MultiDyne®
Video & Fiber Optic Systems

INSTRUCTION MANUAL

SL2150 Series
L-Band
Fiber Optic Extender

191 FOREST AVENUE
LOCUST VALLEY, NY 11560-2132 USA
(800)-488-8378 / (516)-671-7278 FAX (516)-671-3362
sales@multidyne.com
www.multidyne.com

REV A, Sep 21, 2011

This product was designed and manufactured in the
UNITED STATES of AMERICA

REV A, Sep 21, 2011

TABLE OF CONTENTS

INTRODUCTION

The SL2150 fiber optic links connect antennae with control rooms, network operation centers or broadcast head ends. SL2150 links offer more than an alternative to coaxial cabling in teleport earth stations. They have been designed to provide very low carrier-to-noise ratio and extremely linear performance. This means a cost effective technically superior installation for the satellite signal user. Multidyne systems have been engineered to give industry-leading performance when compared with any other fiber optic link. Only SL2150 links have ultra wide dynamic range so that automatic gain control is not required to cope with changing signal intensity caused by meteorological conditions. A range of options to suit a variety of installations is offered, such as 75Ω or 50Ω impedance with either BNC or F connectors. The standard link utilizes a high performance DFB laser, but for less demanding short haul applications, a lower cost FP laser option is available. For installations where the number of cross site fiber connections is limited the complete ITU range of CWDM transmitter wavelengths is offered allowing up to 8 channels to be carried on one fiber. Optical connector options include ST, LC, FC, or LC APC.

FEATURES and OPERATION

FEATURES:

- L-Band RF 950-2150 Mhz to optical fiber signal conversion
- Up to 50Km range using DFB optics
- 9 dB RF gain from FTX to FRX
- 20 dB Noise Figure
- LNB current up to 400mA
- Long Line Compensation (LCC) feature for LNB power
- LNB selectable polarity using 13V or 18V power
- LO Hi band selector using 22 KHz tone
- 75 Ohm F or 50 Ohm BNC connectors
- ST, LC, FC, or LC APC optical connectors
- Universal 9 to 24V DC power source independently of LNB Power needs.
- Menu Driven Front Panel Display for status and parameter selection

OPERATION:
TRANSMITTER, SL2150-FTX

The transmitter module front and back is shown in figure 1.

