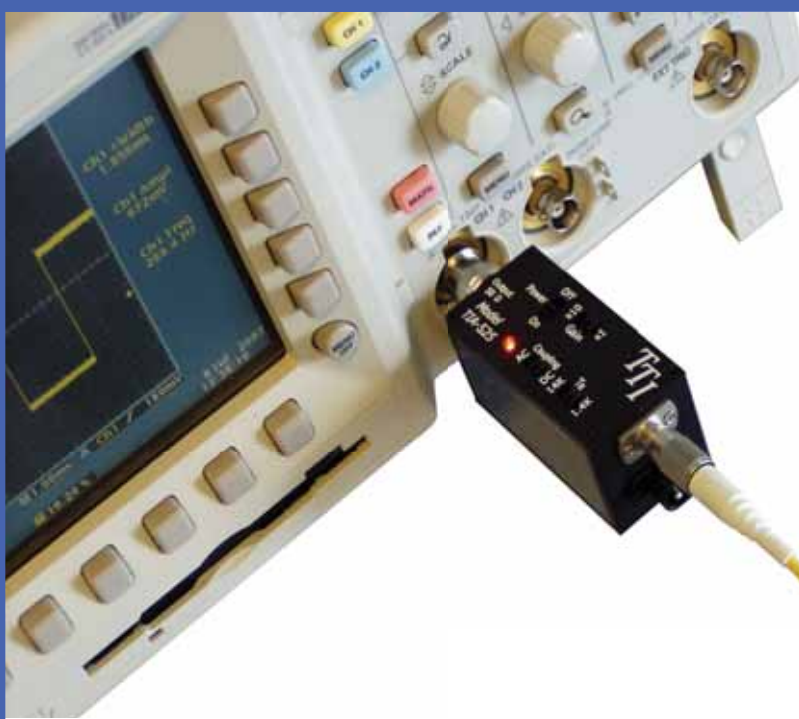




Photonic Test and Measurement Equipment

Terahertz Technologies Inc.



A Note From The President:

Thank you for visiting our web site, and your continued loyalty and support for our company and industries.

The founders and team members of TTI have a wealth of experience in the Photonics and Fiber Optics test and measurement industry dating back to the early 1970s when fiber was still in its infancy. After many years of ingenuity and dedication, we founded TTI in 1989 with the purpose of continuing to delight our customers, assist them in finding the best solutions, and keeping abreast of the technologies they deploy. Our roots may be in the Mohawk Valley Fiber Optic Industry of central New York, but our reach is global, and we pride ourselves in being a world class producer of the high tech solutions our customers require.

Our technology and product development experiences include design and marketing the world's first commercial processor driven Optical Time Domain Reflectometer. Other historic developments include Radiometric Energy and Power Meters, Optical Choppers, Space Probe Mission Sensors, and the industry standard Electrically Calibrated Pyroelectric Radiometer.

Over the decades we continued developing and refining our technologies with recent introductions in our full line of fiber optic test equipment including state of the art Optical Time Domain Reflectometers, hand held Optical Spectrum Analyzers, CWDM Channel Analyzers, Tunable Laser Sources and advanced autotest/autowave Loss Test Sets.

We also have a full line of optical to electrical converters, fiber optic links and a fiber optic video link system. We offer an optical chopper, laser power and energy meter, a fiber optic laser tachometer, photodiode transimpedance amplifier, and various other custom opto-electronic products that are utilized in the automotive, fiber optics, communications, photonics, power generation and medical equipment industries and for research laboratories, government entities and educational organizations worldwide.

Through our experiences the principle engineers at TTI are proud to have amassed over 100 years of combined experience in photonics and fiber optic instrumentation. We also are extremely proud to be one of the few USA developers and manufacturers of OTDRs and high tech photonics equipment, and look forward to maintaining this commitment.

In closing, we'd like to assure you that we are totally committed to our mission of providing leading world class quality solutions for our colleagues and friends. We maintain a passion for investments in our equipment designs, and development of exceptional customer relations through cooperation and training. We share this commitment in developing a superior TTI team through education, training and personal development.

Thank you for the opportunity to be your loyal servants,

Mike and the TTI Team

Mission Statement:

Provide world class test and measurement designs in the industries we serve including Fiber Optics and Photonics technologies, and to continue with our passion for producing the highest quality equipment solutions in these industries. This is our commitment to excellence for our customers, employees, stakeholders and the communities we thrive in.

C-995 Optical Chopper



Features:

- Wide Frequency Range 4 Hz to 5000 Hz
- Rock Solid Crystal Controlled Frequency
- Large 5 Digit LED Display
- Frequency resolution of 0.001 Hz
- External Clock Synchronization
- Covers 4 Hz to 5 KHz with only one blade
- Computer Interface for easy control
- Enclosed Chopper Blade

The C-995 is a microprocessor-based control system that utilizes direct-digital-synthesis to deliver precise optical chopping rates from 4 Hz to 5000 Hz. Equipped with a large five-digit LED readout, the C-995 controller enables digital entry of the desired chopping rates from the front panel. Additionally, the C-995 is equipped with a bi-directional Rs-232 port that permits the user to set the desired chopping rate to a resolution of .001 Hz and to read the status of the instrument.

The C-995, designed with a phase-locked-loop control system, allows the chopping rate to also be synchronized to a user-supplied external clock ranging from 4 Hz to 5 KHz. The controller is then used to measure and display the frequency of the external clock.

The C-995 chopping head is attached to the controller by means of a 10 foot coiled cord. The precision etched blade is fully enclosed for protection from inadvertent damage. (An optional exposed blade version is also available.)

