Telecast Fiber Solutions

CommLink TR6442i User Guide

M4050-9900-102

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grass valley

A **BELDEN** BRAND

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Title	CommLink TR6442i User Guide
Part Number	M4050-9900-102
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About CommLink TR6442i

This chapter provides an overview of the CommLink TR6442i Fiber Optic Intercom Link and includes the safety and warranty information about it.

About CommLink TR6442i

CommLink™ TR6442i Intercom Link is a fiber-optic transceiver system that uses one strand of fiber to carry two channels of production intercom, allowing robust voice and data connectivity over distances up to 40KM (about 25 miles). The CommLink utilizes Wavelength Division Multiplexing (WDM) for bidirectional signal transmission on a single fiber strand. Hence, all fiber links must consist of a 1310nm unit at one end and a 1550nm unit at the other. See Wavelength-Division Multiplexing (WDM) on page 7 for information about Wavelength-Division Multiplexing (WDM) and the use of CommLink units.

The CommLink is compatible with the industry's most popular intercom systems:

- Party line
    - Clear-Com®
    - RTS® TW
- Digital Matrix
    - Clear-Com® MatrixPlus/Eclipse
    - RTS® Adam/Cronus/Zeus
- Generic 4-Wire and Data
    - Two Channels of bidirectional audio
    - Two paths of bidirectional dataRS422 or RS485

In a special usage case, multi-strand fiber optic cable can be used to more than one signal - one to the CommLink TR6442 and one carrying HD Video (see Example CommLink TR6442i Fiber Optic Intercom Link Usage Scenarios on page 22).

About this User Guide

This User Guide is designed to cover all of the various options, so not every page in this guide will apply to your specific system.

Unpacking the CommLink TR6442i Fiber Optic Intercom Link

Individual items shipped with a CommLink TR6442i system depend on the particular configuration.

Please consult your packing slip and purchase order to ensure that you have received all of the expected components. Inspect all components for scratches and other mechanical damage, and inspect the electrical connectors for bent or damaged pins and latches. Report any missing or damaged components to Grass Valley. See Product Returns on page 3.

You must use your own video and audio cables to make connections for Video, Tally, Black Burst/Genlock, Base Station monitor, intercom, and other ancillary signals and equipment. Suggestions for these cables are discussed later in this User Guide.

Product Returns

In the unlikely event of damage to your CommLink TR6442i Fiber Optic Intercom Link during shipping or delivery, take note of any damage with the delivery or shipping service. If any component does not work correctly out of the box, contact Grass Valley (see Contact Us on page 37).

If the problem cannot be remedied through a service telephone, you will receive an RMA number (Return of Merchandise Authorization). Take note this RMA number inside and outside of all shipping boxes and on all documentation provided with the items to be returned.

Ordering Information

Part Number	Description
MTR6442i-MML-13	Intercom transceiver & 4W/2W hybrid (w/autonull), RTS & C-C, MiniMussel, 1 SM fiber: int WDM @ 1310nm, ST connector. Requires (M)TR64421-15.
MTR6442i-MML-15	Intercom transceiver & 4W/2W hybrid (w/autonull), RTS & C-C, MiniMussel, 1 SM fiber: int WDM @ 1550nm, ST connector. Requires (M)TR64421-13.
TR6442i-13	Intercom transceiver & 4W/2W hybrid (w/autonull), RTS & C-C, V2 rackmount, 1 SM fiber: int WDM @ 1310nm, ST connector. Requires (M)TR64421-15.
TR6442i-15	Intercom transceiver & 4W/2W hybrid (w/autonull), RTS & C-C, V2 rackmount, 1 SM fiber: int WDM @ 1550nm, ST connector. Requires (M)TR64421-13.
MTR6442i-13	Intercom transceiver & 4W/2W hybrid (w/autonull), RTS & C-C, V2 throw down, 1 SM fiber: int WDM @ 1310nm, ST connector. Requires (M)TR64421-15.
MTR6442i-15	Intercom transceiver & 4W/2W hybrid (w/autonull), RTS & C-C, V2 throwdown, 1 SM fiber: int WDM @ 1550nm, ST connector. Requires (M)TR64421-13.
ADAP-AC-04	AC Power Adapter for MML units; 120/240 VAC in; 4-pin XLR; 4A; 15 VDC
ADAP-AC-04LC	AC Power Adapter for Viper2 units; 120/240 VAC in; 2.5mm circ; 4A; 15 VDC
TDK-TR6442i-13 and TDK-TR6442i-15	Rack-mount to Throw Down conversion kit
RMK-TR6442i-13 and RMK-TR6442i-15	Throw Down to Rack-mount conversion kit

2 System Overview

This chapter presents an overview of the CommLink TR6442i Fiber Optic Intercom Link componenets and options.

Fiber Overview

Fiber Optics and Fiber Optic Cable are at the heart of the CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link System. The Commlink system features the ability to multiplex and de-multiplex a variety of video, audio, and data signals so that they can be carried over a thin strand of Fiber Optic cable for long distances.

The specific theory and operation of Fiber Optics is beyond the scope of this document, but you need to be aware of the different types of Fiber Optic Cable and Fiber Optic Cable Connectors. Most CommLink TR6442i Fiber Optic Intercom Link applications will use Single Mode Fiber with ST Connectors.
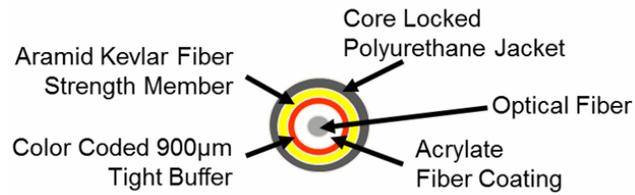
Fig. 2-1: Single Mode Fiber Optic Cable Cross-Section

Wavelength-Division Multiplexing (WDM)

Fiber optic transmission depends on Wavelength-Division Multiplexing (WDM). With WDM, a number of optical carrier signals can be carried on a single optical fiber by using different wavelengths of laser light. The full theory of WDM is beyond the scope of this manual, but it is important to understand that by using equipment with different WDM factors on either end of a fiber optic cable, signals can be sent in both directions over that single cable. The CommLink units use a WDM factor of 1310 nm and a WDM of 1550 nm to provide a complementary pair.

In practice, any CommLink setup requires one unit with a 1310 nm WDM factor and one unit with a 1550 nm WDM factor. Any 1310 nm unit can be used with any 1550 nm unit regardless of physical form. Two units with the same WDM factor will not work regardless of the physical form.

Figure 2-2 displays how any 1310 nm WDM CommLink unit can be paired with any 1550 nm WDM unit. Select one form factor at 1310 nm and pair the 1310 nm unit with one form factor at 1550 nm.
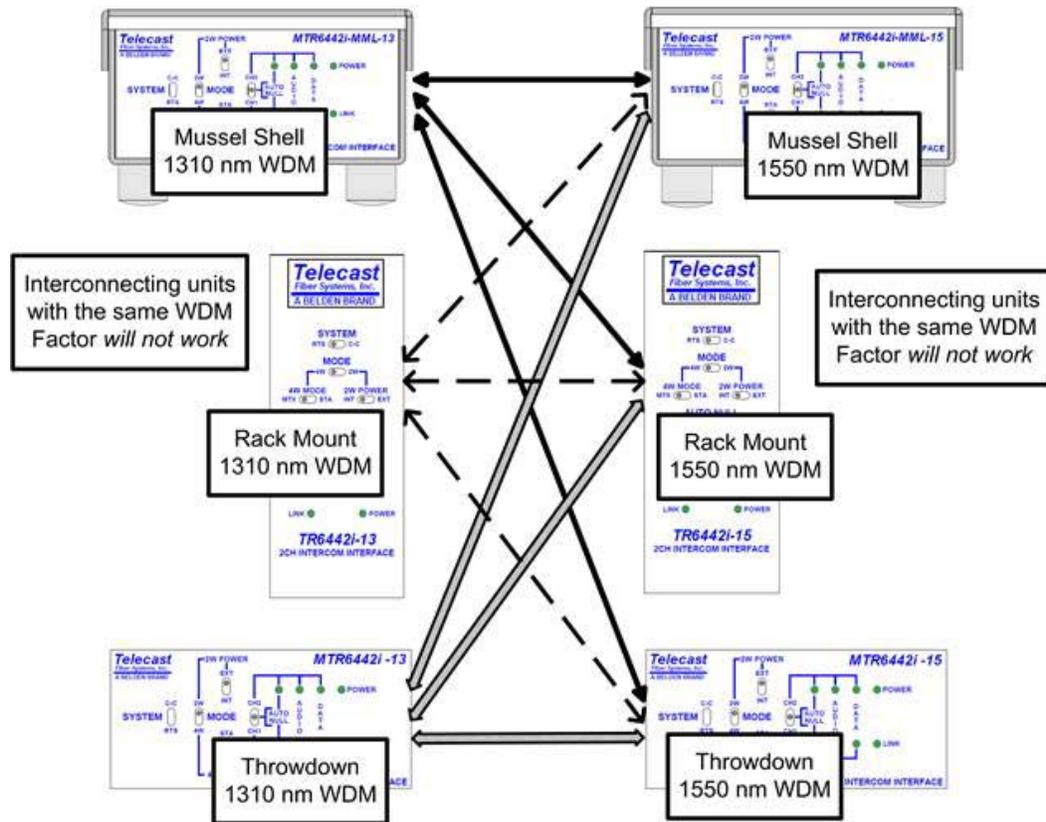
Fig. 2-2: Pairing Different WDM Factor CommLink Units
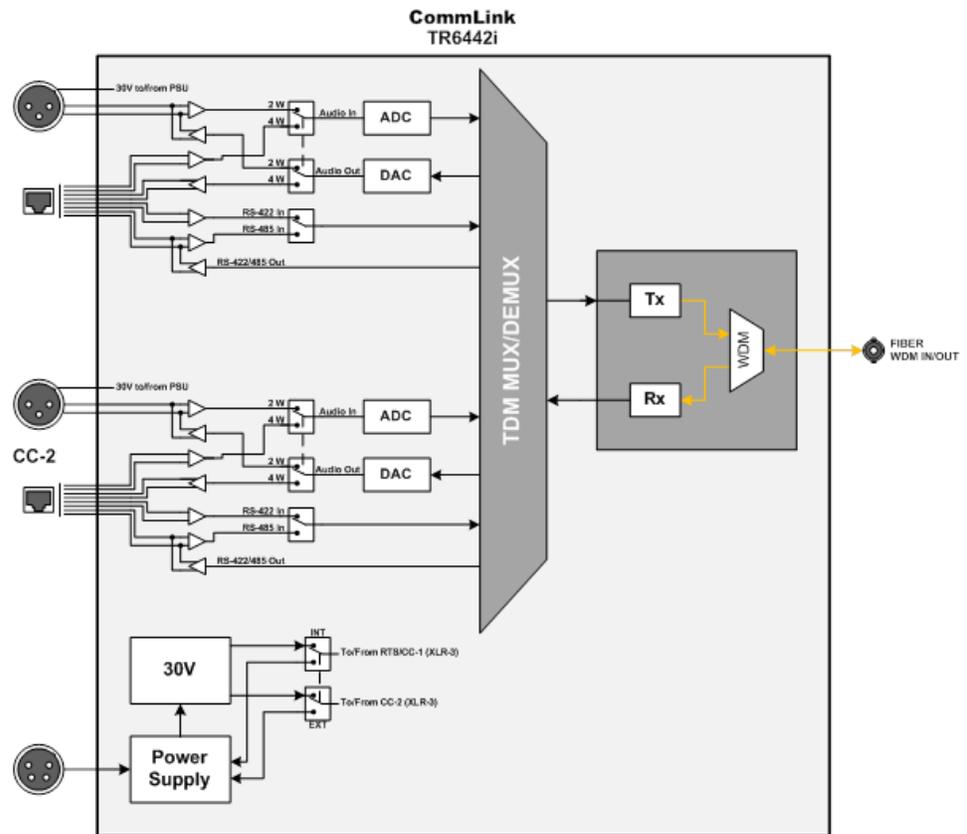
Fig. 2-3: CommLink Block Diagram

CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link Components

The three physical types of the CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link work identically. The variations between them lie in their physical appearance and in how they are powered.

In this section, the "throwdown" version of the CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link is used to illustrate functionality. The variations for the other two types of CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link (Rack Mount and Mini-Mussel Shell) are explained in later sections. See Installing the CommLink TR6442i Fiber Optic Intercom Link in the Viper II Rack on page 39 for information about the installation of the CommLink TR6442i Fiber Optic Intercom Link rack mount version in the Viper II rack.

CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link Front Panel
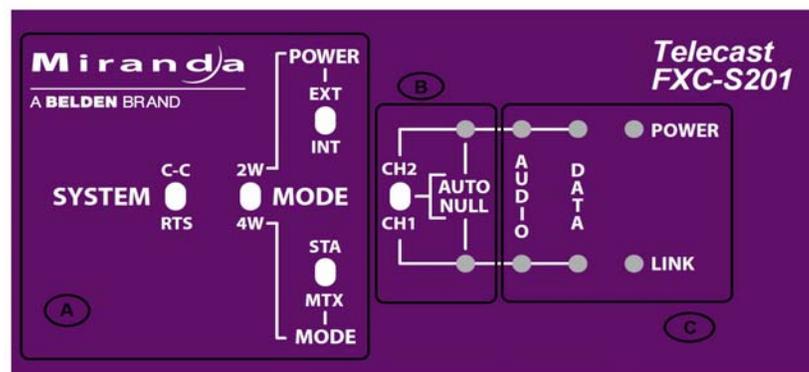
Fig. 2-4: CommLink TR6442i Fiber Optic Intercom Link Throw Down Front Panel

The CommLink TR6442i Fiber Optic Intercom Link has three features:

- **Area A**: System Configuration Switches
- **Area B**: Auto Null Control and Indicators
- **Area C**: System Status Indicators

Area A - System Configuration Switches

The four switches in this section allow the configuration of the CommLink TR6442i Fiber Optic Intercom Link for the particular intercom environment in use. See Example CommLink TR6442i Fiber Optic Intercom Link Usage Scenarios on page 22 below on operation of the CommLink TR6442i Fiber Optic Intercom Link for examples of how these switches interact.
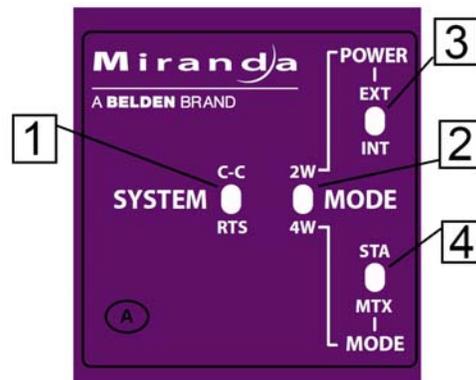
Fig. 2-5: System Configuration switches

- **1: System Switch** - sets the CommLink TR6442i Fiber Optic Intercom Link in either RTS mode or Clear-Com (C-C) mode
- **2: Mode Switch** - sets the CommLink TR6442i Fiber Optic Intercom Link in either Two Wire (2W) or Four Wire (4W) mode
- **3: 2W Power Switch** - sets the CommLink TR6442i Fiber Optic Intercom Link power mode to either externally powered (EXT) or internally powered (INT). This switch is only operational when the Mode Switch is set to 2W.
- **4: 4W Mode Switch** - sets the CommLink TR6442i Fiber Optic Intercom Link to run in Station (STA) mode or Matrix (MTX) mode. This switch is only operational when the Mode Switch is in 4W mode.

When connecting two CommLink TR6442i Fiber Optic Intercom Link units via fiber cable each CommLink TR6442i Fiber Optic Intercom Link unit must be independently set for the configuration requirements at that CommLink TR6442i Fiber Optic Intercom Link unit.

Area B - Auto Null Operation
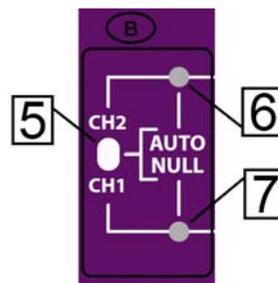
Fig. 2-6: Auto Null switch and indicator

Please see Using the Auto-Null Function on page 32 below on the Auto Null function.

- **5: Auto Null switch**: this three-position spring-loaded momentary switch activates the Auto Null process for either Channel 1 (CH1) or Channel 2 (CH2).

- **6: Channel 1 Auto Null Activity Indicator**: blinks Green while the Nulling process occurs.

    - This indicator will be asolid Green to indicate the process is complete and good.

    - This indicator will be Red if there was a problem with the null. (see Using the Auto-Null Function on page 32 on operating the Auto Null feature)

- **7: Channel 2 Auto Null Activity Indicator**: behaves the same as the Ch1 Auto Null activity indicator

Area C - System Status Indicators
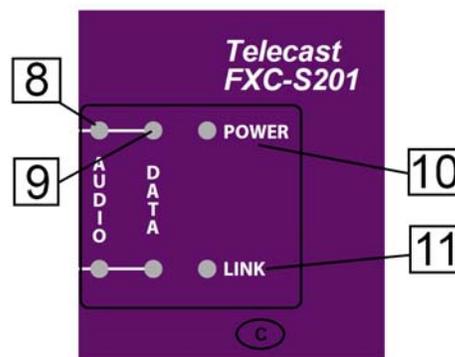
Fig. 2-7: System Status Indicators

- **8: Audio Activity Indicator**
    - Green when audio activity is below 0 db
    - Red when audio activity is above 0 db
- **9: Data Activity Indicator**
    - Green when there is data activity on the particular channel
- **10: Power Indicator**
    - Green indicates power
- **11: Link Status Indicator**
    - Green indicates link is good
    - Red indicates link is bad or non-existent.

CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link Back Panel
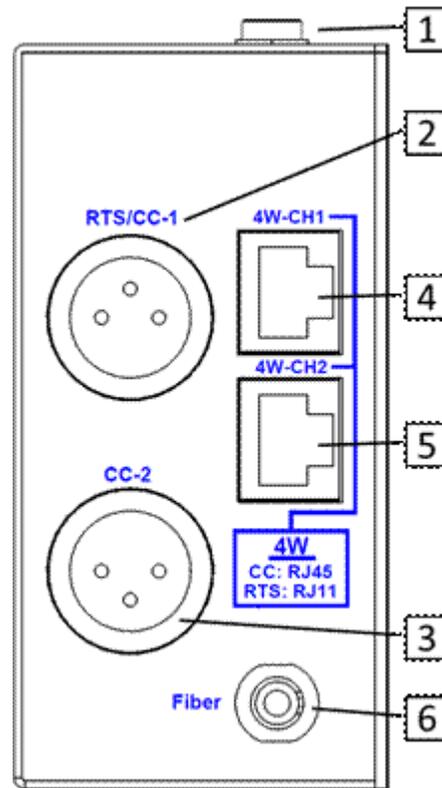
Fig. 2-8: CommLink Throw Down Back Panel

- **1**: **Power Connector** (MTR6442i Throw Down and TR6442i Rack Mount versions only)

  This connector takes a 2.5 mm locking power plug. The recommended power unit is the ADAP-AC-04LC (see CommLink TR6442i Fiber Optic Intercom Link Power Options on page 16 for more information regarding CommLink TR6442i Fiber Optic Intercom Link power options)

- **2**: **RTS/CC-1 Chassis Mounted XLR Connector** - for RTS TW operation or Channel 1 of Clear-Com two wire operation

- **3**: **CC-2 Chassis Mounted XLR Connector** - for Channel 2 of Clear-Com two wire operation. Not active when the system is in RTS-TW mode.

  Connectors 4 and 5 operate in one of 4 modes, depending on system configuration. These connectors can be used with RJ45 cables or RJ11 cables. See CommLink TR6442i Fiber Optic Intercom Link Matrix and Station Connectors on page 14 for more information and for wiring information.