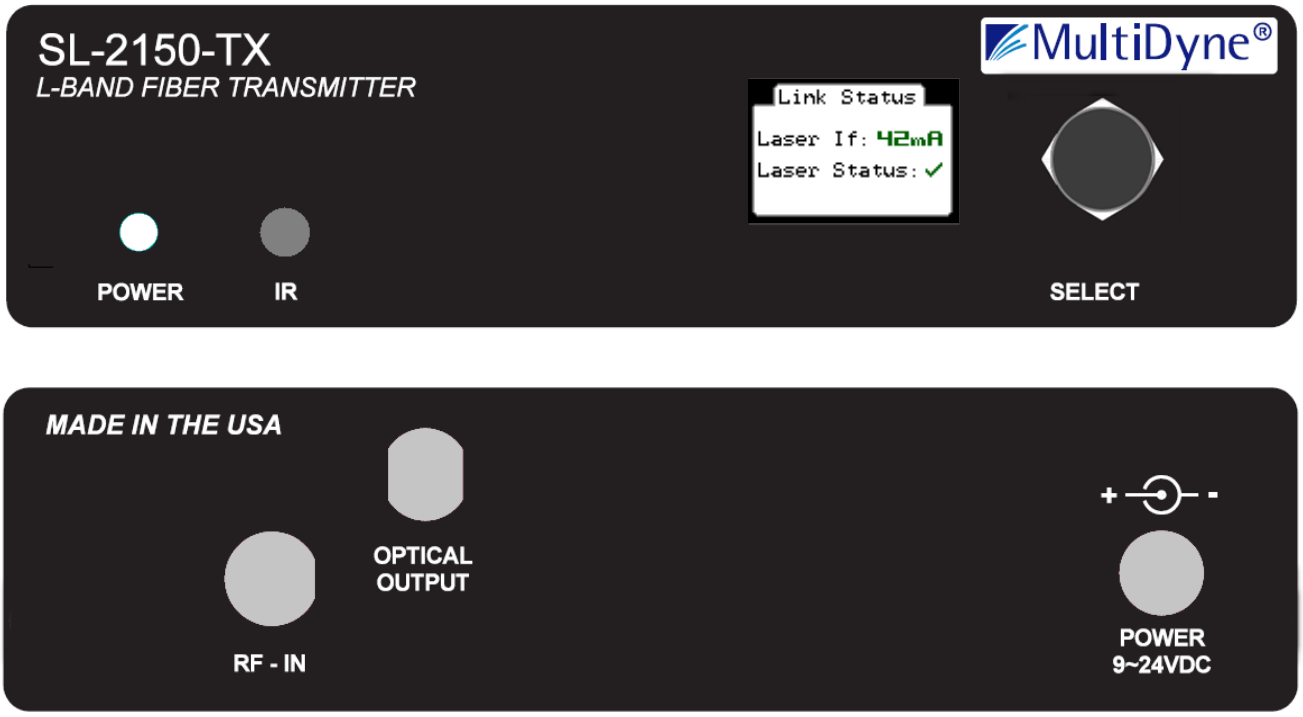


Figure 1. Front and Back of SL2150-FTX

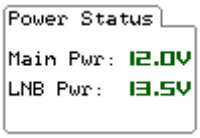
The FTX front panel has a **POWER** LED that glows green when power is applied. The **POWER** LED will flash red if there is a fault. The user may consult the status screens, below, for details on the fault. The FTX also has a menu driven display and a joystick button labeled **SELECT** for menu navigation and setting. There is also an infrared sensor on the front panel. Normally the display is off to conserve power and display life. The **IR** sensor detects motion and turns on the display when your hand is brought near the front panel. After a few moments of inactivity, the display goes to a screen saver for a few minutes, after which it is once again shut off. If the display is off, bringing your hand near the front panel will restore the display to the screen saver. Pressing the **SELECT** button will restore the menus.

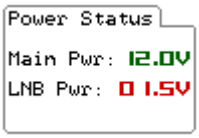
The FTX rear panel has a coaxial **POWER** jack for connecting **9~24VDC** power. Connect a suitable power source to this input, such as the included AC adapter or other source. There is also a **RF IN** connector to which you would connect the coaxial cable to your satellite dish. LNB power is also output over this cable. Up to 400ma of LNB current is permitted. This connector is either a 75 ohm F or a 50 ohm BNC depending on model. Finally you would connect a suitable fiber going to the FRX to the **OPTICAL OUTPUT** connector. Be sure to use only fibers with APC connectors. Using UPC fibers could damage the unit if the fiber is forced into the connector.

The FTX display has screens showing **Power Status**, **Link Status**, **Display Configuration** and **Link Configuration**. To navigate between the screens, press on the left or right edge of the **SELECT** button. Only the config screens have parameters you can set. Once you are in one of these screens, press the upper or lower edges of the **SELECT** button to move up and

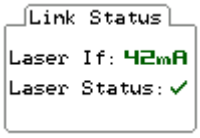
down the list to highlight the parameter you wish to change. When the desired parameter is highlighted, press the right or left edges of **SELECT** to cycle thru the settings. When you have arrived at the desired setting, push **SELECT** straight in to invoke it. Doing so will also cause any further left/right pressings to revert back to screen-to-screen navigation. If you wish to stay within the screen to adjust other settings, only press **SELECT** up or down to highlight other parameters in the screen you might wish to change. If you do so and highlight a different parameter, the left/right pressings will remain in the parameter setting mode. To revert to left/right screen-to-screen navigation, press **SELECT** straight in on a selection. The status screens are "read-only" and they also show whether or not a parameter is in error. If there is an error, the parameter will be shown in red, and the **POWER** LED will also be flashing red. If there is no error, both the parameter and the **POWER** LED will be green.