There are two apertures and two sections (30 slots and 3 slots) for the high and low frequency ranges, respectively. The aperture diameter is 15 mm with a slot width of 4.5 mm (30 slot section) or 30 mm (3 slot section). The small 4.75 inch square outline and two inch maximum depth permits easy integration into compact optical setups. Dual #8-32 mounting holes permit the apertures to be placed at a height as low as 0.75 inches above an optical bench, or with the included 1/2 inch rod and stand, as high as 13 inches above the mounting surface.

The ease of use and convenience of this instrument are matched only by the high performance to price ratio that is typical of products from Terahertz Technologies Inc. The C-995 is backed by our standard two year warranty and our guarantee of customer satisfaction.



Specifications	
Chopping Frequency Range	4 Hz to 500 Hz (Inner slots), 40 Hz - 5 KHz (outer slots)
Aperture Size	0.6 inch diameter (15 mm), and 0.6 inch by 0.2 inch (15 x 4.5 mm)
Frequency Control	Phase-Locked-Loop, Direct Digital Synthesis
Frequency Uncertainty	±.0025 % of setting
Phase Jitter	0.1 % peak to peak, 3 slot section, 1.0 % peak to peak, 30 slot section
Settling Time to Phase Lock	< 3 seconds
External Clock Input Requirements	TTL, CMOS Compatible Square Wave, 4 Hz to 5000 Hz
Sync Signal Output	TTL, CMOS Compatible Square Wave
Display	Five Digit, high intensity green, 0.5 " high
Temp. Coefficient of Chopping Frequency	< 10 ppm/C
Frequency Resolution (W/Rs-232 Control)	.001 Hz
Frequency Resolution (W/Front Panel Control)	.01 Hz
Counter Resolution using External Clock	0.1 Hz, 1 Hz
Rs-232 Interface	9600 Baud, N-8-1, 3 wire
Chopper Head Mounting	Standard 8-32 tapped holes, mounting rod and stand is provided
Chopper Blade Diameter	4.1 inch diameter
Operating Temperature Range	0 - 40 C
Dimensions (Head)	4.5 " H x 4.5 " W x 2 " D, 114 mm x 114 mm x 51 mm
Dimensions (Controller)	2.7 " H x 7 " W x 9.1 " D, 69 mm, 178 mm, 231 mm
Interconnecting cable supplied	Coiled Cord 10 feet max length
Power Requirements	95-260 VAC, 50-60 Hz, 15 VA Max
CE Certification	Yes
Weight	3 lbs, 1.36 Kg
Accessories Provided	Mounting rod and stand, Rs-232 cable, Power Cord, Operating Manual
Standard Warranty	Two years, Components and Workmanship, 30 Day Satisfaction Guarantee
Application Software Provided	Downloadable from TTI website, www.terahertztechnologies.com

TTI reserves the right to change specifications without notice

**Enclosed
Chopper Head
Assembly**



**Open
Chopper Head
Assembly**



PDA-750

Photodiode Transimpedance Amplifier



Features:

- Eight Decade Dynamic Range
- Less Than 1 pA Noise
- Maximum Resolution 1 part in +/- 20 000
- Rechargeable Ni-mH Batteries for Low Noise
- Digital Input of A/W value yields readout in Watts
- Computer Interface for easy control
- Background Cancellation of +/- 200 %
- Digitally set bias source from -14.00V to +14.00V

The PDA-750 is a low noise, high gain, transimpedance amplifier designed to provide a direct digital readout of the current generated from a photodiode photomultiplier, or other similar current source. With full scale input ranges of ± 20 nA to ± 20 mA and a noise level of less than 1 pA, the PDA-750 offers superb dynamic range. Digital entry of an Amps/Watt setting via the front panel controls permits the instrument to display current measurements in units of Watts. The A/W setting ranges from 1.000 to 0.100. A variable bias supply is built into the instrument and may be switched into series with the device under test. It can supply digitally selectable voltages ranging from -14.00 to + 14.00 volts. The Offset control permits the nulling of background signals as large as $\pm 200\%$ of the range currently in use. Rechargeable batteries isolate the unit from the mains and eliminate the effects of ground loops and/or power line noise that may be present during sensitive measurements. They will power the instrument for approximately 10 hours between charges. The unit may be operated normally while the batteries are charging.

The large 4 1/2 digit Liquid Crystal Display provides a maximum resolution of 1 part in $\pm 20,000$, thus enabling the detection of very small changes in the signal under test. An analog output port provides a ± 2 Volt, full-scale signal that is directly proportional to the display reading of $\pm 20,000$ counts. The PDA-750 is equipped with a bi-directional Rs-232 serial port that enables the user to remotely control the instrument and read data and the instrument's status.

Applications for the PDA-750 include: serving as a precision readout device for Unity Quantum Efficient detectors such as the QED-150 manufactured by UDT Instruments, characterization of detector dark current, a readout interface for spectrometers, spectral calibration of detectors, a high gain precision transimpedance amplifier and as a sensitive, high precision optical power meter. The ease of use and convenience of this instrument is typical of TTI products. This instrument is covered by our standard two year limited warranty and guarantee of satisfaction. The PDA750 may be purchased with a 10DP Silicon Photodiode.



