LTX-7215
Fiber Optic Link

Operating Instructions

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Quick Start Page

1. Connect a Singlemode fiber optic patchcord between the ST connectors on the rear panel of each unit.

2. Set power switch to off

3. Set controls on both units to:

   POWER - Off
   INPUT Z - 1 M
   RANGE - ± 5 V

4. Connect the power supply plugs to the connector on the back of each units.

5. Plug the power supplies into a wall socket.

6. Connect a signal source to the transmitter Input BNC connector.

7. Connect the receiver output to an oscilloscope.

8. Switch the power switches to ON.

9. The input signal should now be visible on the oscilloscope.

Contents

Introduction

The LTX-7215 Fiber Optic Link system comprise a convenient product that is intended to transmit analog and digital information to a remote location via fiber optic cable. Its primarily designed to be used in those situations where the signal of interest has a high common mode voltage with respect to the measurement equipment. Such situations arise in plasma physics experiments, power transmission equipment, and high power laser systems. Trigger information from electrically noisy sources such as high current discharge laser systems may be transmitted without conducting Electro-Magnetic Interference, (EMI) to the measurement or control equipment.

The system transmits an analog signal plus four digital input channels simultaneously. The input analog signal may range in frequency from DC to 25 MHz (-3 dB point). The digital signals may switch at up to 50 Mb/s rates and are independent. The analog input may be terminated at 1 Megohm or 50 Ohms depending on the front panel switch. The output impedance is always 50 ohms. Analog signals may range from -5 to +5 volts. The output signal will have a one-to-one correspondance, i.e. a gain of +1. When the front panel selector switch is set to +/- 1V F.S. the gain is +5, ie. a 1 volt input signal will result in a five volt output signal. The digital inputs accept TTL, CMOS or LVTTL levels and output LVTTL levels, i.e. 0 to 3.3V for a logic zero and logic one respectively. The sense is non-inverting.

Unpacking and Inspection

Prior to shipment this instrument was inspected and found to be free of mechanical and electrical defects. Upon acceptance by the carrier he assumes responsibility for its safe arrival. After unpacking, examine the unit for any evidence of shipping damage. Should you receive this instrument in a damaged condition, apparent or concealed, it must be noted on the freight bill or express receipt and signed by the carrier’s agent. Failure to do so could result in the carrier refusing to honor the claim. Upon filing a claim TTI should be notified.

Power Considerations

The LTX-7215 operates from a regulated 9 VDC wall-mount power supply. These power supplies operate with line voltages ranging from 95 to 260 VAC, 50-60 Hz. Four interchangeable power line connectors are supplied that are compatible with connectors used in North America, Continental Europe, Australia, and the United Kingdom. Do not use with any other wall-mount supply or damage may result.

Theory of Operation

The LTX-7215 amplifies, filters and digitizes the input analog signal to 12-bit precision at a 100 MS/S rate. The twelve bit digital data from each sample is combined with the state of the four digital input channels to form a sixteen bit word. This word is converted to an 8b/10b code and transmitted as a twenty bit word. This process is repeated at a 100 MHz rate resulting in a 2 Gb/s data stream. This data is converted to an optical bitstream and transmitted via a user-supplied optical fiber.

The companion unit the optical bitstream and converts it to a digital signal. It then decodes and de-multiplexes this data. Twelve bits are presented to a fast D/A converter and post amplifier which drives the analog output port and four bits are latched and presented at the digital output ports. The system is intended for use with singlemode fiber.

Operating Considerations

The LTX-7215s are calibrated in pairs. Pairs have the same serial number with an A or B suffix. If converters are used with a units that do not have the corresponding serial numbers, there can offset error of + or - 30 mV and gain errors of one to two percent.

The LTX-7215 system may be used to transmit signals from a source that is distant or at a different ground potential with respect to measuring devices such as an oscilloscope. The input signal must be in the range of 0 - ± 1 V or 0 - ± 5 V depending on the range selected. Digital signals may be transmitted as well. TTL, CMOS or LVTTL level signals are acceptable. The output signals are LVTTL (0-3.3 V).

For high speed signals transmitted via any significant amount (electrical length comparable to rise/fall times) of coaxial cable, a 50 ohm termination may be switched in to preclude distortion and reflections from a mismatched transmission line.

The power supply for the unit must be at roughly the same potential of the signal common mode voltage. For example, using the unit at a 10 000 V potential while it is utilizing the wall mount power supply at conventional line potential will result in a *hazardous situation and certain damage to the equipment*. An isolation transformer with sufficient isolation voltage rating must be used to power the wall mount supply. Alternatively the internal rechargeable battery option may be used to preclude the need to accommodate high common mode potentials.

Operating Considerations

(Continued)

The red LED labeled Optical Overload indicates that the input signal exceeds the maximum input voltage for the range in use.