- **4**: **4W-CH1 Connector** - 8 Conductor RJ45/RJ11 connector for Channel 1

- **5**: **4W-CH2 Connector** - 8 Conductor RJ45/RJ11 connector for Channel 2

- **6**: **Fiber Connector** - ST Connector for Fiber Optic Cable

  Read the Using Fiber Optics Guide for information on how to manage and deploy your fiber optics cabling, safety precautions, tips & tricks, and recommendations for creating

complex fiber optic networks. You can find a copy of this document on the Support portal (see Contact Us on page 37).
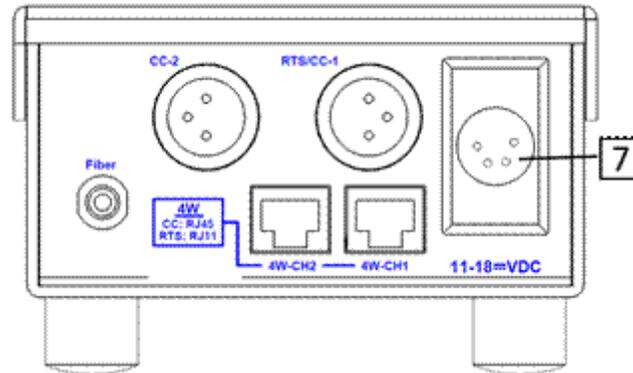
Fig. 2-9: CommLink Mussell Shell Back Panel

- **7**: **11-18 VDC Power Connector** - for use with the ADAP-AC-04 Power Supply.

  This power supply has a 4-pin XLR connector and is used only with the MTR6442i-MML Mussell Shell configuration of the CommLink TR6442i Fiber Optic Intercom Link. See CommLink TR6442i Fiber Optic Intercom Link Port State and Power Options on page 17 for wiring information.

CommLink TR6442i Fiber Optic Intercom Link Matrix and Station Connectors

Both the RTS and Clear-Com system matrix systems use data wiring to carry intercom audio and data. Clear-Com systems use an 8-wire "network" cable with RJ45 connectors. RTS systems use a 6-wire cable with RJ11 connectors similar to standard telephone wiring. However, telephone wiring will not work as it is only 4-wire.

The CommLink TR6442i Fiber Optic Intercom Link Configuration is shown for each intercom mode. The switch position is indicated. In all cases, the 4W/2W switch is in the 4W position.

Clear-Com Mode Wiring and Switch Settings

Fig. 2-10: Clear-Com Mode Data Cable Wiring

Clear-Com Wiring Pin Outs (RJ45)

- 1 to 7
- 2 to 8
- 3 to 4
- 4 to 3
- 5 to 6
- 6 to 5
- 7 to 1
- 8 to 2

The Clear-Com system utilizes RS422 data.

RTS Mode Wiring and Switch Settings

In all cases the 4W/2W switch is in the 4W position.

Fig. 2-11: RTS Mode Data Cable Wiring

RTS Wiring Pin Outs RJ11

- 1 -- NA
- 2 to 2
- 3 to 4
- 4 to 3

- 5 to 6
- 6 to 5
- 7 to 7
- 8 -- NA

CommLink TR6442i Fiber Optic Intercom Link Power Options

The CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link is powered through an attached external power supply or from power received from the Two-Wire intercom connection.
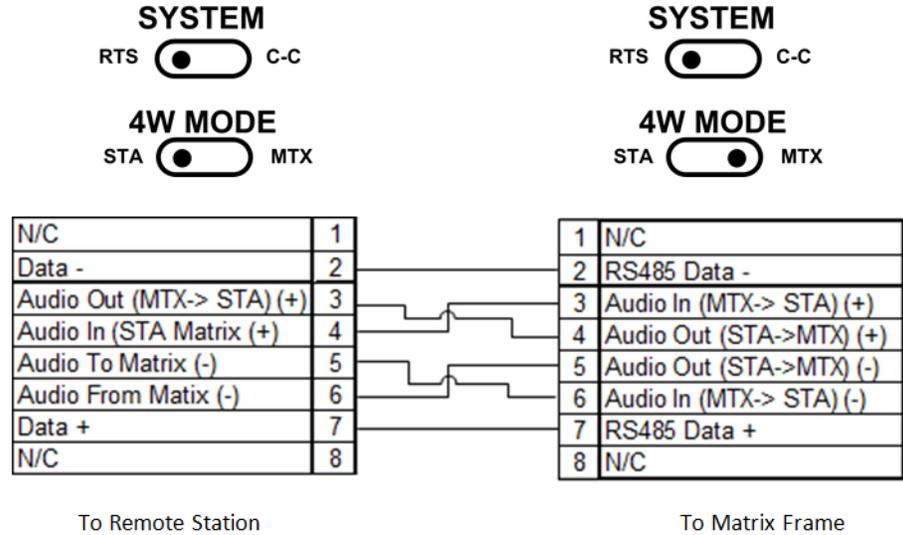
The following table shows how each CommLink TR6442i Fiber Optic Intercom Link unit can be powered:

Model	Type	12 Volt Power Supply	30 Volt Power Supply	30 Volt Power Output to Belt Packs*
MTR6442i-13 or 15	Throw Down	ADAP-AC-04LC with 2.5mm plug	Can be powered from Intercom system when in Two-Wire mode	30 Volts is provided on RTS/CC-1 and CC-2 XLR connectors.
MTR6442i-MML-13 or 15	Mussell Shell	ADAP-AC-04 with 4-pin XLR	Can be powered from Intercom system when in Two-Wire mode	30 Volts is provided on RTS/CC-1 and CC-2 XLR connectors.
TR6442i-13 or 15	Rack Mount in Viper II Rack Unit	Powered through Viper II frame - PS5000 power supply	Can be powered from Intercom system when in Two-Wire mode	30 Volts is provided on RTS/CC-1 and CC-2 XLR connectors.

* 30 Volts is output from the CommLink TR6442i Fiber Optic Intercom Link unit when it has 12V power applied. When no 12V power is applied (2W Power switch is on EXT), the CommLink TR6442i Fiber Optic Intercom Link unit derives power from the intercom connection and all Belt-Packs derive power from the Intercom system or from internal power sources.

When powered by the 12 Volt power supply, the CommLink TR6442i Fiber Optic Intercom Link will power five intercom belt packs (10 total on the system) or two remote matrix stations per channel. If the system has self-powered belt packs attached (30V), and the external 12 Volt power supply is also attached, the 12 Volt supply takes priority in powering the CommLink TR6442i Fiber Optic Intercom Link.

CommLink TR6442i Fiber Optic Intercom Link Port State and Power Options

The CommLink TR6442i Fiber Optic Intercom Link also manages the enabling of ports depending on the type of power supply and the system mode. The following table shows the different CommLink TR6442i Fiber Optic Intercom Link states:

System Mode	Power Supply	Internal 30 Volt Supply	Belt Pack Power	4W Ports
2W	30V from Intercom System	Disabled	Self-powered or from Intercom System	Disabled
2W	12 Volt External & Belt-Packs are powered internally or from the intercom system	Disabled	Self-powered or from Intercom System	Disabled
2W	12 Volt External	Enabled	From CommLink	Disabled
4W	12 Volt External	Disabled	Disabled	Enabled
2W to 4W or 4W to 2W Conversion	12 Volt External	Can be used	Self-powered or from Intercom System or from CommLink TR6442i Fiber Optic Intercom Link 30V supply	Enabled but with RS422/485 data transfer disabled

Mussel Shell MTR6442i Power Connector - 4 Pin XLR Connector Wiring

	Pin	Function
	1	Ground
	2	Unused
	3	Unused
	4	+ Power 12 VDC

This matching connector is from either an ADAP-AC-04 or a customer 12VDC power supply.

Fiber ADAP Power Supplies

Fiber Part Number ADAP-AC-04
Supplied with 4PIN XLR/A4F connector for power plug on Mussell Shell unit

Fiber Part Number ADAP-AC-04LC
Supplied with 2.5 MM plug for power jack on Throw Down unit

Fig. 2-12: Power Supplies

Block Diagram

Fig. 2-13: CommLink TR6442i Functional Block Diagram

Setting Up the CommLink TR6442i

This chapter explains how to set up and configure the CommLink TR6442i Fiber Optic Intercom Link system.

About Setting up the CommLink TR6442i

Use of the CommLink TR6442i Fiber Optic Intercom Link system first requires the setup and connection of the Intercom System and the CommLink TR6442i Fiber Optic Intercom Link Link units. The second step is the proper configuration or setting of switches on the CommLink TR6442i Fiber Optic Intercom Link front panel. If two-wire systems are in use, the Auto Null function should be employed.

Each system setup is based on the appropriate mix of the three physical types of the CommLink TR6442i Fiber Optic Intercom Link. Depending on your particular operation the combination of units may be all the same physical type or a mix and match. Whatever the physical configuration of the units, they must operate in pairs of 1310mm WDM and 1550mm WDM units. It makes no difference where the WDM units are placed in the system. If the CommLink TR6442i Fiber Optic Intercom Link is being used locally to convert between intercom system types, either WDM type can be used

Example CommLink TR6442i Fiber Optic Intercom Link Usage Scenarios

Five usage configurations are illustrated:

- Connecting a Two Channel Base System with Remote Belt Packs
- Connecting a Matrix Frame System with Two Remote Matrix Stations
- Connecting a Matrix Frame with Remote Belt Packs
- Connecting Two Matrix Stations System with a Matrix Frame with Video Multiplexed on to a Multi-Strand Fiber Cable (This is an example of "hybrid" use with the CommLink TR6442i Fiber Optic Intercom Link)
- Converting a Two Channel System to work with a Matrix Frame