Specifications	
Full Scale Ranges	± 20 nA to ± 20 mA in decade steps, 1 pA maximum resolution
Maximum Input Current Without Damage	± 25 mA
Measurement Uncertainty	± 0.05 % of Reading ± 2 Least Significant Digits
A/W Setting	0.100 to 1.000 A/W in increments of .005 A/W
Input Impedance (DC to 2 KHz)	Zero Ohms Virtual Ground, Single Ended
Input Capacitance	25 pF
Output Impedance	100 Ohms
Bias Voltage	Selectable from - 14 V to + 14 V in 6.5 mv increments
Analog Output Port	± 2 V corresponds to ± 20 000 counts of range in use
Noise and Drift	$< \pm 1$ pA/5 seconds on most sensitive range
Background Cancelation	± 200 % of the range in use
Analog Output Port Frequency Response	DC to 2 KHz, most sensitive range, DC to 40 KHz, least sensitive range
Rs-232 Interface	9600 Baud, N-8-1, 3 wire, Bi-directional, Cable Provided
Display	4 1/2 Digit LCD, 0.4 " high
Power Requirements	Rechargeable Ni-mH batteries provide approximately 10 hours of use
External Power Supply/Charger	85 - 250 VAC, 50-60 Hz, < 9 VA
Mains Adaptors	Adaptors provided for US, Continental Europe, Great Britain and Australia
Operating Temperature Range	0 - 40 C
Dimensions	5.5" W x 2.5" H x 8.5" L (140 x 63 x 215 mm)
Weight	2 Lbs., 0.9 kg (excluding external power supply)
Interconnecting cable supplied	Rs-232, 14 feet max length
CE Certification	Yes
Accessories Provided	Rs-232 cable, Power Supply/Charger, Operating Manual
Standard Warranty	Two years, Components and Workmanship, 30 Day Satisfaction Guarantee
Application Software Provided	Downloadable from TTI website, www.teratec.us

TTI reserves the right to change specifications without notice



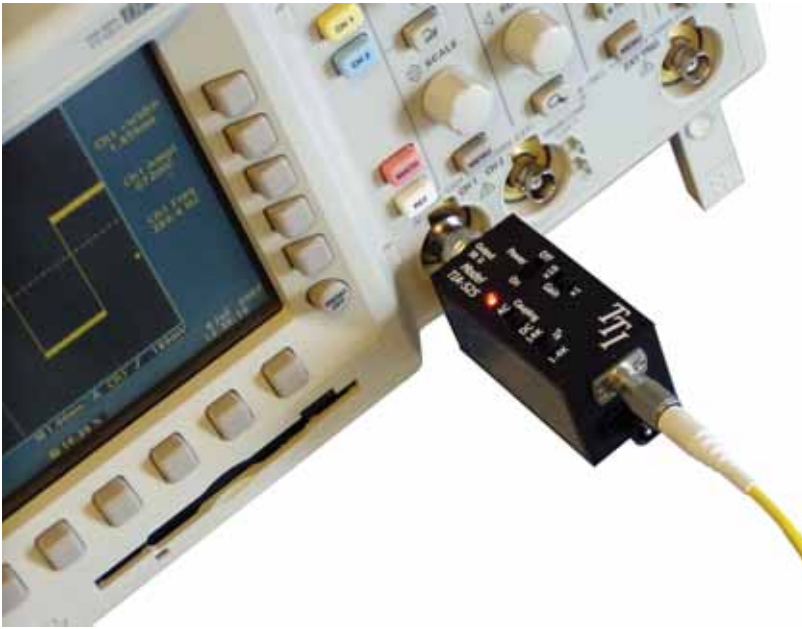
PDA750 with 10DP photodiode

PIN 10DP Photovoltaic Detector	
Active Area	Area (mm ²) 100, Dimensions (mm) 11.28 ^φ
Peak Responsivity Wavelength typ. (λ _p)	970nm
Responsivity at λ _p	Min. 0.55 A/W and typ. 0.60 A/W
Capacitance (pF) OV	9800 Max.
Shunt Resistance (GΩ at -10mV)	Min. 0.05 A/W and Typ. 0.2 A/W
NEP @ 0V and 970nm	6.8 3-15 typ.
Rise Time @ 0V and 632nm with 50Ω	1000 ns typ.
Temp range	Operating -40C to +100C, Storage -55C to +125C

Ordering Information

PDA-750	Photodiode Amplifier
PDA-750-10DP	Photodiode Amplifier with 10DP Si Photodiode with Stand and Holder
10-DP	10DP Si Photodiode with Stand and Holder

Optical to Electrical Converters

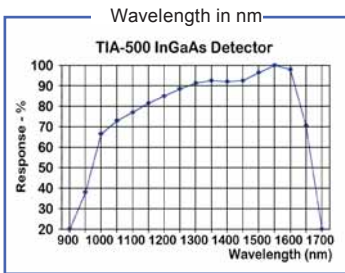


Features:

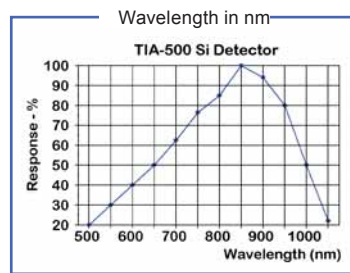
- 400 nm to 1700 nm wavelengths
- Battery or External AC Operation
- Bandwidth to 20 GHz
- Compact Size

The TIA-525, 527 and 952 series have BNC outputs for direct connection to your oscilloscope or digitizer. The TIA-1200, 2000, 3000, and 4000 use a type K SMA female output connector. The TIA525 offers a free space option. Patch cords and adapters can be supplied to mate with various fiber optic connectors. The TIA-525 and 527 have dual power capability, battery and external universal power supply.

