Product Specification

25.78Gb/s SFP+ Passive Direct Attach Copper Cable

P/N: 25G-SFP-CU

Features

- Hot Pluggable SFP28 form factor
- Wire AWG:30AWG,28AWG,26AWG
- Available length range 0.5m~5m
- Passive Copper Twinax Cable
- Operating data rate 25Gbps
- Power supply：+3.3V
- Max power dissipation <0.1W
- Small diameter cable design
- Commercial temperature range 0°C to 70°C

Compliance

- SFP28 MSA
- Compliant with SFP+ Electrical MSA SFF-8431
- Compliant with SFP+ Mechanical MSA SFF-8432
- SFF-8472
- RoHS

Applications

- 25G Gigabit Ethernet
- 25 GbE high performance computer clusters
- High bandwidth switches and routers
- Storage Area Networks (SAN) & Storage Servers

Description

The 25G-SFP-CU is a high-speed, cost-effective passive copper cable designed for 25Gb/s Ethernet connectivity in data centers. Compliant with IEEE 802.3by and SFF-8402 standards, it provides reliable short-reach connections (up to 5 meters) between servers, switches, and storage devices. The cable features a single high-speed copper pair for efficient 25Gb/s data transmission with minimal latency and power consumption. Each SFP28 connector integrates an EEPROM for automatic device recognition and configuration, ensuring plug-and-play compatibility with SFP28 ports. Ideal for high-density, low-latency environments like Top-of-Rack (ToR) architectures and hyperscale data centers, the 25G-SFP-CU delivers a robust, standards-driven solution for modern 25G network infrastructures.

Product performance Specifications

1. Product Basic Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit
Storage Temperature	T_S	-40		85	°C
Supply Voltage	V_{CC}	3.14	3.3	3.47	V
Relative Humidity	RH	5		95	%
Operating Case Temperature	T_C	0		70	°C
Data Rate Per Lane				25.78	Gbp/s

2. High Speed Characteristics

Parameter	Symbol	Min	Typ.	Max	Unit	Conditions
Differential Impedance	RIN,P	90	100	110	Ω	
Insertion loss	SDD21	8		22.48	dB	12.8906 GHz
Differential Input Return Loss	SDD11	12.45		See1	dB	0.05 to 4.1 GHz
	SDD22	3.12		See 2	dB	4.1 to 19 GHz
Common-mode to common-mode output return loss	SCC11	2			dB	0.2 to 19 GHz
	SCC22					
Differential to common-mode return loss	SCD11	12		See3	dB	0.01 to 12.89 GHz
	SCD22	10.58		See4		12.89 to 19 GHz
Differential to common Mode Conversion Loss		10			dB	0.01 to 12.89 GHz
	SCD21-IL			See5		12.89 to 15.7 GHz
		6.3				15.7 to 19 GHz
Channel Operating Margin	COM	3			dB	

Note1: Reflection Coefficient given by equation SDD11(dB) < 16.5 - 2*SQRT(f), with f in GHz.

Note2: Reflection Coefficient given by equation SDD11(dB) < 10.66 - 14* log10(f/5.5), with f in GHz.

Note3: Reflection Coefficient given by equation SCD11(dB) < 22 - (20/25.78)*f, with f in GHz.

Note4: Reflection Coefficient given by equation SCD11(dB) < 15 - (6/25.78)*f, with f in GHz.

Note5: Reflection Coefficient given by equation SCD21(dB) < 27 - (29/22)*f, with f in GHz.