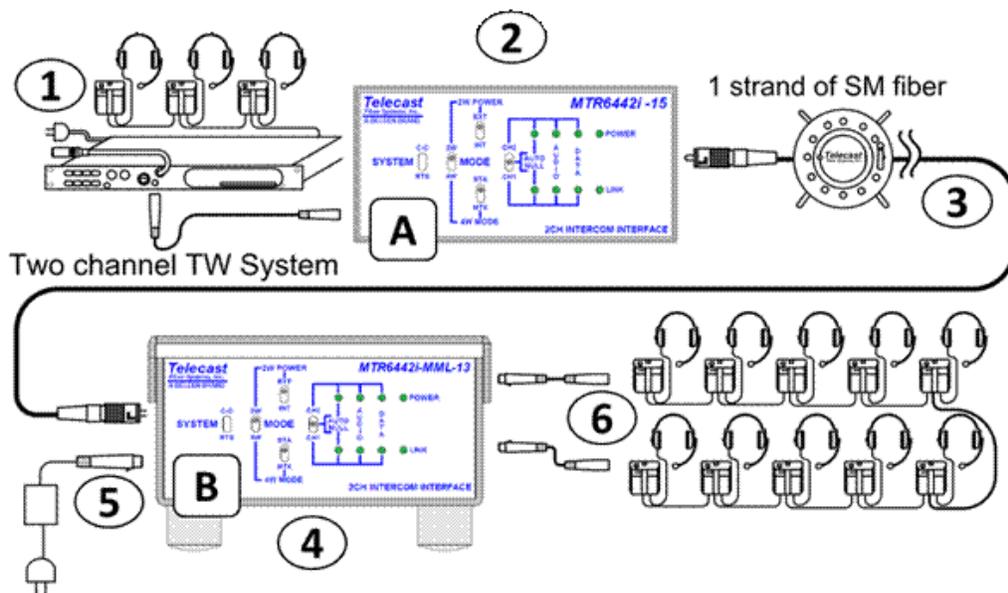## Connecting a Two Channel Base System with Remote Belt Packs

Fig. 3-1: Connecting a Two Channel Base System with Remote Belt Packs

Connect the Two-Channel Two-Wire Intercom System (1) and CommLink TR6442i Fiber Optic Intercom Link Unit "A" (2). In this example it is assumed that the CommLink TR6442i Fiber Optic Intercom Link is powered from the intercom.   Run a Single Strand Fiber Cable (3) between CommLink TR6442i Fiber Optic Intercom Link Unit "B" (4) and power the CommLink TR6442i Fiber Optic Intercom Link using the appropriate power supply (5).

Connect your intercom Belt Packs in normal daisy chain fashion to the CommLink TR6442i Fiber Optic Intercom Link. The number of Belt Packs will depend on whether they are self-powered or are powered by the CommLink TR6442i Fiber Optic Intercom Link. When powered by the CommLink TR6442i Fiber Optic Intercom Link you can expect 5 units to work per channel.

Remember that CommLink TR6442i Fiber Optic Intercom Link "A" must have a WDM factor different from CommLink TR6442i Fiber Optic Intercom Link "B." You must use a WDM @1550nm unit at one end of the fiber cable and a WDM@1310 at the other end of the fiber cable.

In this example two Mussel Shell versions of the CommLink TR6442i Fiber Optic Intercom Link are used. It makes no difference which of the three physical versions is used so long as the WDM factors are different as described above.

CommLink Unit	System Switch	Mode Switch	4W Switch	2W Power Switch
#A in drawing	Match Intercom	2W	NA	EXT
#B in drawing	Match Intercom	2W	NA	INT

Connecting a Matrix Frame System with Two Remote Matrix Stations
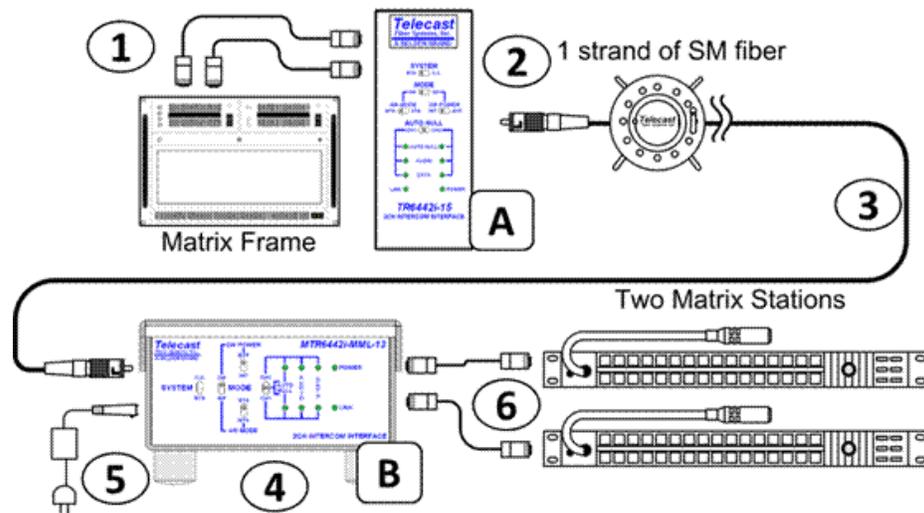
Fig. 3-2: Connecting a Matrix Frame System with Two Remote Matrix Stations

Connect the Intercom Matrix (1) and CommLink TR6442i Fiber Optic Intercom Link Unit "A" (2) In this case it is assumed the CommLink TR6442i Fiber Optic Intercom Link is a rack mount unit and is powered from the Viper II frame.*   Run a Single Strand Fiber Cable (3) between CommLink TR6442i Fiber Optic Intercom Link Unit "B" (4) and power the CommLink TR6442i Fiber Optic Intercom Link using the appropriate power supply (5).

Connect your two intercom Matrix Stations (6) and provide power locally. Remember that CommLink TR6442i Fiber Optic Intercom Link "A" must have a WDM factor different from CommLink TR6442i Fiber Optic Intercom Link "B." You must use a WDM @1550nm unit at one end of the fiber cable and a WDM@1310 at the other end of the fiber cable.

* If using a Throw Down CommLink TR6442i Fiber Optic Intercom Link it would need to be powered from the ADAP-AC-04LC power supply unit

| CommLink Unit	System Switch	Mode Switch	4W Switch	2W Power Switch
#A in drawing	Match Intercom	4W	MTX	NA
#B in drawing	Match Intercom	4W	STA	NA

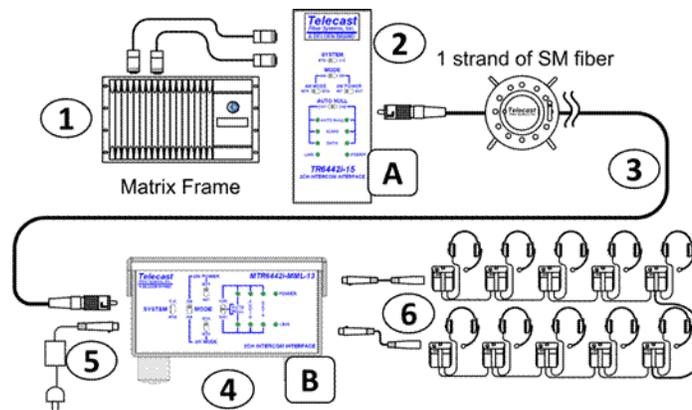## Connecting a Matrix Frame with Remote Belt Packs

Fig. 3-3: Connecting a Matrix Frame with Remote Belt Packs

Connect the Intercom Matrix (1) and CommLink TR6442i Fiber Optic Intercom Link Unit "A" (2) In this case it is assumed the CommLink TR6442i Fiber Optic Intercom Link is a rack mount unit and is powered from the Viper II frame.*   Run a Single Strand Fiber Cable (3) between CommLink TR6442i Fiber Optic Intercom Link Unit "B" (4) and power the CommLink TR6442i Fiber Optic Intercom Link using the appropriate power supply (5).

Connect your intercom Belt Packs in normal daisy chain fashion to the CommLink TR6442i Fiber Optic Intercom Link. The number of Belt Packs will depend on whether they are self-powered or are powered by the CommLink TR6442i Fiber Optic Intercom Link. When powered by the CommLink TR6442i Fiber Optic Intercom Link you can expect 5 units to work per channel depending on cable runs

Remember that CommLink TR6442i Fiber Optic Intercom Link "A" must have a WDM factor different from CommLink TR6442i Fiber Optic Intercom Link "B." You must use a WDM @1550nm unit at one end of the fiber cable and a WDM@1310 at the other end of the fiber cable.

* If using a Throw Down CommLink TR6442i Fiber Optic Intercom Link it would need to be powered from the ADAP-AC-04LC power supply unit

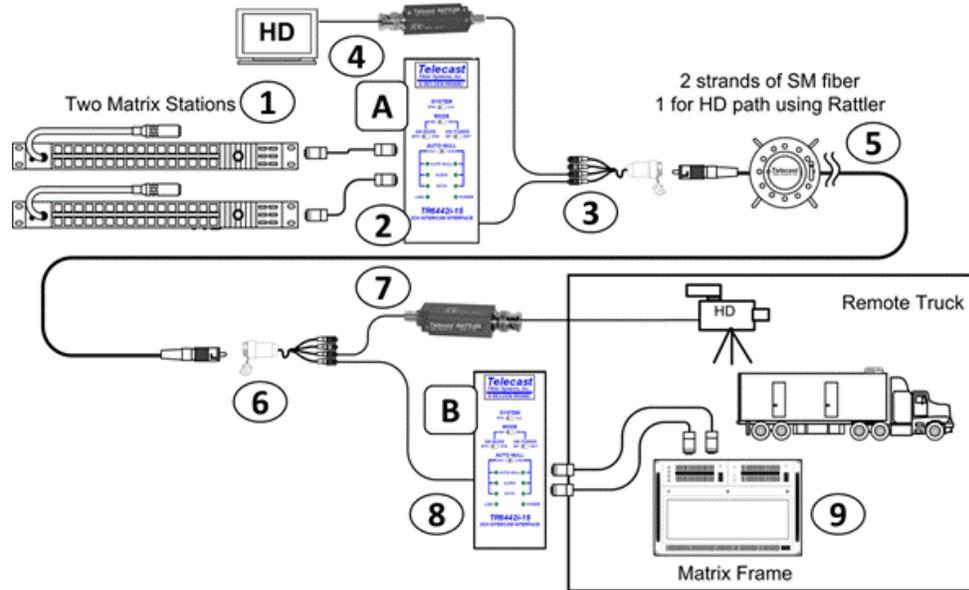| CommLink Unit	System Switch	Mode Switch	4W Switch	2W Power Switch
#A in drawing	Match Intercom	4W	MTX	NA
#B in drawing	Match Intercom	2W	NA	INT

Connecting a Two Matrix Stations System

Fig. 3-4: Connecting Two Matrix Stations System with a Matrix Frame plus Video Multiplexed on the Multi-Strand Fiber Cable

This usage scenario demonstrates the flexibility provided by Grass Valley products. In this case Multi-Strand Fiber Cable with MX Connectors is used in place of Single Strand Fiber Cable. With the addition of the Break Out cable MXRR-4-08 Fiber optic signals can be sent to multiple locations. Here a Grass Valley Rattler Mini HD/SDI Transmitter and Receiver are used to transmit HD video along the same Fiber Cable as the Intercom Link. A wide variety of set-ups is possible using different components. Please consult your Grass Valley dealer for more information.