Typical InGaAs Detector Response



Typical Si Detector Response



TIA-525

Model/BW	Detector	Wavelength	Power	AC/DC Coupling	Conversion Gain @ Peak Wavelength
TIA-525S-ST (125 MHz)	Silicon	400 -1000 nm	9 V Lithium Battery*/ Univ. Power Supply	Selectable	100,000 V/W
TIA-525I-FC or -ST (125 MHz)	InGaAs	850 - 1700 nm	9 V Lithium Battery*/ Univ. Power Supply	Selectable	100,000 V/W
TIA-527-FC (125 MHz)	Matched InGaAs	850 - 1700 nm	9 V Lithium Battery*/ Univ. Power Supply	Selectable	100,000 V/W
TIA-952-FC (750 MHz)	InGaAs	850 - 1700 nm	Universal Power Supply	AC	2500 V/W
TIA-1200-FC (12 GHz Typ.)	InGaAs	900 - 1700 nm	Universal Power Supply	DC	0.8 A/W
TIA-2000-FC (20 GHz Typ.)	InGaAs	900 - 1700nm	Universal Power Supply	DC	0.8 A/W
TIA-3000 (10 GHz)	InGaAs	900 - 1700 nm	Universal Power Supply	AC	500 V/W

*30 hrs. avg. (no load) 9 V Lithium, use of std. 9 Volt battery will provide approx. 1/3 life of Lithium battery.

Specifications subject to change without notice



O/E Converter Selection Chart

	TIA-525	TIA-527	TIA-952	TIA-1200	TIA-2000	TIA-3000
Detector Types	Silicon (400-1000nm) InGaAs (850 -1700nm)	Matched InGaAs (850 -1700nm)	InGaAs (850-1700nm)	InGaAs (900 -1700nm)	InGaAs/InP (900-1700nm)	InGaAs (900 -1700nm)
Transimpedance Ranges	1.4 K, 14 K	1.4 K, 14 K	1.2 K	50 Ohm internal in parallel, user supplied load	50 Ohm internal in parallel, user supplied load	$V_R = 500 \text{ V/W}$
Current Responsivity	N/A	N/A	N/A	0.8 A./W @ 1550nm Typ.	0.8 A./W @ 1550nm Typ.	N/A
Post Amplifier Gain	1.0, 10.0 selectable	1.0, 10.0 selectable	1.0, 5.0 selectable	Not amplified	Not amplified	NA
Max. Linear Input Power	1.2 mW	1.2 mW	2 mW	3 mW	3 mW	1.25 mW
Max. Input w/o Damage	10 mW	10 mW	15 mW	10 mW	10 mW	2.5 mW
Bandwidth (-3 dB) 50 Ohms	DC - 125 MHz Tr =1.4K DC - 35 MHz Tr = 14K	DC - 125 MHz Tr =1.4K DC - 35 MHz Tr = 14K	30KHz - 800 MHz Gain 1.0 30KHz - 300 MHz Gain 5.0	DC to 12GHz Typ. 10 GHz Min.	DC to 20GHz Typ, 18 GHz Min.	100 KHz to 11 GHz (typ) 8.5 GHz (min.)
Output Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Output Connector	Male BNC	Male BNC	Male BNC	SMA Type K Female	SMA Type K Female	SMA Type K Female
F. O. Input Connector	ST, FC or Free-Space	FC	FC or ST	FC/UPC or FC/APC	FC/UPC or FC/APC	FC/UPC or FC/APC
Input Numeric Aperture	0.29	0.29	0.29	0.11 9 μm Singlemode	0.11 9 μm Singlemode	0.11 9 μm Singlemode
Inter-Stage Coupling	AC or DC selectable	AC or DC selectable	AC	DC	DC	AC
Output Offset Voltage	+/- .1 V at Max Gain	+/- .1 V at Max Gain	N/A	0	0	NA
Max Output Voltage	4 V pk-pk, no load, 2 V pk-pk 50 ohm load	4 V pk-pk, no load, 2 V pk-pk 50 ohm load	2 V pk-pk 50 ohm load	0.1 V	0.1 V	0.65 V into 50 Ohms
Noise Level	3 pW/Hz ^{1/2}	3.6 pW/Hz ^{1/2}	9.5 pW/Hz ^{1/2}	Dark Current <1.0 nA	Dark Current <1.0 nA	15pW/Hz ^{1/2}
Power Required	9 V Lithium Battery or Univ. Power Supply	9 V Lithium Battery or Univ. Power Supply	Universal Power Supply	Univ. Power Supply	Univ. Power Supply	Universal Power Supply
Dimensions	1.2W, 2.5L, 1.35H inches 30.5W, 63L, 33H mm	1.2W, 2.5L, 1.5H inches 30.5W, 63L, 32H	1.2W, 2.5L, 1.35H inches 30.5W, 63L, 33H mm	1.2W, 2.5L, 1.35H inches 30.5W, 63L, 33H mm	1.2W, 2.5L, 1.35H inches 30.5W, 63L, 33H mm	1.2W, 2.5L, 1.35H inches 30.5W, 63L, 33H mm
Weight	4 oz, 114 g	5.6 oz, 160 g	4 oz, 114 g	2.8 oz, 80g	2.8 oz, 80 g	2.8 oz, 80 g
Operating Temperature	0 to 40 C	0 to 40 C	0 to 40 C	0 to 40 C	0 to 40 C	0 to 40 C
Limited Warranty	2 yrs from date of receipt	2 yrs from date of receipt	2 yrs from date of receipt	2 yrs from date of receipt	2 yrs from date of receipt	2 yrs from date of receipt

Specifications subject to change without notice

LTX551x Analog/Digital Fiber Optic Links



- Features:**
- One analog plus up to four digital channels
 - DC to 25 MHz analog bandwidth
 - Input ranges of ± 1 V and ± 5 V
 - Analog signal digitized to 12 or 14 bit precision
 - DC to 48 Mb/s data rate (each channel)

The LTX-5510 and the LTX-5515 Signal Transports enables the precise conveyance of one analog channel plus up to four digital channels of information over fiber optic links ranging from meters to more than 10 kilometers.

