Time-over-Fiber
InterFacility Link Systems

Rev. V1

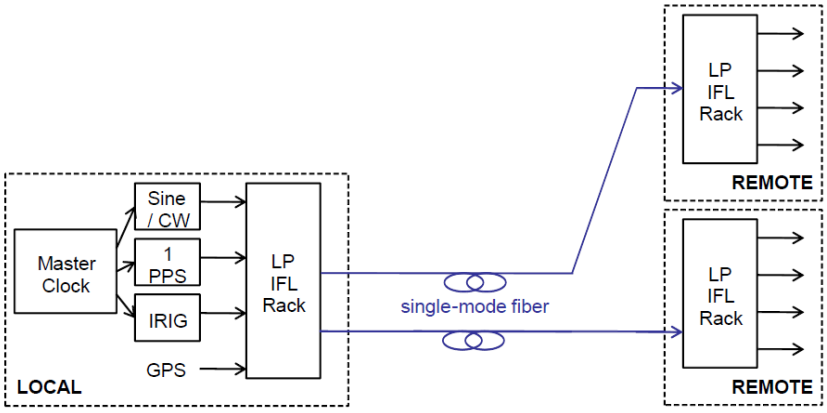
Features

- Multiple Protocols: 1 PPS, CW/Sine Standards, IRIG, GPS
- Stable Group Delay
- Low Allan Variance
- Fully Hot-Swappable
- Multiple Buffered Outputs
- Dual Redundant Power Supplies
- Up to Six Link Modules per 1RU Rack
- Customizable IFL Platform
- Ultra-Wideband Frequency Response
    - >10 km Link Length
    - EMI Immunity
    - Low Noise
    - High Stability

Description

MACOM's Time-over-Fiber (ToF) modules provide point-to-point and point-to-multipoint interfacility time standard distribution over single mode fiber. These modules plug directly into MACOM's InterFacility (IFL) Rack System. Up to six independent hot-swappable modules can be accommodated in a single 1RU enclosure. Single mode fiber offers the advantage of very low loss and stable group delay over very long distances. At the local site, choose the IRIG, 1PPS, CW/Sine or GPS input protocols. Fiber Transmitter modules convert the electrical time signal standard to an intensity-modulated laser optical output. Choose from single or multiple fiber outputs for distribution to remote sites. At the remote site, the Fiber Receiver module converts the optical signal back to the electrical protocol while buffering the signal for directly driving single or multiple time devices.

MACOM TimeLink products provide precise time distribution over optical fiber. All Optical Transmitters employ low noise Distributed Feedback (DFB) single-mode laser and single mode optical fiber. All optical receivers employ InGaAs PIN photodiodes. These features combine to provide greater link length and frequency response, lower noise and higher stability than multimode optical or copper-based solutions. Links accept standard protocol IRIG, 1 PPS, CW/sine (1-100 MHz) and GPS inputs. Point-to-point and point-to-multipoint options are available. IRIG Links incorporate Automatic Level Control to provide 0 db Linear gain independent of link loss. All standard and custom modules are available as hot-swappable Standard LPL IFL Plug-ins.



Transmitter		
Signal Input	Model type: 1 PPS IRIG CW/SINE GPS/L-Band	 1 PPS Standard TTL / 50 Ω IRIG Standard 6 V modulated sine / 50 Ω 1-100 MHz / 50 Ω / -50 to +15 dBm (Note 1) 1000-2000 MHz / 50 Ω / -50 to 0 dBm
Signal Input Connector	SMA or BNC	
Optical Output Connector	Single Mode FC/APC or LC/PC	
Optical Wavelength	1550 nm (standard)	
Module Size	Single Output	Single-Wide IFL Plug-in
	2 or 4 Outputs	Double-wide IFL Plug-in
Alarm Indicator	GRN: Operational RED: Laser Fault	

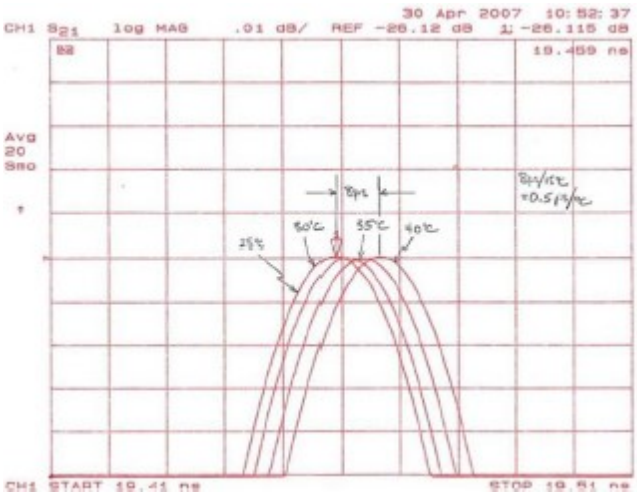
Receiver		
Optical Input Connector	Single Mode FC/APC or LC/PC	
Signal Output	Model type: 1 PPS IRIG CW/SINE GPS/L-Band	 1 PPS Standard TTL / 50 Ω IRIG Standard 6 V modulated sine / 50 Ω 1-100 MHz 1000-2000 MHz
Optical Input Connector		Single Mode FC/APC or LC/PC
Signal Output Connector	SMA or BNC	
Module Size	Single Output	Single-Wide IFL Plug-in
	2 or 4 Outputs	Double-wide IFL Plug-in
Alarm Indicator	GRN: Operational RED: Low/No Optical Input	