3. Product Electrical Characteristics

Test Type	Test Item	24AWG	26AWG	28AWG	30AWG
Electrical Characteristics	Differential impedance	100±5Ω at TDR	100±5Ω	100±5Ω	100±5Ω at TDR
	Mutual capacitance	14pF/ft nominal	14pF/ft nominal	14pF/ft nominal	14pF/ft nominal
	Time delay	1.31ns/ft nominal, (4.3ns/m) nominal	1.35ns/ft nominal	1.35ns/ft nominal	1.35ns/ft nominal, (4.3ns/m) nominal
	Time delay skew (within pairs)	80ps/10m maximum	120ps/8.5m maximum	120ps/7m maximum	50ps/5.5m maximum
	Time delay skew (between pairs)	350ps/10m maximum	500ps/8.5m maximum	500ps/7m maximum	350ps/5.5m maximum
	Attenuation	10dB/10m maximum at 1.25Ghz	10dB/8.5m maximum at 1.25Ghz	10dB/7m maximum at 1.25Ghz	8.4dB/5.5m maximum at 1.25Ghz
	Conductor DC Resistance	0.026Ω /ft maximum at 20°C	0.04Ω /ft maximum at 20°C	0.06Ω/ft maximum at 20°C	0.01Ω/ft maximum at 20°C
Physical Characteristics	Conductors (two pair)	24AWG Solid, Silver plated copper	26AWG Solid, Silver plated copper	28AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper
	Insulation	Foam polyolefin	Foam polyolefin	Foam polyolefin	Foam polyolefin
	Pair drain wire	26AWG Solid, Silver plated copper	28AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper	30AWG Solid, Silver plated copper
	Overall cable shield	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage, Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyest er tape, 125% coverage,Tin plated copper braid, 38AWG, 85% coverage	Aluminum/polyester tape, 125% coverage,Tin plated copper braid, 38AWG, 85% coverage
	Outer diameter	6.0mm	5.2mm	4.7mm	4.2mm