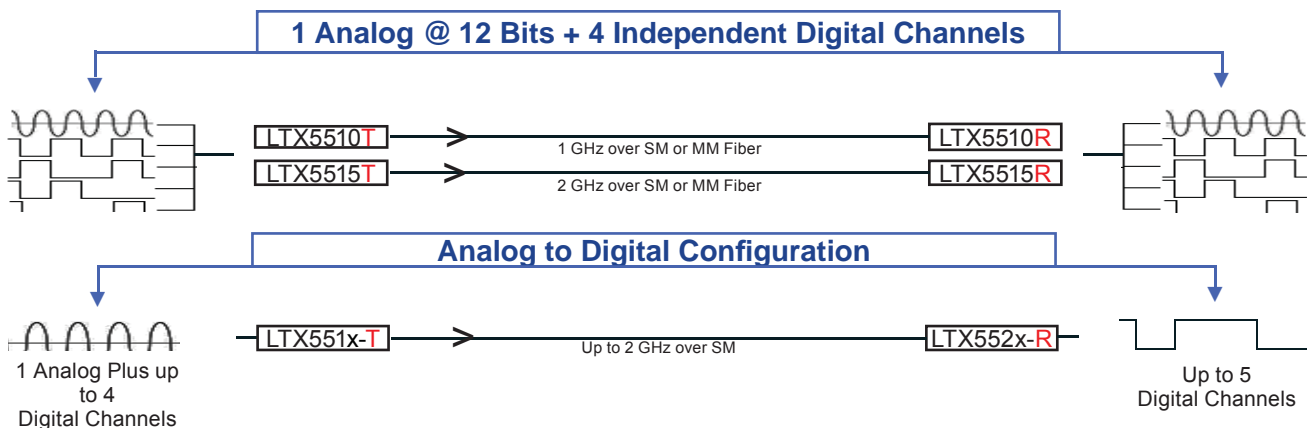
Incoming analog data is digitized to 12 or 14 bit precision at up to 100 mega-samples per second and transmitted over optical fiber at one to two gigabits per second depending on the model. The receiver acquires this digital data and accurately reconstructs the analog signal at the far end of the fiber optic link.

The analog signal bandwidth is from DC to 25 MHz (-3 dB). Two input voltage ranges are provided, ± 1 Volt and ± 5 Volts. The input impedance of the transmitter analog channel may be set to 50 ohms or 1 megohm (75 ohms is optional).

Multiplexed along with the analog data, are up to four independent TTL/CMOS/LVTTL digital signals that may be toggled at rates of up to 48 Mb/s.

The LTX-5510 and LTX-5515 models are available in multi-mode or single-mode versions depending on the transmission distance required. The LTX-55XX-850 transmits at 850nm over multi-mode fiber optic links of up to 500 meters in length, while the LTX-55XX-1310 transmits at 1310nm over single-mode fiber to span distances exceeding 10 km.

Applications include data acquisition for plasma physics experiments, signal transmission and control of equipment at high voltage potentials, transmission of high quality video, and precise noise-free signal transmission in hostile EMI environments.



Specifications

	LTX-5510	LTX-5515
Analog Signal Bandwidth	DC to 12.5 MHz (-3 dB)	DC to 25 MHz (-3 dB)
Input Voltage Ranges	+/- 1 V or +/- 5 V (selectable)	
Resolution	12 or 14 bit	
Transfer Accuracy	+/- 0.1% Full Scale, +/- 20 mV offset	
Signal Latency (with one meter of fiber)	Approximately 300 nS	
A/D Sampling Rate	50 Megasamples/S	100 Megasamples/S
Input Impedance	50 Ohms or 1 Megohm 20 pF, (selectable)	
Output Drive Capability	+/- 5 V open circuit, +/- 2 V into 50 ohm load	
Output Impedance	50 Ohms	
Digital Inputs	TTL, LVTTL, CMOS compatible	
Digital Outputs	LVTTL (0 - 3.3 V)	
Digital switching Rates	0 - 12 MHz	0 - 24 MHz
Digital Signal Edge Uncertainty	0 - 20 nS	0 - 10 nS
Laser Wavelength	850 nm +/- 20 nm or 1310 nm +/- 20 nm	
Optical Transmission Rate	1.0 Gb/S	2.0 Gb/S
Loss Budget	15 dB max	
Optical Return Loss	> 15 dB	
Laser Safety Classification	Class I safety per FDA/CDRH and IEC-825-1 regulations	
Typical Trans. Distances MM	500 M - 50/125μ and 300 M - 62.5/125μ	250 M - 50/125μ and 150 M - 62.5/125μ
Typical Trans. Distances SM	10 KM with 9/125 micron fiber	
Fiber Optic Connectors	ST standard, FC optional	
LED Annunciators Provided	Input Overload (TX), Optical Signal (RX)	
Power Requirements	9 - 24V DC, 500mA	
Power Supply Included	95 - 260 VAC, 50 - 60 Hz, 16 VA Max - Output 9VDC/.67A with Universal, US, UK, Continental Europe and Australian plugs included	
Fiber Optic Connectors	ST standard, FC available upon request	
LED Annunciators Provided	Input Overload (transmitter), Optical Signal - ON (receiver)	
Tx and Rx Dimensions	6.89L x 4.1W x 1.6H in. (175L x 105 W x 40 H mm)	
Operating Temperature	0 - 40 C	
Weight (each)	16.2 oz. (0.46 Kg)	
Standard Warranty	Two Years, Components and Workmanship, 30 day Satisfaction Guarantee	
Accessories Supplied	5 pin DIN connector for digital inputs/outputs, xmtr and receiver	

TTI reserves the right to change specifications without notice.