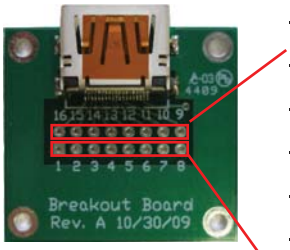
The green (Optical Siganl) LED indicates that unit is receiving an adequate optical input signal. If the indicator goes out, the companion has lost power or the connecting fiber is disconnected or broken.

For units equipped with the internal battery option, there is a Low Battery Warning LED located on the rear panel of the units. This LED will begin to flash when the battery has 10 to 15 minutes of operation remaining. At the end of this time the unit will shut itself down.

The controls and their functions are indicated on the following pages.

The electrical output signal has a 10 V peak to peak output into an open circuit. The maximum output into a fifty ohm load is 8 V peak to peak.

HDMI Breakout Board Wiring Scheme

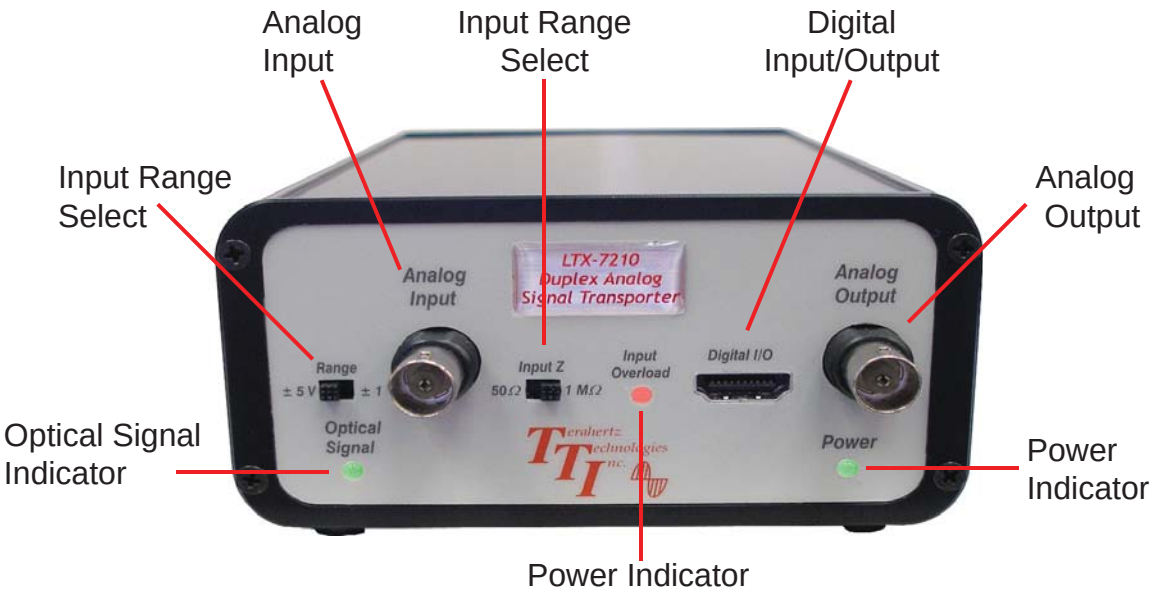


Input Channel	Pad Number	Output Channel	Pad Number
0	9	0	16
1	10	1	15
2	11	2	14
3	12	3	13