The **Power Status** screen for the FTX shows the unit's supply voltage (**MAIN PWR**) and the LNB voltage (**LNB PWR**) going to the dish. If a parameter is within spec, it will be shown in green, otherwise it will be red. Examples showing good and bad LNB power are shown below:

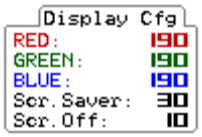




The **Link Status** screen for the FTX shows the **LASER** current in mA and if the **LASER STATUS** is good. If a parameter is in spec, it will be shown in green, otherwise it will be red. An example is shown below:

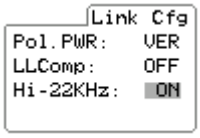


The **Display Configuration** screen allows one to set the intensities of the **RED**, **GREEN** and **BLUE** pixels of the display from **0** to **255**. There are also settings for the seconds of inactivity after which the **SCR**een **SAVER** will appear, and for the minutes of inactivity after which the **SCR**een will shut **OFF** entirely. Bringing your hand near the front panel will restore the screen saver. Pressing the **SELECT** button will restore the menu. An example of the **Display Config** screen is shown below, along with the screen saver:



The **Link Configuration** screen allows one to choose the **POL**arity **P**o**W**e**R** to the dish, either **HOR** (18V) or **VER** (13V). It also allows one to choose **L**ong **L**ine **COMP**ensation to be **ON** or **OFF** and **HI** band **22KHZ** mode **ON** or **OFF**. Long Line Compensation adds an extra

1V to the polarity power voltages to offset any voltage drop caused by long coax cable runs. This change in LNB voltage will also be reflected on the **Power Status** screen. An example of the **Link Config** screen is shown below:



RECEIVER, SL2150-FRX

The receiver module front and back is shown in Fig 2.