To Order:

LTX-551X-X-X

Optical Transmission Rate:
0 = 1 gigabit
5 = 2 gigabit

850
1310

Laser Wavelength:
= 850nm Multi-mode
= 1310nm Singlemode

Analog Bit Rate
Blank = 12 bit
14 = 14 bit

LTX552x Digital Fiber Optic Links



Features:

- Channel capacity up to 50 Mb/S
- Accepts LVTTTL and/or CMOS/TTL inputs
- Transmits 16 independent TTL signals over a single fiber
- Outputs are LVTTTL (0 - 3.3 V)
- 850 nm version for multimode links up to 500 M
- 1310 nm version for SM links up to 10 KM
- Paired with LTX-551x to configure remote high speed 12 or 14-bit A/D and D/A converter modules

The LTX-552x conveys sixteen independent channels of digital information over a fiber optic link ranging from meters to more than 10 kilometers.

Each of the 16 incoming TTL channels is sampled at up to 5×10^7 times per second, multiplexed and transmitted serially over an optical fiber at up to 2 gigabit per second. The receiver acquires this digital data and de-multiplexes it to 16 separate output ports. Each of these channels may be toggled at rates ranging from 0 to 48 Mb/S.

Two models are available. The LTX5520 transmits serially at 1 gigabit and the LTX5525 transmits at 2 gigabit over either SM or MM fibers. The distance between units determines the fiber required to complete the link. 850 nm units operate on multimode fiber up to 500 meters in length, while 1310 nm units operate with single-mode fiber to span distances exceeding 10 kilometers.

The LTX-5510 precision analog fiber optic link was the first in our series of "Signal Transporters". It digitizes an analog signal at a 50 Ms/S rate with 12-bit precision and reconstructs the signal at the LTX-5510 receiver by means of a fast D/A converter. If the user employs the LTX-5520 receiver with the LTX-5510 transmitter, the result is a remote fiber-coupled 12-bit data acquisition system.

Similarly one can employ the LTX-5520 transmitter with the LTX-5510 receiver to generate fast high-resolution analog signals at a remote location.

Applications include data acquisition for plasma physics experiments, signal transmission and control of equipment at high voltage potentials, operation through equipment at high voltage potentials, operation through Faraday shields, and precise noise-free signal transmission in hostile EMI environments



Specifications

	LTX-5520	LTX-5525
Number of Independent Channels	16	
Signal Latency (with one meter of fiber)	Approximately 300 nS	
Input Impedance	50 Ohms or 1 Megohm 20 pF, (selectable)	
Output Drive Capability	+/- 5 V open circuit, +/- 2 V into 50 ohm load	
Output Impedance	50 Ohms	
Digital Inputs	TTL, LVTTTL, CMOS compatible	
Digital Outputs	LVTTTL (0 - 3.3 V)	
Digital switching Rates	0 - 12.5 MHz (up to 24 Mb/s)	0 - 24 MHz (up to 48 Mb/s)
Digital Signal Edge Uncertainty	0 - 20 nS	0 - 10 nS
Laser Wavelength	850 nm+/- 20 nm or 1310 nm +/- 20 nm	
Optical Transmission Rate	1.0 Gb/S	2.0 Gb/S
Loss Budget	15 dB max	
Optical Return Loss	> 15 dB	
Laser Safety Classification	Class I safety per FDA/CDRH and IEC-825-1 regulations	
Typical Trans. Distances MM	500 M - 50/125 μ and 300 M - 62.5/125 μ	250 M - 50/125 μ and 150 M - 62.5/125 μ
Typical Trans. Distances SM	10 KM with 9/125 micron fiber	
Fiber Optic Connectors	ST standard, FC optional	
Signal Connectors	DB25 on input and output	
LED Annunciators Provided	Input Overload (TX), Optical Signal (RX)	
Power Requirements	9 - 24V DC, 500mA	
Power Supply Included	95 - 260 VAC, 50 - 60 Hz, 16 VA Max - Output 9VDC/.67A with Universal, US, UK, Continental Europe and Australian plugs included	
LED Annunciators Provided	Input Overload (transmitter), Optical Signal - ON (receiver)	
Tx and Rx Dimensions	6.89L x 4.1W x 1.6H in. (175L x 105 W x 40 H mm)	
Operating Temperature	0 - 40 C	
Weight (each)	16.2 oz. (0.46 Kg)	
Standard Warranty	Two Years, Components and Workmanship, 30 day Satisfaction Guarantee	
Accessories Supplied	db25 connectors for digital inputs /outputs	

TTI reserves the right to change specifications without notice.

To Order:

LTX-552X-X-X

Optical Transmission Rate:
0 = 1 gigabit
5 = 2 gigabit

Laser Wavelength:
850 = 850nm Multi-mode
1310 = 1310nm Singlemode

Optical Connector
Blank = ST
FC = FC

LTX7215 Bidirectional Analog/Digital Fiber Optic Link



Features:

