlled Parameters

6.4. VISTALINK® TRAPS

The following traps can be controlled through the VistaLINK® interface. Each trap will indicate a fault condition when its value is True.

Trap	Description
RF Input Power High	Input power is above the threshold.
RF Input Power Low	Input power is below the threshold.
AGC Out of Range	AGC is out of range.
LNB Short	Short on LNB DC supply.
LNB Current High	LNB current is above the threshold.
LNB Current Low	LNB current is below the threshold.

Table 6-3: VistaLINK® Traps