The example calls for you to connect the Matrix Stations (1) and CommLink TR6442i Fiber Optic Intercom Link Unit "A" (2). In this case it is assumed the CommLink TR6442i Fiber Optic Intercom Link is a rack mount unit and is powered from the Viper II frame.* Connect the CommLink TR6442i Fiber Optic Intercom Link Unit to the Break-Out Cable (3) and then connect the Break-Out cable to the Multi-Strand Fiber Cable (5). Connect the Rattler Receive Unit RRX 1679 (4) to your HD Video Display and to the Break Out Cable (3).

Connect the Fiber Cable (5) to a Break Out Cable (6) at the other end. The Break Out Cable then connects to CommLink TR6442i Fiber Optic Intercom Link Unit "B" (8) and to the Rattler Transmit Unit RTX 1660 (7). The Rattler is connected to your HD Video Source and CommLink TR6442i Fiber Optic Intercom Link is connected to the Intercom Matrix Frame (9).

Converting a Two Channel System to work with a Matrix Frame
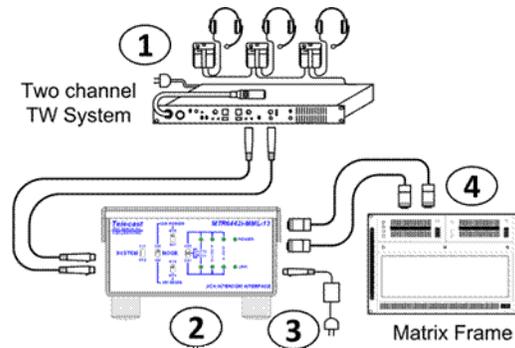
Fig. 3-5: Converting a Two Channel System to work with a Matrix Frame

Connect the Two-Channel Two-Wire Intercom System (1) and CommLink TR6442i Fiber Optic Intercom Link Unit (2). In this example a Mussell Shell version is used. Power the CommLink TR6442i Fiber Optic Intercom Link using the appropriate power supply (3).

Connect the Intercom Matrix (4).   The WDM factor of the CommLink TR6442i Fiber Optic Intercom Link is not relevant in this scenario.

In this example a Mussel Shell version of the CommLink TR6442i Fiber Optic Intercom Link is used. It makes no difference which of the three physical versions of the CommLink TR6442i Fiber Optic Intercom Link is used.

The System Switches should be set as follows:

- **SYSTEM** - Set for your Two Channel System - ClearCom (CC) or RTS
- **MODE** - Set to 2W
- **2W POWER** - Set for your CommLink Unit

CommLink Physical Configurations

The CommLink™ TR6442i Intercom Link comes in three physical configurations each supplied in a 1310mm unit and a 1550 nm unit. Please see Ordering Information on page 4 for ordering information.

MTR6442i-MML
MiniMussel Shell Enclosure for Harsh Environments

TR6442i
Viper II Rack Mount
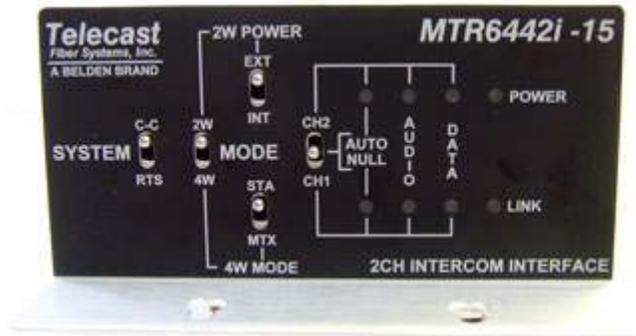
MTR6442i
"Throw Down"

Fig. 3-6: CommLink TR6442i Fiber Optic Intercom Link Physical Configurations

All variations of the CommLink™ TR6442i Intercom Link work in the same way. The only difference is in the method in which they are powered and whether they are a 1310mm or a 1550mm unit.

The system provides flexibility in the types of intercom systems that can be used in that the system can link one type of party line system to another type of party line system, a matrix frame to two key panels, or act as a two-wire to four wire hybrid adaptor via fiber or as a standalone local unit. Each of these operating modes is explained in detail later in this document.

TWO-WIRE PARTYLINE MODE

Plug two channels of Clear-Com® PL (two XLRs) or RTS® TW (one XLR) into each CommLink module and connect them with a fiber cable. The system will "translate" between two systems so that you can have Clear-Com® at one end and RTS® at the other. It also translates the call lights.

ADVANCED DSP AUTO-NULLING

Once the two-party system is connected, a toggle of the AUTO NULL switch provides a digital system null of the two-wire system, no matter what the load, without the need for manual adjustments.

BELT PACK POWER

Each CommLink™ module can be powered from the Party line intercom circuit without an external power supply, like a belt pack. Alternately, with a 12VDC power source, the CommLink unit can act as a Party line power supply, providing enough 30VDC current to support approximately ten belt packs.

FOUR-WIRE MATRIX MODE

The system links a MatrixPlus/Eclipse (Clear-Com®) or Adam (RTS®) family matrix frame and two of the system's key panels over a fiber strand. All of the key panel functionality is supported, including displays, controls, and communications to the matrix frame.

HYBRID MODE

The CommLink system can be used to connect a matrix frame in a control room or truck with two party line channels in the venue, without the need for a separate hybrid adaptor.

A single CommLink unit can also act as a standalone digital system interface/system-to-system adapter, utilizing the digital auto-nulling system.   Connect two-wire intercom systems to legacy fiber systems, two-way radios, satellite links, TV cameras, and other communications devices with 4-wire circuits.

CommLink TR6442i Fiber Optic Intercom Link Switch Configuration

The following decision tree traces the setting of the CommLink TR6442i Fiber Optic Intercom Link configuration switches.

- Set the System mode - Clear-Com (CC) or RTS
- Decide if you are operating in 2W or 4W
- If in 2W set your power to External (EXT) or Internal (INT) - this decides between using the power from the intercom system or Belt Packs (EXT) or providing internal power from the CommLink TR6442i Fiber Optic Intercom Link with the 12 Volt power supply (INT)
- If in 4W set the switch depending on whether you have an Intercom Matrix Station (STA) or Matrix (MTX) attached to the CommLink TR6442i Fiber Optic Intercom Link
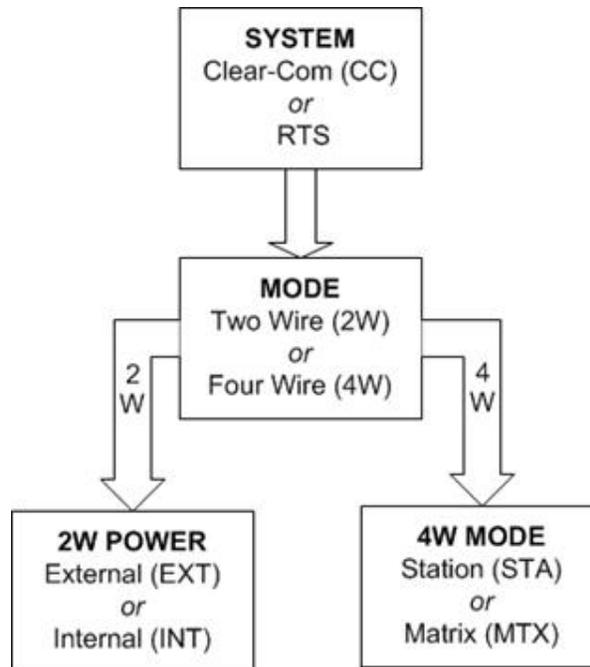

Fig. 3-7: Configuration Switch Decision Tree

CommLink TR6442i Operation

This chapter describes in the operation of CommLink TR6442i Fiber Optic Intercom Link. Please keep in mind that once the system is properly set up and configured there is very little to do during normal operation.

Using the Auto-Null Function

The Auto-Null function is used only with CommLink TR6442i Fiber Optic Intercom Link units that are connected to Two-Wire system. Auto Null has no purpose with a Four Wire system.

To use the Auto-Null Function

1 Before starting the Auto-Null process, ensure the following:

   - **A**: All headsets are connected
   - **B**: Headsets are not being worn by any operators
   - **C**: Headset microphones are off

2 To Auto Null Channel 1 (CH1), hold the Auto Null switch (A) in the direction of CH1.

   The system will generate a tone and the indicator (B) will blink green while the Nulling process occurs. This should take about 7.5 seconds.

3 Once the Auto Null process is complete, the tone will stop and the indicator will glow green.

   This indicator will be red if there was a problem with the null. This can occur if any of the items in Step 1 are not followed.

4 Once you troubleshoot the Null problem, perform Steps 1-3 again.

5 For Channel 2 (CH2), hold the Auto Null switch (A) in the direction of CH2. Steps 2 and 3 will then follow with the CH2 indicator being active (C).

6 After completing the Auto-Null process, check that side-tone operation and overall intercom performance on each intercom channel is correct.

Best Practices

- Take every precaution to reduce the risk of damaging your eyes when handling the equipment.
- Protect the Fiber Optic Cable and the Fiber Optic Connectors. Always keep these capped unless there are being connected.
- Read Best Practices on page 33 on planning the Fiber Run.
- Once the system is set up and running, carefully monitor the Link strength indicators at either of the CommLink TR6442i Fiber Optic Intercom Link units. Because the system is digital, the Signal Strength either meets or exceeds the operational requirements. When theSignal Strength is no longer strong enough, the signal stops.
- If introducing new equipment (intercom units, additional Belt-Packs, etc.) or new operators, be sure to do a comprehensive, realistic test run. A hands-on approach is the best way to understand how the system should work will and what to do to ensure proper operation.
- Be as careful during System tear down as during System setup.

Troubleshooting

Troubleshooting any technical issues with the CommLink TR6442i Fiber Optic Intercom Link Fiber Optic Intercom Link System is similar to any piece of television production gear, with the exception of the core Fiber Optic technology.