Recommended Host Board Power Supply Circuit

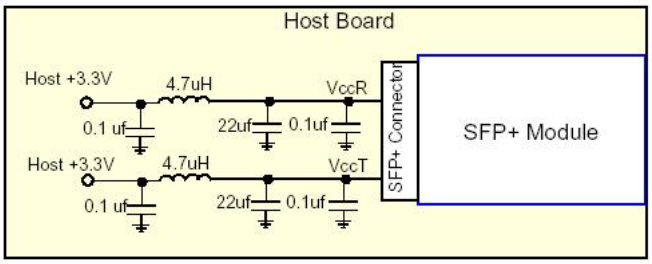


Figure 1: Recommended Host Board Power Supply Circuit

Recommended Interface Circuit

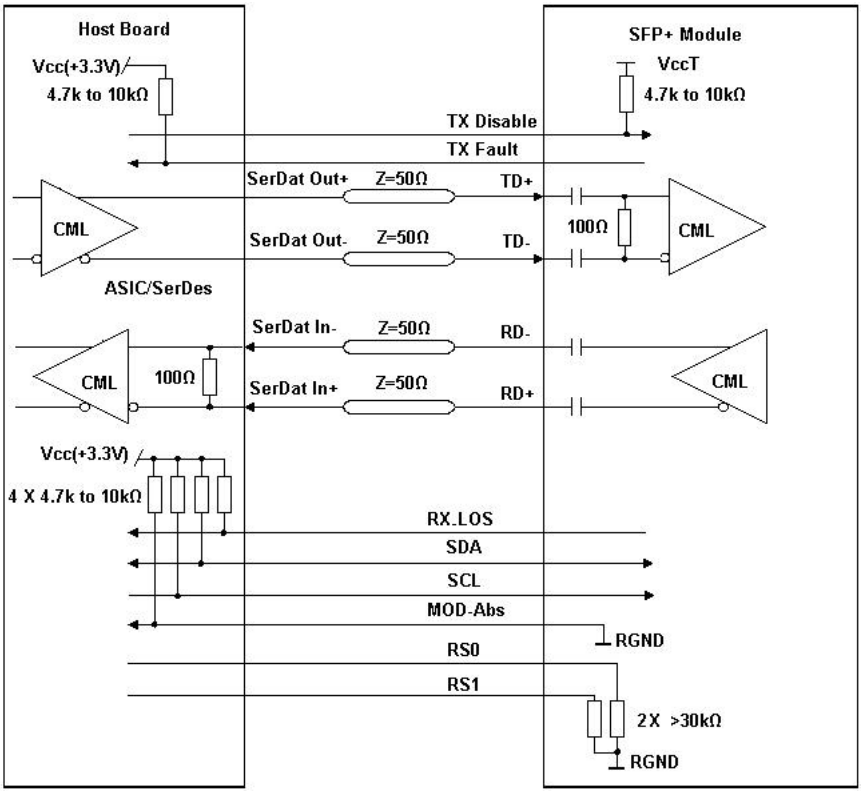


Figure2: Recommended Interface Circuit

Pin-out Definition

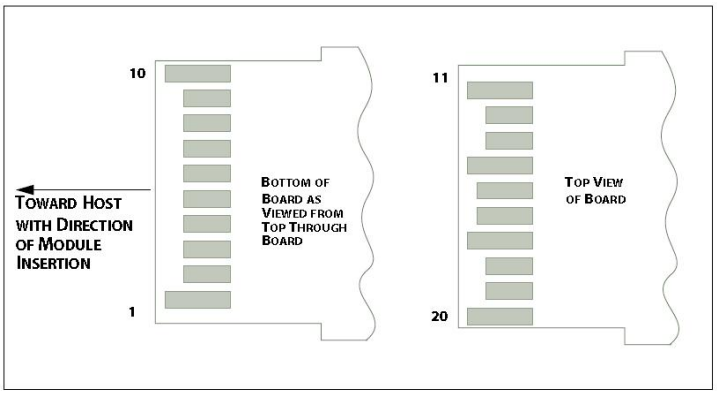


Figure3: Pin view

Pin Function Definitions

Pin	Logic	Symbol	Description
1		VeeT[1]	Module Transmitter Ground
2	LVTTL-O	TX_Fault[2]	Module Transmitter Fault
3	LVTTL-I	TX_Disable[3]	Transmitter Disable; Turns off transmitter laser output
4	LVTTL-I/O	SDA[4]	2-wire Serial Interface Data Line (Same as MOD-DEF2 as defined in the INF-8074i)
5	LVTTL-I/O	SCL[4]	2-wire Serial Interface Clock (Same as MOD-DEF1 as defined in the INF-8074i)
6		MOD_ABS[5]	Module Absent, connected to VeeT or VeeR in the module
7	LVTTL-I	RS0[6]	Adaptive multi-rate operation
8	LVTTL-O	RX_LOS[2]	Receiver Loss of Signal Indication (In FC designated as RX_LOS, in SONET designated as LOS, and in Ethernet designated at Signal Detect)
9	LVTTL-I	RS1[6]	Adaptive multi-rate operation
10		VeeR[1]	Module Receiver Ground
11		VeeR[1]	Module Receiver Ground
12	CML-O	RD-	Receiver Inverted Data Output
13	CML-O	RD+	Receiver Non-Inverted Data Output
14		VeeR[1]	Module Receiver Ground
15		VccR	Module Receiver 3.3 V Supply
16		VccT	Module Transmitter 3.3 V Supply
17		VeeT[1]	Module Transmitter Ground

18	CML-I	TD+	Transmitter Non-Inverted Data Input
19	CML-I	TD-	Transmitter Inverted Data Input
20		$VeeT_1$	Module Transmitter Ground

Note1: The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.

Note2: This pin is an open collector/drain output pin and shall be pulled up with 4.7kΩ-10kΩ to Host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5V.

Note3: This pin is an open collector/drain input pin and shall be pulled up with 4.7kΩ-10kΩ to VccT in the module.

Note4: See SFF-8431 4.2 2-wire Electrical Specifications.

Note5: This pin shall be pulled up with 4.7kΩ-10kΩ to Host_Vcc on the host board.

Note6: Connect with 30kΩ load pulled down to GND in the module.