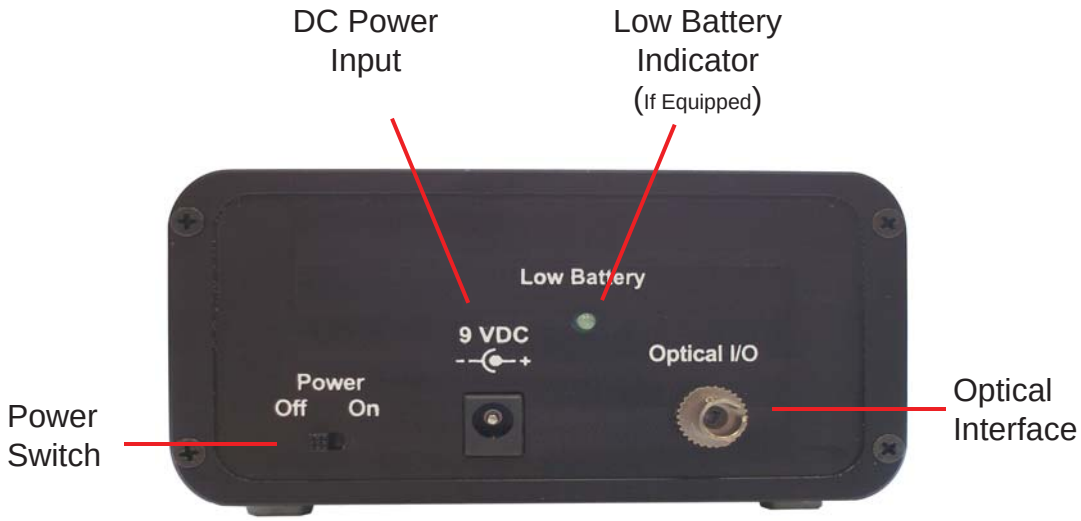
Pads 1-8 are Ground

Operating Considerations

Front Panel



Back Panel



Specifications

Analog Channels	
Number of Analog Channels	1
Analog Signal Bandwidth	DC to 25MHz (-3 dB)
Resolution	12 Bits
Input Voltage Ranges	+/- 1 V or +/- 5 V
Transfer Accuracy	+/- 10 mV offset, +/- 0.1% Full Scale (100Hz sine wave 8v pk-pk)
Output Impedance	50 Ohms
Output Drive Capability	+/- 5 V open circuit, +/- 2 V into 50 ohm load
Input Impedance	50 Ohms or 1 Megohm || 20 pF, (selectable)
A/D Sampling Rate	100 Mega samples p/s
Digital Channels	
Number of Digital Channels	4
Digital Inputs	TTL, LVTTL, CMOS compatible
Digital Outputs	LVTTL (0 - 3.3 V)
Signal Latency (with one meter of fiber)	Approximately 300 ns
Digital Channel Switching Rate	0 - 50 Mb/s
General	
Laser Wavelength	1310 nm +/- 20 nm
Optical Transmission Rate	2.0 Gb/S
Loss Budget	7 dB
Laser Safety Classification	Class I safety per FDA/CDRH and IEC-825-1 regulations
Typical Transmission Distances	10 KM with 9/125 micron fiber
Fiber Optic Connectors	ST standard, FC available upon request
Analog Connector	BNC
Digital Connector	(Stripped Cable Supplied)
LED Annunciators Provided	Input Overload, Optical Signal, Low Battery Warning and Power
Power Supplies	Wall Mount, Universal, US, UK, Continental Europe and Australian plugs included
Power Requirements	95 - 260 VAC, 50 - 60 Hz, 16 VA Max.
Batteries/hrs of Operation	6 AA NiMH / 2 hrs
Operating Temperature Range	0 - 40 C
Transmitter Dimensions (mm	214 L x 114 W x 59 H
Weight (each)	0.578 Kg
Standard Warranty	Two Years, Components and Workmanship, 30 day Satisfaction Guarantee

Battery Replacement

To replace batteries follow these procedures. Carefully remove the top two screws from front panel and the top two screws of the back panel that retain the top cover of the unit. With the LTX unit laying flat, carefully lift of the top to expose the two battery compartments. Remove the screw that holds each the battery covers in place. Replace only with 6 AA NiMH batteries. If you install NiMH batteries that are dead or less than 1 volt each, charge these batteries for one (10) hours before using the LTX72XX.

For maintenance, batteries should be recharged on a monthly basis.

WARNING: To Prevent Fire or Shock Hazard: Do not install other battery types; Do not expose the power supply to rain or excessive moisture; Do not use the power when there are signs of damage to the enclosure or cord; Do not use any other power supply than the one provided with this instrument. Any other condition will void the warranty.

Service Information

Products manufactured by Terahertz Technologies Inc.(TTI) are designed and fabricated to provide reliable performance. However, in the event that service is required, both telephone technical assistance and factory repair services are available. Call (315) 736-3642 for information.

For IN-WARRANTY REPAIRS, call us to obtain a Returned Material Authorization number, (RMA Number). All products are to be returned to TTI with freight charges pre-paid. Those products sent under warranty will be returned to our customers pre-paid. We cannot be responsible for returned products that do not reference the TTI RMA number.

For OUT-OF-WARRANTY repairs, services are billable for both time and materials.

LIMITED WARRANTY

TERAHERTZ TECHNOLOGIES INC. (“TTI”) WARRANTS THAT TO THE FIRST PURCHASER, FOR A PERIOD OF TWO YEARS FROM THE DATE OF RECEIPT, THAT THIS PRODUCT (“THE PRODUCT”) WILL BE FREE FROM DEFECTS IN MATERIALS AND MANUFACTURING. THE FOREGOING WARRANTY IS THE ONLY WARRANTY, EXPRESS OR IMPLIED, GIVEN BY TTI, I.E., THERE IS NO WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. TTI HEREBY DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY OTHER THAN THE WARRANTY IN THE FIRST SENTENCE TO THE FULLEST EXTENT PERMITTED BY LAW. THE SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY IS REPAIR OR REPLACEMENT AT TTI’S OPTION OF ANY PRODUCT THAT PROVES TO BE DEFECTIVE IN MATERIALS OR MANUFACTURING WITHIN TWO YEARS OF RECEIPT OF THE PRODUCT. NOTE: THIS WARRANTY DOES NOT APPLY TO ANY PRODUCT WHICH HAS BEEN SUBJECT TO MISHANDLING, MISUSE, OR SERVICE BY UNAUTHORIZED PERSONNEL OR TO ANY PRODUCT WHICH HAS BEEN DAMAGED, MODIFIED, ALTERED OR TAMPERED WITH.
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