End-to-End Link		
Gain	1 PPS IRIG CW/Sine & GPS/L-Band	Fixed Output 1 PPS regenerated (< 2 ns rise time) Fixed Output IRIG Linear Transfer with ALC Linear Transfer 0 dB Gain with 1 km fiber
Group Delay Variation	+500 fs/°C typical	

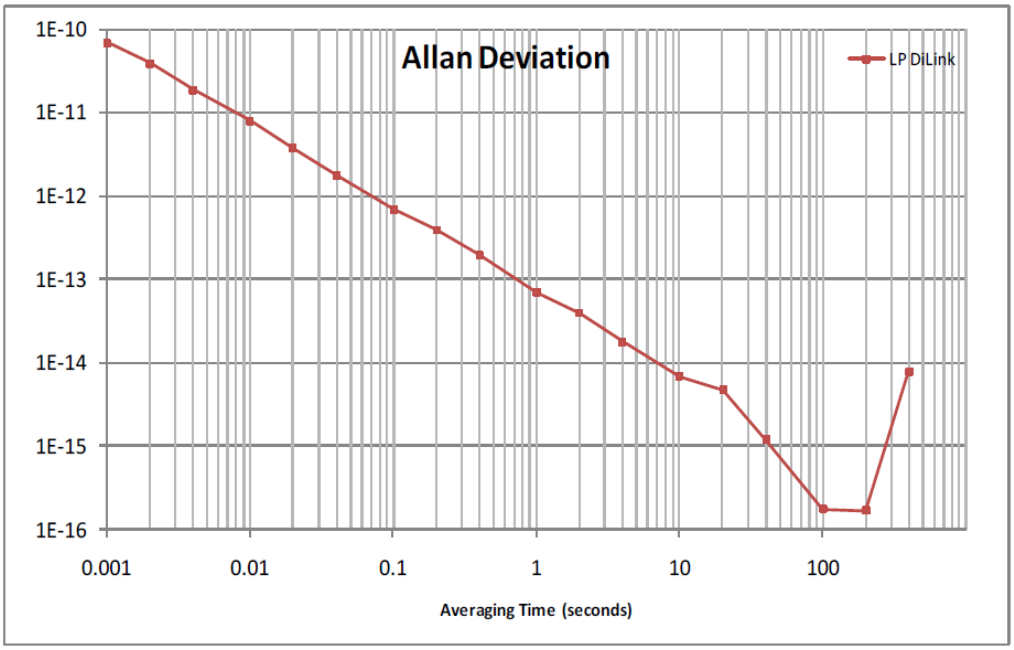
Environmental	
Operating Temp Range	0 to 50°C
Link Length	0 to 10 km

Note 1: Phase noise performance of the CW/Sine Link is best with transmitter input power close to +15 dBm.

Pulsed Group Delay vs Temperature HF CW/Sine Link Modules



System Allan Variance HF CW/Sine Link Modules



TimeLink Part Number Information

T	L	m	p	n	r	o	-	w

example:
TLTP2SL
Transmitter
1 PPS Protocol
Dual Optical Outputs
SMA RF Input
LC/PC Optical Outputs
1550 nm

* Multiple outputs are only availble on certain models. Performance may be affected. Consult Factory

[m] Module Type
T Transmitter
R Receiver

[p] Protocol
P 1 PPS
R IRIG
H HF, 1-100 MHz
L GPS/L-Band, 1000-2000 MHz
W Wide Band, 100-2000 MHz
S S-Band, 3000-4000 MHz

[n] Number of Outputs
1 Single Output, Single-wide
2 Dual Output, Double-wide *
4 Quad Output, Double-wide *

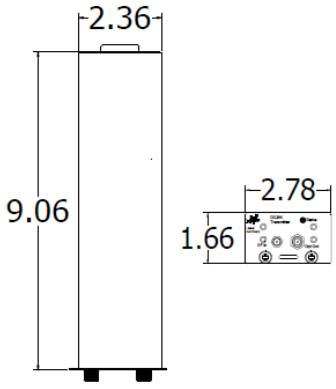
[r] RF Connector(s)
S SMA
B BNC

[o] Optical Connector(s)
F FC/APC
L LC/PC
A LC/APC

[w] Wavelength
OMIT (default) 1550 nm
3 1310
4 1530

TimeLink Module Outline Drawings

TimeLink SINGLE-WIDE PLUG-IN



TimeLink DOUBLE-WIDE PLUG-IN