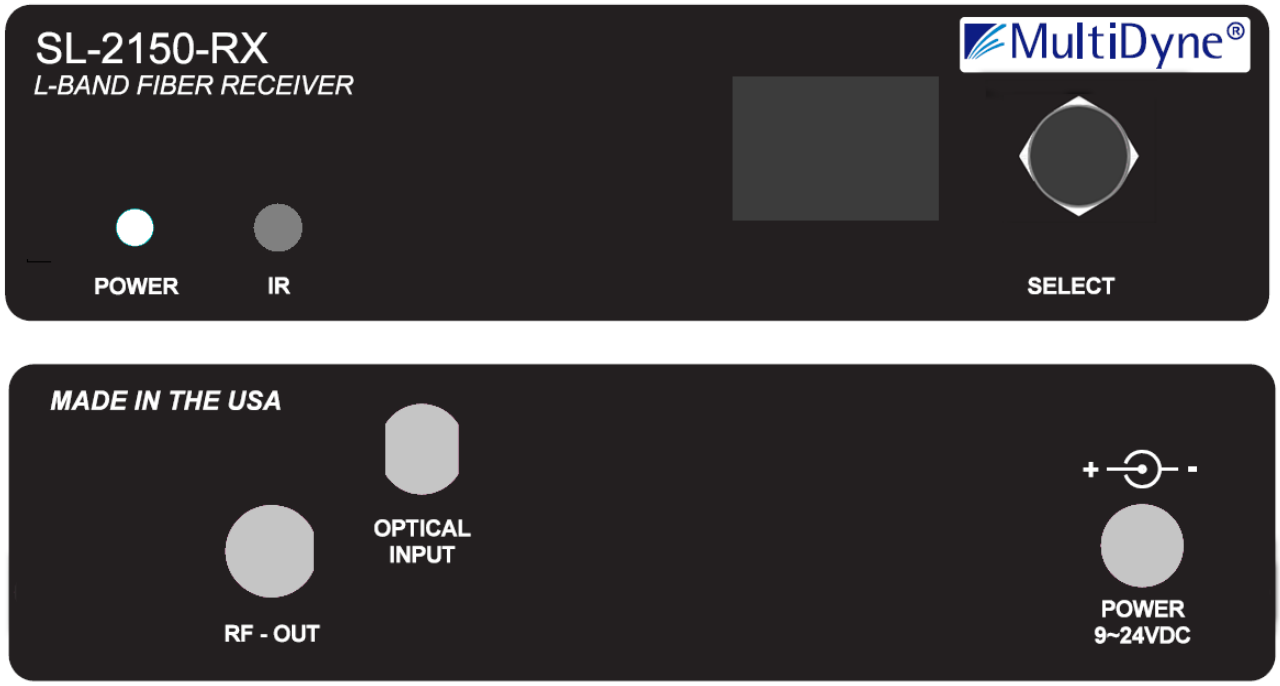


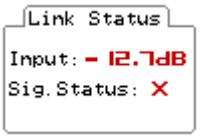
Figure 2. Front and Back of SL2150-FRX

The FRX front panel features and functionality are identical to those of the FTX. The rear panel has the same **POWER** input as the FTX. The **OPTICAL INPUT** connector is for connecting the fiber from the FTX. As with the FTX, use only fibers with APC connectors. The **RF-OUT** connector is for connection of a 50 or 75 ohm coax for your L-band RF output. As with the FTX, connector types are dependent on model.

The FRX display screens are similar to those of the FTX with the exception that there are only 3 screens: **Power Status**, **Link Status**, and **Display Config**. Navigation is as described in the FTX section. The **Display Configuration** screen is identical to that of the FTX. The

Power Status screen for the FRX differs from the FTX in that only **MAIN PWR** is shown. An example of the FRX Power Status screen is shown below:

The **Link Status** screen for the FRX differs from that of the FTX in that instead of laser current and status, effective link gain is displayed as **INPUT**, along with received **RF SIG**nal **STATUS**. Sufficient link gain from FTX to FRX is needed for good RF signal integrity. As with the other status screens, parameters in spec will be shown in green, otherwise they will be red. Below are some examples of displays where both the link gain and RF output signal integrity are good; where the link gain has degraded but not yet to the point where RF output signal integrity is impaired; and finally an example where link gain has degraded to the point where RF output signal integrity is impaired. Link gain should be between -8 to +9dB.



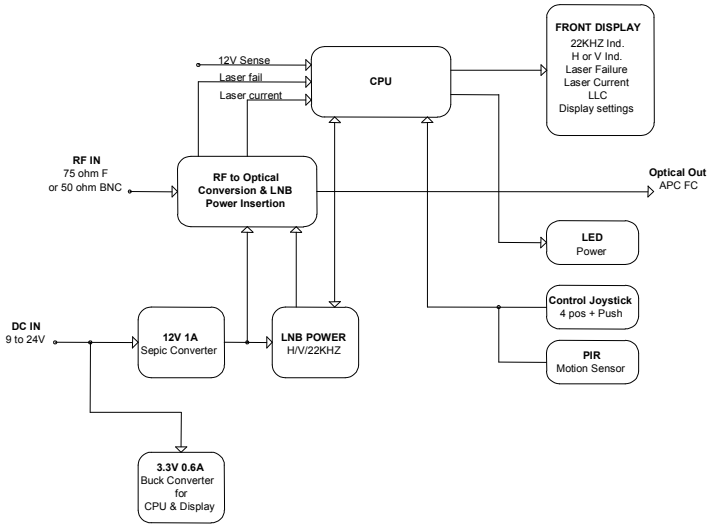
INSTALLATION

The SL2150 Series operates from 85 to 240 VAC with the included wall-mount 12V power supply or other source in a range from 9 to 24 VDC and at least 10W of power. It uses a coaxial type connector (sleeve ground) on the rear panel labeled **POWER**. If desired, the units can be powered from a battery pack or automotive battery instead of the wall unit.