Monitoring Specification

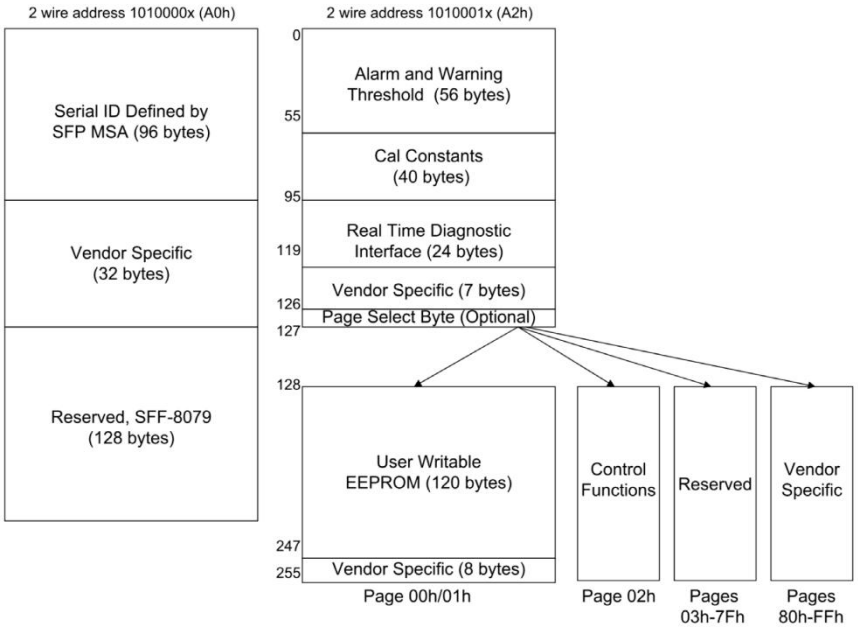


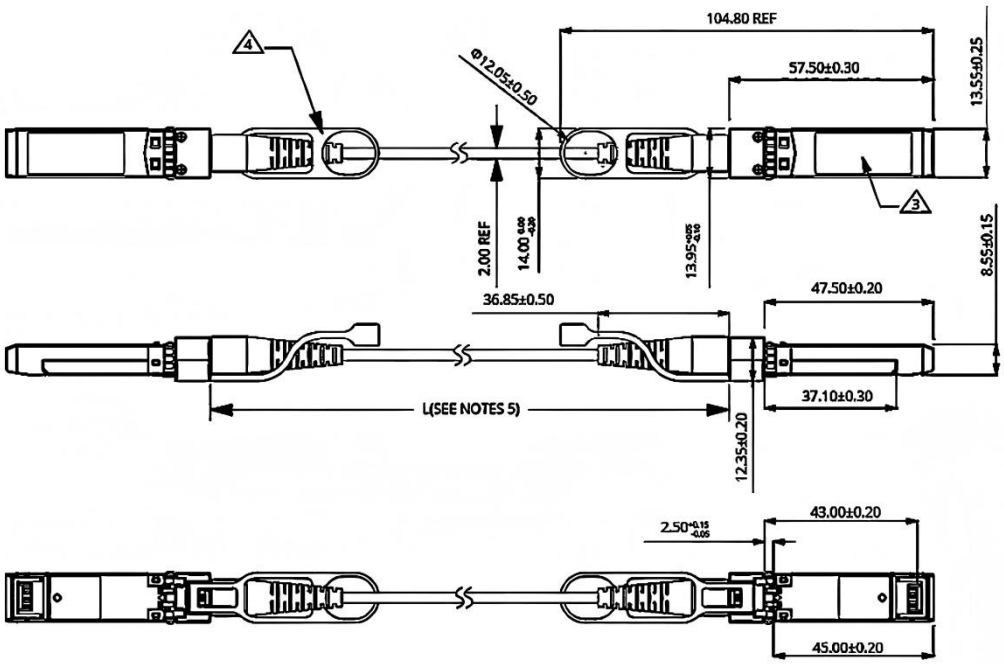
Figure4: Memory map

Memory map Table

Byte	Unit	Name	Description
A0h ID Fields			
0	1	Identifier	Type of transceiver
1	1	Ext. Identifier	Extended identifier of type of transceiver
2	1	Connector	Code for connector type