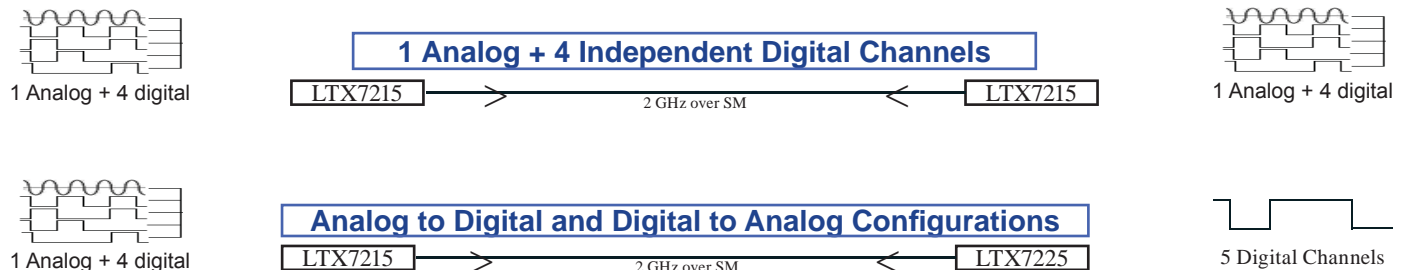
- Single Fiber Transceivers
- DC-25MHz Analog
- Four Independent Digital Channels
- 0 to 50 Mb/s Per Digital Channel
- +/-5V or +/-1V Full Scale I/O
- Digital LVTTTL, CMOS/TTL Input
- Analog I/O - 12 bit Precision
- AC/DC Operation

Transmit and receive precise analog data from DC to 25 Mhz over a single optical fiber!

The LTX-7215 Bidirectional Fiber Optic Link multiplexes one analog signal along with up to 4 independent TTL/CMOS/LVTTL digital channels to over 10 kilometers with a single fiber. The incoming analog data is digitized to 12 bit precision at 100 mega samples per second and the digital channels operate at data rates of 0 to 50Mb/s. This is then transmitted at 2 Gb/s second for distances up to 10 kilometers.

The digital signal is then received and the analog signal is accurately reproduced at the far end of the fiber optic link. The analog signal bandwidth may be from DC to 25 MHz (-3dB). The LTX-7215 has input voltage ranges of ± 1 Volt or ± 5 Volts. The input impedance of the analog channel may be set to 50 ohms or 1 megohm (75 ohms is optional). The LTX7215 series has a battery option that will allow for up to 3 hours of operation for experiments at extremely high potentials.

Applications include data acquisition for plasma physics experiments, signal transmission and control of equipment at high voltage potentials, transmission of high quality video, and precise noise-free signal transmission in hostile EMI environments.



Specifications

Analog Channel Specifications	
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

We welcome
the challenge of
custom applications

Digital Channel Specifications	
Number of Digital Channels	4
Digital Inputs	TTL, LVTTTL, 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
Digital Signal Edge Uncertainty	0 - 10 ns

Call, fax or E-mail us
with your
requirements

General Specifications	
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 9/125µm (SM) fiber
Fiber Optic Connectors	ST standard, FC available upon request
Analog Connector	BNC
Digital Connector	(Cable and Breakout Board Supplied)
LED Annunciators Provided	Input Overload, Optical Signal 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 / 3 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

TTI reserves the right to change specifications without notice.

Ordering Information	
LTX-7215-1310	Singlemode, 2.0 Gb/s Analog/Digital Signal Transporter
LTX-7215-1310-BAT	Singlemode, 2.0 Gb/s Analog/Digital Signal Transporter with Battery Pack

LTX7225 Bidirectional Fiber Optic Link



Features:

- Transmits 16 independent Channels
- Single Fiber Transceivers
- 0 to 50 Mb/S Bit Rate Per Channel
- 1310nm for Links to 10km
- Digital LVTTTL, CMOS/TTL Input
- Outputs are LVTTTL (0-3.3V)
- AC/DC Operation

Pair an
LTX-7225 with a LTX-7215
to configure remote
high speed, 12 bit
A/D and D/A converter links

The LTX-7225 Bidirectional Fiber Optic Link multiplexes up to 16 independent channels of digital TTL/CMOS/LVTTTL information to over 10 kilometers with a Singlemode fiber. The LTX-722X samples each of the channels at 100 million times a second, The signals are then multiplexed and transmitted serially over a single optical fiber at 2 gigabits per second. The far end of the fiber link demultiplexes the signal back into independent outputs. Each of these channels maybe be toggled at rates up to 50 Mb/S.

Using the LTX-721X in conjunction with a LTX-722X unit, results in a remote fiber-coupled 12-bit data acquisition system, digitizing the signal at up to 50 Mb/s and reconstructs the signal by means of a fast D/A converter. The units may also be employed in the reverse direction if desired.

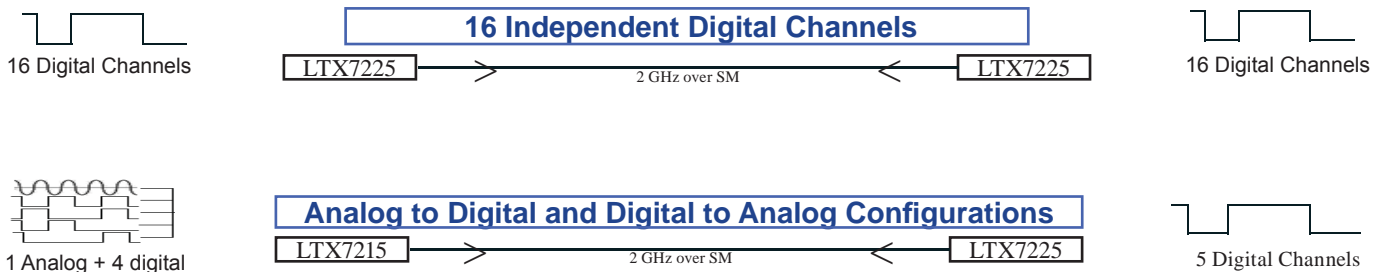
Applications include data acquisition for plasma physics experiments, signal transmission and control of equipment at high voltage potentials, operations through Faraday shields, and precise noise -free signal transmission in hostile EMI environments.