The following is a list of checks to keep in mind:

- During power-up of the CommLink TR6442i Fiber Optic Intercom Link, the Auto Null indicators will turn Green, then Red, and then OFF. This indicates that these LEDs are working properly. These are the only indicators tested on power up.
- The Auto Null indicators will blink RED if any of the CommLink TR6442i Fiber Optic Intercom Link operating power levels are out of specification. This error condition will not likely affect operation, but it should be addressed as soon as possible. This error may require contacting Grass Valley Support (see Contact Us on page 37).
- Check all your cables forany broken connections or bad connectors.
- Check that your Power Supplies are working.
- If there is a power problem, check the fuses.
- If you cannot resolve the problem in the field, contact Grass Valley Fiber support (see Contact Us on page 37)

5 Specifications

Intercom

Number or intercom channels...2

2-Wire (TW/PL)

Interface:...Clear-Com PL: XLR3M x 2

....RTS TW: XLR3M x 1

Max Level... 2VP-P, @ 1KHz (equiv. to +18dBu in 4W)‡

Dyn. Range...>85dB, ref. 2VP-P @ 1KHz ‡

Freq. Response ....+.1/-3dB, 70Hz to 22kHz, ref. 2VP-P ‡

THD+N.. <.1% @ 2VP-P ‡

I/O Impedance (100Hz to 20KHz)......

Termination engaged (internal power) .... 220? ±10%

Termination dis-engaged (external power)...?10K?

Nulling: .... Automatic DSP

‡properly terminated (internal or external)

4-Wire (4W) Ports

Interface.. Clear-Com MatrixPlus/Eclipse: RJ45 x 2

....RTS Adam/Cronus/Zeus: RJ11 x 2

Maximum Level (I/O, Unity Gain) ....+18dBu

Dynamic Range .... >85dB, ref. +18dBu

Frequency Response .... +.1/-3dB, 35Hz-22kHz, ref. 0dBu

THD+N... <.05% @ +17dBu @ 1KHz

Input Impedance. ....10k? balanced

Output Impedance.... ....30? balanced

Data: . ...Clear-Com: RS422, RTS: RS485

Crosstalk: . ... >85dB

Electro-Optical

Operating Wavelength, standard .... 1310/1550 nm (Wave Division Multiplexed)

Nominal Optical Loss Budget Values

TX Laser output power.. ....-7 dBm

RX Sensitivity, HD/SDI...-22 dBm

Link/Distance Limit* .... 15dB optical loss (? 30Km*)

Fiber Compatibility... .... Single Mode

Optical Connector . ...ST

*Maximum cable length varies due to optical cable quality, dirt/dust/contamination on connectors, and the number of in-line connectors.

Mechanical/Environmental

Dimensions (HxWxL)

  Rack Mount...5" x 2" x 10"

  Throw Down..4" x 2" x 10"

  Mini-Mussel (without feet)...2" x 4" x 10"

Weight

  Rack Mount/Throwdown..1.375 lb

  MiniMussel...2.8 lb

Power Consumption

  2W with Local Power .... 3 watts@10-18VDC

  Powered from 2W System .... 6 watts@10-18VDC

  4W System .... 3 watts@10-18VDC

Temperature Range ....-25° to +55°C

Humidity Range .... 0 to 95% RH, Non-condensing

Compliance

Laser Safety...Class 1 Laser 21 CFR 1040.10

EMI/RFI...IEC/EN 60825-1

RoHS

Grass Valley Technical Support

For technical assistance, please contact the Grass Valley Technical Support center nearest you:

Americas

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Telephone:	1-800-224-7882
Fax:	+1 514 335 1614
E-mail:	support@miranda.com

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Fax:	+852 2539 0804
E-mail:	asiatech@miranda.com

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Telephone:	+44 118 952 3444
Fax:	+44 118 952 3401
E-mail:	eurotech@miranda.com

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Office hours:	9:00 a.m. – 6:00 p.m. (GMT+8)
Telephone:	+86 10 5873 1814
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Telephone:	+33 1 55 86 87 88
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CommLink TR6442i Installation Items

This appendix explains how to mount CommLink TR6442i in a rack and how to convert a Rack Mount Unit for use.

Installing the CommLink TR6442i Fiber Optic Intercom Link in the Viper II Rack

> **Note:** Much of this section is adapted from the Viper II - V2Frame User Guide which is available at http://www.miranda.com/support. Please consult this manual for complete information regarding the use and operation of the Viper II V2 Frame.

The CommLink TR6442i Fiber Optic Intercom Link 13 or 15 rack mount unit is a standard Viper II module. When installing or removing modules, takespecial care to ensure that no damage occurs as a result of an improperly inserted module as the pins are of a very fine pitch and can easily be bent.

If pins do become bent, contact Grass Valley for an RMA number.Do NOT attempt to repair bent pins as failure to properly align the backplane will result in additional bent pins.

Carefully align the module in the top and bottom guides and slowly insert it into place. As the rear end of the module nears the rear of the frame, it will hit a riser-plate that serves to lift the module so that the power connectors will properly come together and seat.

You should be able to sense the plate as you insert the module and sense the female power connector on the module make smooth contact with the male power plug in the frame. Any attempts to force the module into the frame are likely to result in bent pins.

Fig. A-1: Viper II - V2 Frame

The CommLink TR6442i Fiber Optic Intercom Link Rack Mount unit can go into any Viper II frame slot.

Converting the TR6442i Viper II Rack Mount Unit

The CommLink TR6442i Fiber Optic Intercom Link Rack Mount version can be converted to a MTR 6442i Throw Down version of the CommLink. The Throw Down unit can also be converted to a Rack Mount kit. The conversion of a Rack Mount unit requires a TDK-TR6442i kit and the conversion of a Throw Down unit requires an RMK-TR6442i kit. The kit consists of a replacement front plate and rear plate. Make sure you order the -13 or -15 version of the kit to match your existing CommLink unit.

Fig. A-2: 2CH Intercom Interfaces

The CommLink TR6442i Fiber Optic Intercom Link Rack Mount Unit can be converted to a CommLink MTR6442i Throw Down Unit.
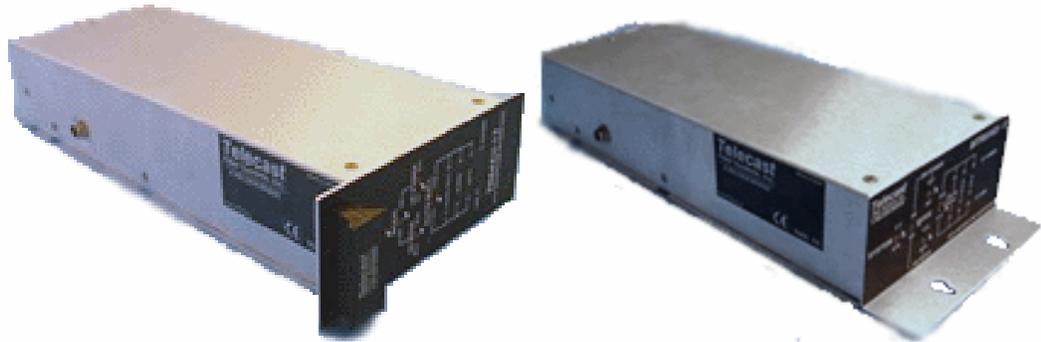
Fig. A-3: Side view of the CommLink Units

The conversion can be performed by a qualified end-user who is comfortable working with delicate multi-pin connectors and can work in a static-free environment. An experienced Grass Valley technician can accomplish this conversion in about 15 minutes,but if you decide to perform the conversion yourself, you should budget about an hour to complete this task.Make sure you have time to fully test the unit prior to using in a production environment.

You will need the following tools:

- a medium Phillips head screwdriver
- a wrench to loosen and re-install an ST Fiber Barrel
- a container to temporarily hold a number of screws
- a clean static-free work space

The conversion of a Throw Down unit is essentially the same using the RMK-TR6442i kit.

To convert a CommLink Rack Mount Unit to a Throw Down Unit

Please walk through all of the steps prior to beginning the disassembly of the Rack Mount unit. Be sure totake the time to understand each step and be careful when disconnecting and reconnecting the multi-pin connectors.

1   Disconnect all cables and power from the unit and place it on your work surface.

Remove three screws from the top of the unit and three screws from the side of the unit with the power connector. Make sure to retain the screws for re-use later.

2   On the side opposite the power connector, remove the three remaining cover screws and retain the screws for re-use later. After removing all of the cover screws, lift off the cover being careful not to pull the power connection.
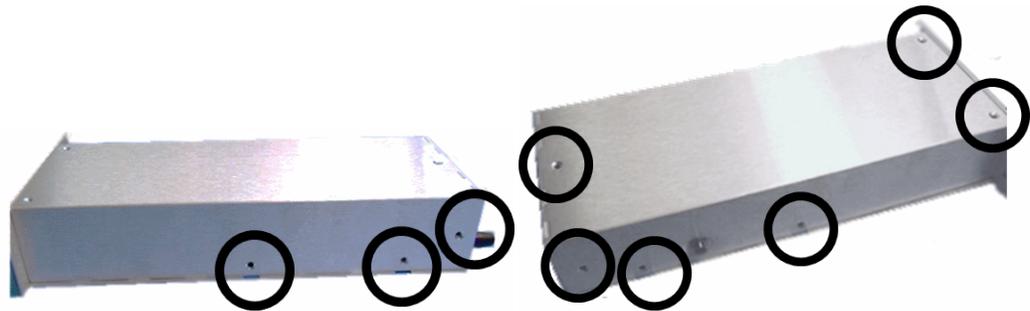
Fig. A-4: Removing cover screws

3   Carefully remove the orange power connector from the main circuit board.
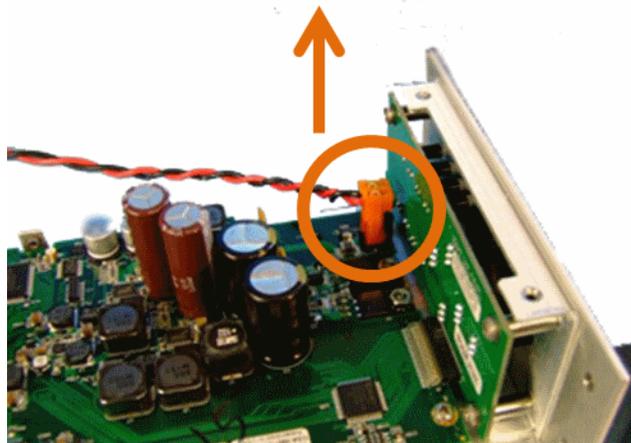
Fig. A-5: Removing orange power connector

You can now set the unit cover aside for re-installation later.