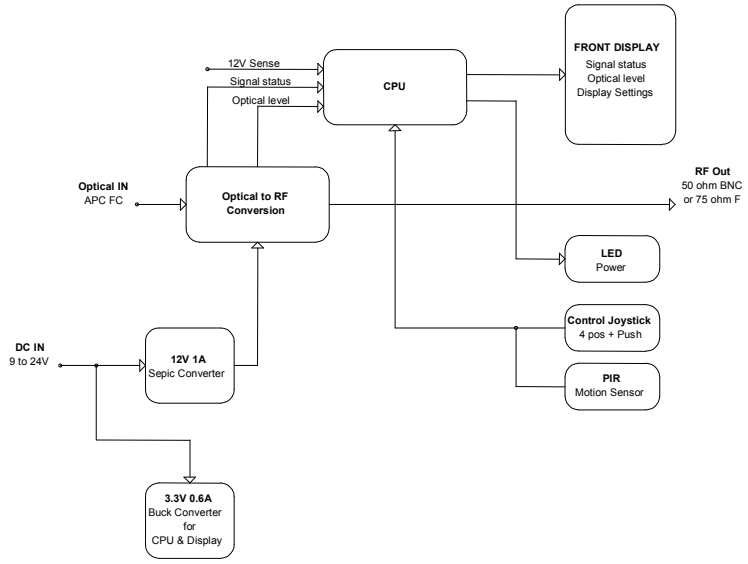
If the dish uses LNB power, it should be connected to **RF-IN** before power is applied to the FTX. Otherwise, hot-plugging the dish to **RF-IN** may cause the power supply overcurrent protection to trip, and a fault condition to occur as evidenced by the **POWER** LED flashing red. If this happens, remove power to FTX and try again after a few minutes. Once the dish is connected to **RF-IN**, the SL2150 Series does not have any special sequencing requirements for connection of fiber, **RF-OUT**, or power. RG58/59 or other 50/75 ohm coax cable must be used for the RF inputs and outputs, and single mode fiber with the proper APC connectors must be used for the fiber link. Multimode fiber cannot be used reliably with the SL2150 series. The SL2150 Series come standard as stand-alone units. An optional rack-mounting kit is available to mount up to 3 units in a 1 Rack-unit or 1 ¾" by 19" rack space. The part number is –RMT.

APPENDIX A. Block Diagrams

LBAND TX BLOCK DIAGRAM



LBAND RX BLOCK DIAGRAM



APPENDIX B. Technical Specifications

General

Dimensions (LxWxH):	7.09"x5.57"x1.52" (141x180x37mm)
Weight (Each end)	24 oz (0.68Kg)
Operating Temperature Range	0° C to +50°C
Relative Humidity	0 to 95%
Storage Temperature Range	-20° C to +70°C
Frequency Range	950 – 2150 MHz
Flatness	+/- 1.25 dB
IMD	-62 dBc
CNR	56 dB
Gain Stability	0.25 dB
RF Link Gain (short distance)	9dB +/- 3dB
Noise Figure	20 dB
Link budget (Standard DFB)	Up to 50Km

Transmitter (-FTX)

Power:	9-24V / 10W
Wavelength (Standard DFB)	1310nm Single Mode
Wavelength (CWDM or 1550nm option)	1470 to 1610nm
Optical Power	4.5 dBm
Laser Safety	Class 1
Optical Connector	APC ST, FC, SC, or LC
RF Input	F 75 Ohms / BNC 50 Ohms
Return Loss	>15dB
LNB voltages (LCC off)	13V Vert. / 18V Hor.
LNB voltages (LCC on)	14V Vert. / 19V Hor.
Max LNB current	400ma.
Universal LNB (LO control)	22 KHz
Indicators	Power, 22KHz, Polarity, Laser
	Current/Status, Long Line Comp.

Receiver (-FRX)

Power:	9-24V / 5W
Wavelength	1100 to 1600nm
Optical Sensitivity	-16dBm
Optical Connector	APC ST, FC, SC, or LC
RF Output	F 75 Ohms / BNC 50 Ohms
Return Loss	>15dB
Max Input Power	+15dBm
Indicators	Power, Optical Power, Signal Status

Specifications are subject to change without notice.