Specifications

Number of Digital Channels	16
Digital Inputs	TTL, LVTTTL, CMOS compatible
Digital Outputs	LVTTTL (0 - 3.3 V)
Signal Latency (with one meter of fiber)	Approximately 300 ns
Digital Channel switching Rate	0 - 50 Mb/S
Digital Signal Edge Uncertainty	0 - 10 ns
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	HDMI (Cable and Breakout Board Supplied)
LED Annunciators Provided	Input Overload, Optical Signal 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 / 3 hrs
Operating Temperature Range	0 - 40 C
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

Specifications subject to change without notice



Ordering Information	
LTX-7225-1310	Singlemode, 2.0 Gb/s 16 Channel Digital Signal Transporter
LTX-7225-1310-BAT	Singlemode, 2.0 Gb/s 16 Channel Digital Signal Transporter with Battery Pack

LT880 Laser Tachometer



Features:

- Remote Sensing of RPM and Angular Vibration
- No Special Reflective Tape Required
- Large 5 Digit LED Display
- Sensing rates to 40 000 PPS
- Ni-mH Powered with Fast Charger
- Measures RPM, RPS, PPS
- Entry of number of encoder sectors

The LT-880 Laser Tachometer is a hand-held, battery operated device that senses the passage of reflective/non-reflective markings on a rotating or linearly translated piece of machinery in order to determine the target's rotational rate or its linear velocity. The sensing head is remote from the electronics package and is fiber coupled. This permits measurement of objects in hostile environments or in hard-to-get-to locations. The sensed change in reflectivity from black to white generates a transition at its output.

This TTL/CMOS compatible signal may be utilized by a spectrum analyzer, computer or electronic counter in order to provide information concerning vibration, angular or linear velocity of the machinery under test. The high speed of the unit, 40,000 PPS, coupled with its small spot size can provide high resolution measurements unattainable with conventional incandescent source tachometers.

Use the right angled adapter if it is not possible to aim the standard optical head at the target. The transmissive head is a beam breaking device that allows a <math><1/4</math> inch slotted target to pass through the heads transmitter and receiver.

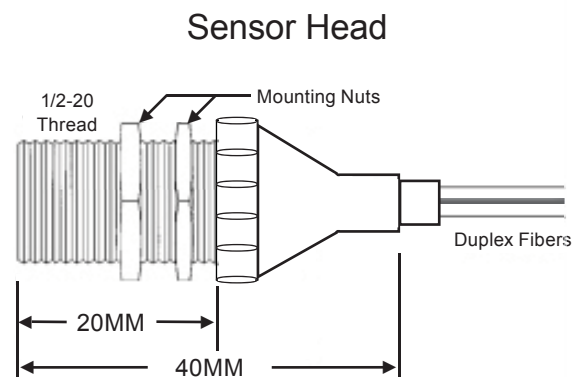
A six digit LCD display indicates the rate of passage of the white/dark areas of the encoder and registers the results in units of revolutions per minute, (RPM), revolutions per second, (RPS), or pulses per second (PPS). The reading is updated twice per second. The user may input the number of pulses per revolution generated by the encoder for use in the subsequent calculations. They may range from 1 pulse per revolution to 255 pulses per revolution.



LT880OH-RF with RAA-LT880, Right Angled Adapter Installed



RAA-LT880 Transmissive Head



Specifications

Units of Measurement	Revolutions per Second, Revolutions per Minute, Pulses per Second
Measurement Update Rate	Twice per Second
Readout Uncertainty	$\pm .02$ % of Reading, ± 1 LSD
Maximum Measurement Rate	40 000 PPS
Range from Sensor to Target	12 to 125 mm (using white copier paper)
Laser Wavelength	650 nm \pm 10 nm
Laser Output Power	< 2 milliwatts
Laser Spot Size	< 1.9 mm @ 13 mm range
Laser Beam Divergence	< 13 milliradians
Display	Six Digit LCD, 0.375 height, Six LED annunciators
Frequency Output Port	TTL pulse for each reflective sector sensed, (0 to 5 volts)
Output Impedance	100 Ohms
Standard Fiber Optic Cable Length	5 meters
Standard Fiber Types	Receiver - 400 u m core, Transmitter - 62.5 um core
Standard Connector Type	ST Type
Batteries Supplied	Four AA NimH, 2700 mAh
Charger Power Requirements	95 - 260 VAC, 50-60 Hz Universal, < 10 VA
Mains Connectors Supplied	North American, Great Britain, Continental Europe, Australian
Charging Time	Approximately two hours
Dimensions (Controller)	200 mm L x 98 mm W x 38 mm D
Dimensions (Sensor)	40 mm L x 13 mm Diameter, 1/2 by 20 Thread, Jam Nuts Included
Operating Temperature, Electronics, Sensor Head	0 - 50 C, - 40 - 120 C
Weight	0.46 Kg
Accessories Provided	Carrying Case, Batteries, Power Supply/Charger, Operating Manual
Standard Warranty	Two years, Components and Workmanship, 30 Day Satisfaction Guarantee

TTI reserves the right to change specifications without notice

Ordering Information

LT-880	Fiber Optic Laser Tachometer (Includes 5 Meter Cable with Reflective Sensor Head)
LT-880-10	Fiber Optic Laser Tachometer (Includes 10 Meter Cable with Reflective Sensor Head)
LT-880-T	Fiber Optic Laser Tachometer (Includes 5 Meter Cable with Transmissive Sensor Head)
LT-880OH-RF	5 Meter Cable w/Reflective Sensor Head for use with LT 880
LT-880OH-T	5 Meter Cable w/Transmissive Sensor Head for use with LT 880
RAA-LT-880	Right Angle Adapter for use with LT-880 Reflective Optical Head



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