4   Remove the Fiber Cable from the ST Barrel on the rear plate. Remove the connector by pushing in and turning to the left. Protect the Fiber Cable connector from debris and dust.
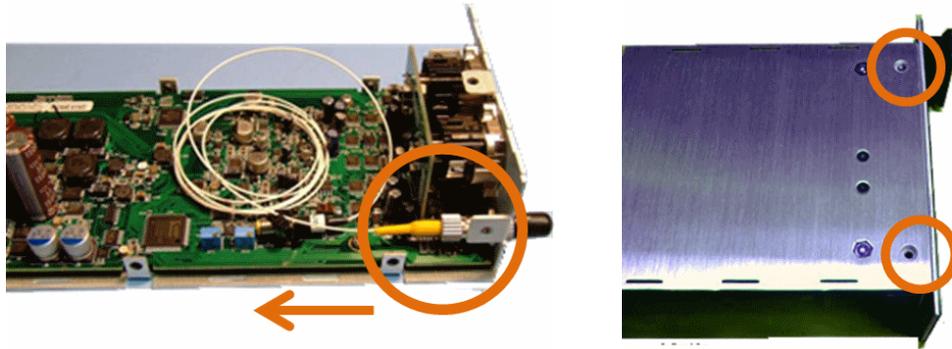
Fig. A-6: Removing Fiber Cable (left) and the front panel (right)

5 Begin the process of removing the front panel by removing the two screws indicated. Retain the screws for later re-use. Do not slide off the front panel.

6 Carefully slide the front panel straight out from the unit so as to not bend the connector pins. This is a multi-pin connector and can be damaged if not handled carefully.
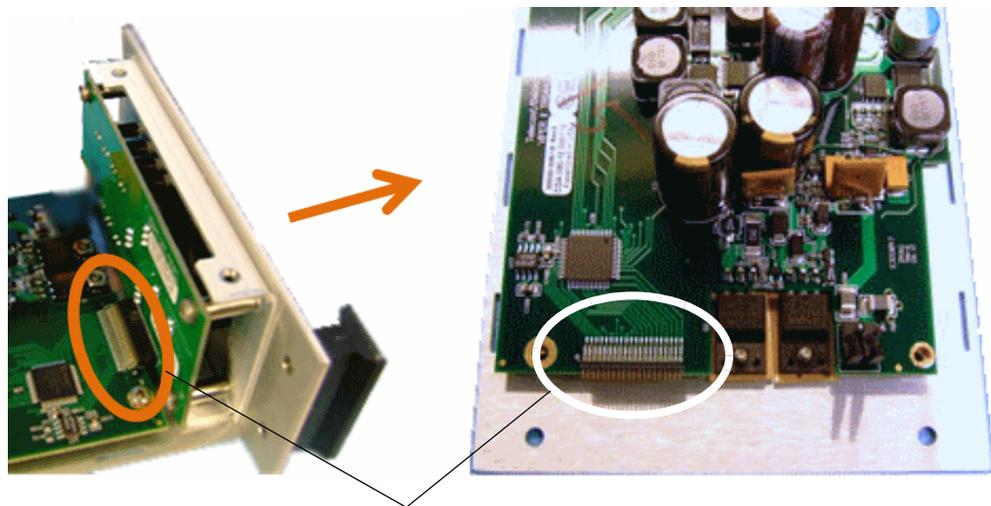
*Multi-pin connector*

Fig. A-7: Exposing the multi-pin connector

7 At the bottom rear of the unit, remove two screws that hold the back panel in place.

8 Remove the four screws from the back panel. These screws hold the connector board to the panel. Do not attempt to remove the panel.
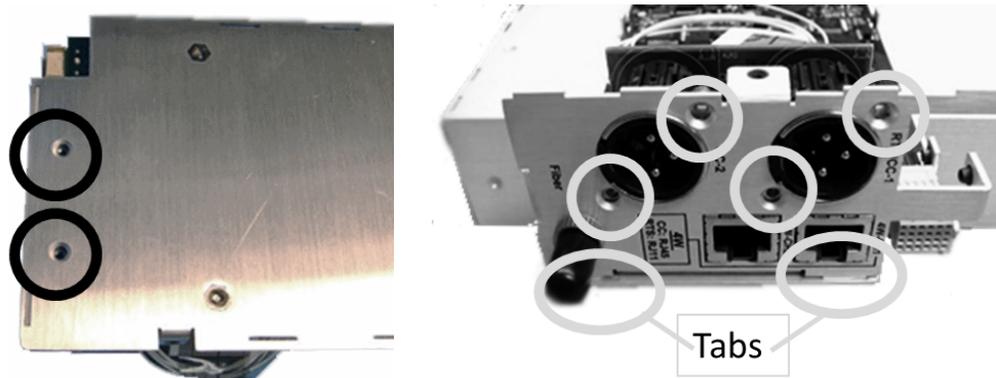
Fig. A-8: Removing back panel screws

Note the two tabs that go into the bottom plate of the unit.

9   Once the screws are removed, pull the connector board up and away from the unit. Make sure to not bend the ribbon connector. Set aside for re-installation.

10 On the main circuit board, loosen but DO NOT REMOVE the two screws indicated. This will allow you to raise slightly the board and allows the rear panel to come clear of the main unit.
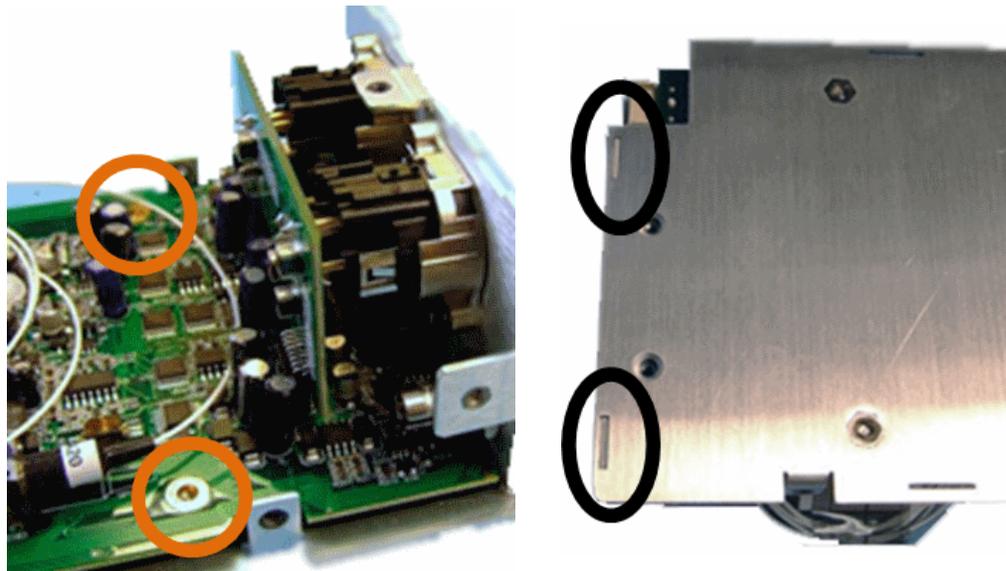
Fig. A-9: Removing the rear panel

Note the tabs/slots on the bottom of the unit. These tabs/slots are what you will be clearing in order to remove the rear panel.

11 Lift the front panel slightly and pull out away from the unit. Make sure to clear the tabs. The previous step of loosening the circuit board screws should give you the clearance to remove the rear panel. If it does not feel free, completely remove the screws and retain them for re-installation.
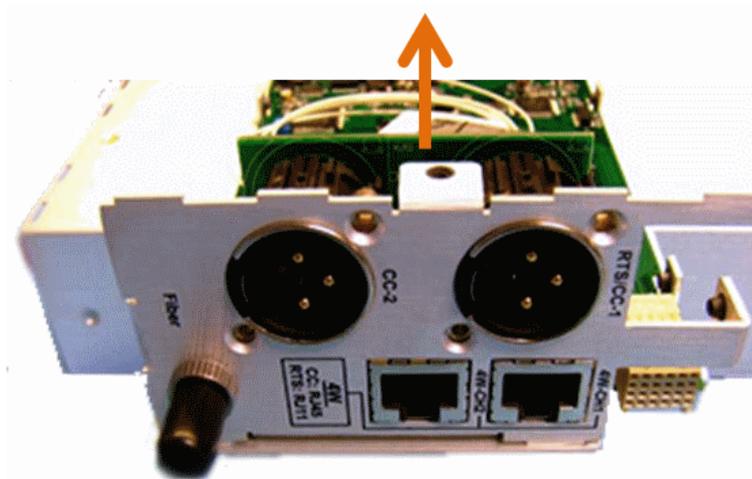
Fig. A-10: Removing the front panel

At this point, the connector panel should be removed from the unit (not shown).

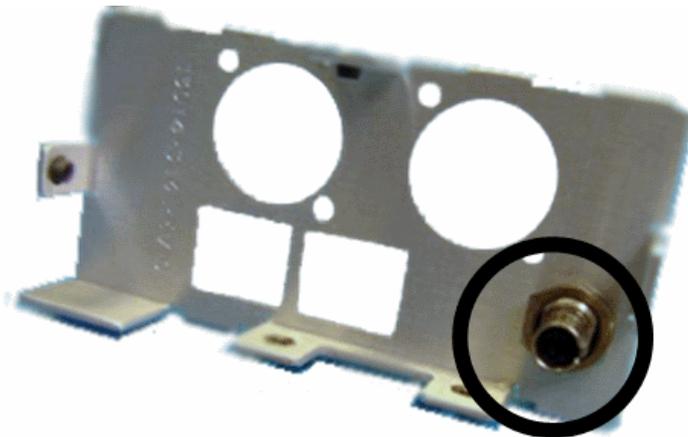12 Remove the ST Fiber Barrel from the Rack Mount version rear panel. The Barrel will be used in the next step.

Fig. A-11: Remove the ST Fiber Barrel

13 Install the ST Fiber Barrel on the rear panel. The slotted side of the Barrel should be installed so that it will face the exterior of the unit.

14 Remove the display circuit board from the Rack Mount version front panel. The board and the four screws will be used in the next step.
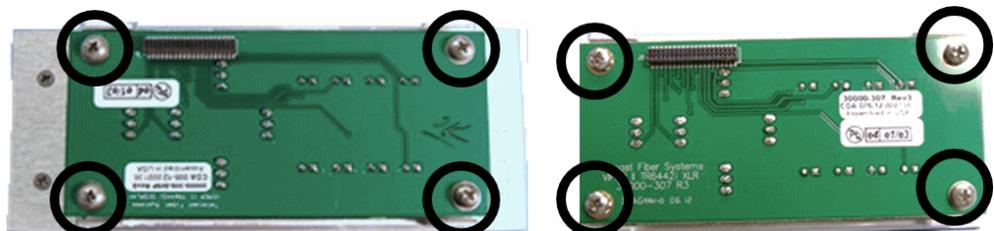
Fig. A-12: The display circuit board screws

15 Install the display circuit board from the previous step to the Throw Down front panel using the same four screws

16 Install the front plate assembly onto the base of the unit as shown. Carefully align the connector of the ribbon connector. The pins should go straight in and align.

Once the front plate is properly seated and the tabs inserted into the bottom plate of the unit, you are ready to secure the plate with the screw previously removed.
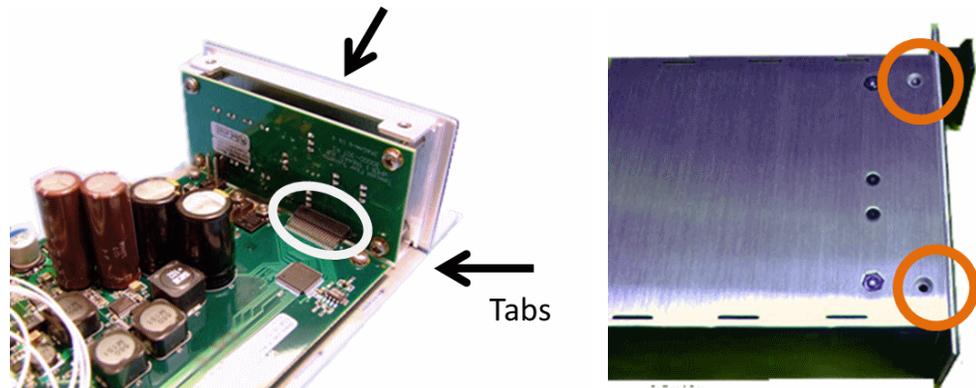

Fig. A-13: Securing the front panel

17 Secure the front plate with the two screws as shown in Figure A-13.

18 Install the rear plate on to the unit.

To get the tabs into place on the bottom plate of the unit, you must lift the main circuit board as you did when removing the Rack Mount rear panel.

You may need to give the panel a small amount of pressure in order to the the 4 Wire (RJ45 type) connectors in place over the EMI tabs.
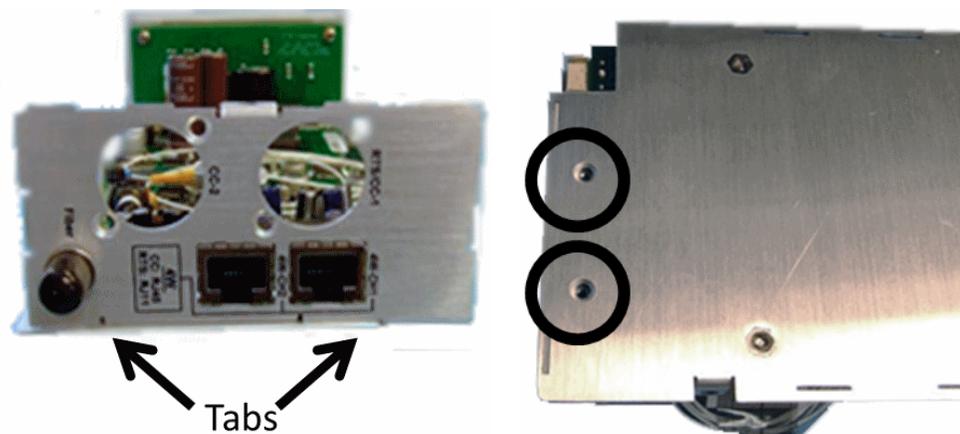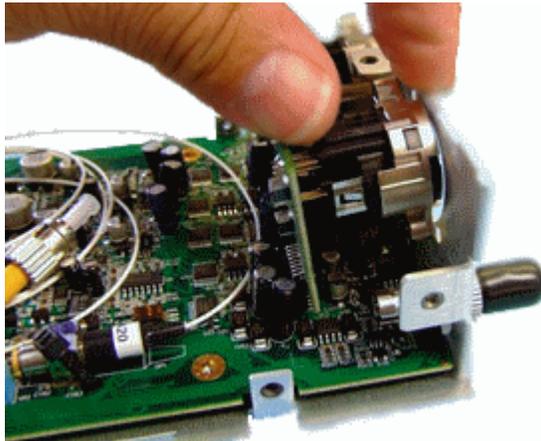

Fig. A-14: Securing the back panel

19 Secure the back plate to the unit base by re-installing the two screws removed when taking off the Rack Mount rear panel

20 Install the connector board onto the base. Be careful not to bend the connector pins.

Fig. A-15: Installing the connector board

Initially the board won't fit correctly - once the connectors are seated, pull the back plate forward slightly and the board will fall into place.

21 Re-install the four self-tapping screws removed when the Rack Mount rear panel was taken off of the main unit.
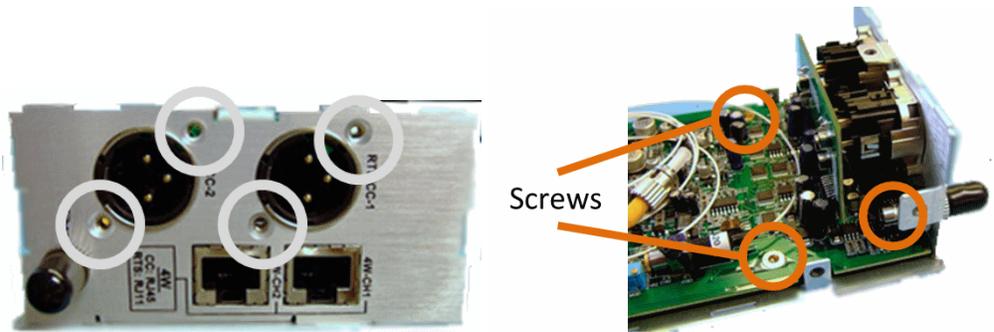
Fig. A-16: Reinstall the rear panel and tighten the main circuit board

22 Tighten (replace if you removed completely) the two screws holding the main circuit board in place.

23 Re-install the Fiber Cable on to the ST Barrel. Make sure it locks into place.

24 Re-install the power connector. It is keyed to fit only one way.
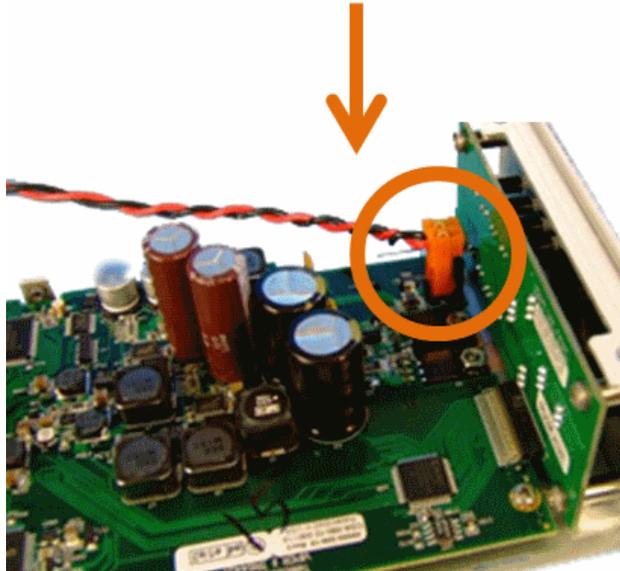
Fig. A-17: Re-install the power connector

Replace the cover on the unit making sure not to pinch the Fiber Cable and the Power Cable between the cover and the main chassis.

25 Replace all nine screw removed in Steps 1 and 2. Three of the screws are shown here.
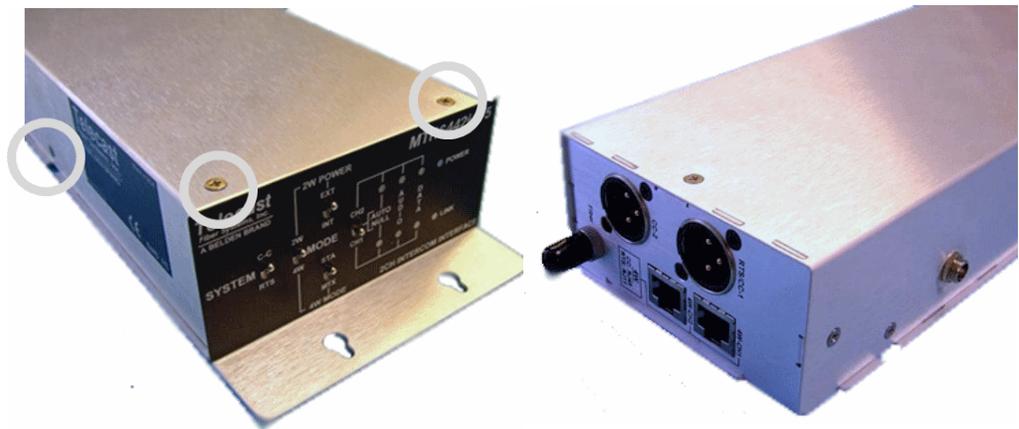
Fig. A-18: Replace the screws and connect the power

26 Reconnect the CommLink unit to your system components and to power. Check that all of the indicator LEDs and switches on the front panel function properly and that the system performs as expected.