3-10	8	Transceiver	Code for electronic or optical compatibility
11	1	Encoding	Code for high speed serial encoding algorithm
12	1	Signaling Rate, Nominal	Nominal signaling rate, units of 100 MBd.
13	1	Rate Identifier	Type of rate select functionality
14	1	Length (SMF,km) or Copper Cable Attenuation	Link length supported for single-mode fiber, units of km, or copper cable attenuation in dB at 12.9 GHz
15	1	Length (SMF) or Copper Cable Attenuation	Link length supported for single-mode fiber, units of 100 m, or copper cable attenuation in dB at 25.78 GHz
16	1	Length (50 um, OM2)	Link length supported for 50 um OM2 fiber, units of 10 m
17	1	Length (62.5 um, OM1)	Link length supported for 62.5 um OM1 fiber, units of 10 m
18	1	Length (OM4 or copper cable)	Link length supported for 50um OM4 fiber, units of 10 m. Alternatively, copper or direct attach cable, units of m
19	1	Length (OM3) or Cable length, additional	Link length supported for 50 um OM3 fiber, units of 10 m. Alternatively, copper or direct attach cable multiplier and base value
20-35	16	Vendor name	SFP vendor name (ASCII)
36	1	Transceiver	Code for electronic or optical compatibility
37-39	3	Vendor OUI	SFP vendor IEEE company ID
40-55	16	Vendor PN	Part number provided by SFP vendor (ASCII)
56-59	4	Vendor rev	Revision level for part number provided by vendor (ASCII)
60-61	2	Wavelength	Laser wavelength (Passive/Active Cable Specification Compliance)
62	1	Fibre Channel Speed 2	Transceiver's Fibre Channel speed capabilities
63	1	CC_BASE	Check code for Base ID Fields (addresses 0 to 62)
64-65	2	Options	Indicates which optional transceiver signals are implemented
66	1	Signaling Rate, max	Upper signaling rate margin, units of %
67	1	Signaling Rate, min	Lower signaling rate margin, units of %
68-83	16	Vendor SN	Serial number provided by vendor (ASCII)
84-91	8	Date code	Vendor's manufacturing date code
92	1	Diagnostic Monitoring Type	Indicates which type of diagnostic monitoring is implemented (if any) in the transceiver
93	1	Enhanced Options	Indicates which optional enhanced features are implemented (if any) in the transceiver
94	1	SFF-8472 Compliance	Indicates which revision of SFF-8472 the transceiver complies with.
95	1	CC_EXT	Check code for the Extended ID Fields (addresses 64 to 94)
96-127	32	Vendor Specific	Vendor Specific EEPROM
128-255	128	Reserved	Reserved (was assigned to SFF-8079)

Mechanical Dimension



Note:

- Unit: mm
- Tolerance: φ0.1mm if not shown
- Latch color: black
- When L≤2m, the tolerance is ±25mm, when L>2m, the tolerance is ±1%

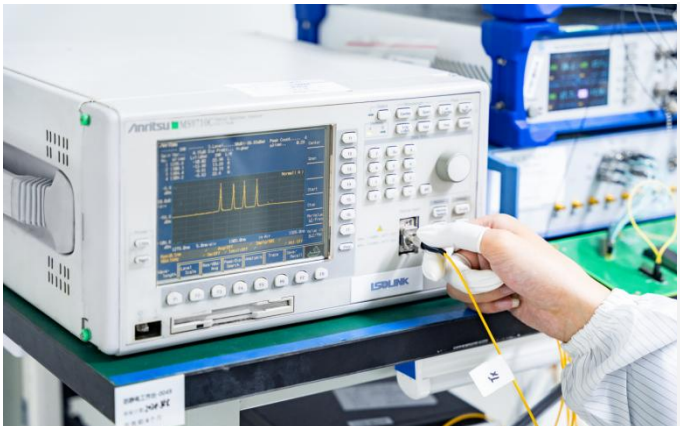
Waring:

- The transceiver optics is supplied with a dust cover. This plug protects the transceiver optics during standard manufacturing processes by preventing contamination from air borne particles.It is recommended that the dust cover remain in the transceiver whenever an optical fiber connector is not inserted.
- Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.
- Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Test Center

1. Performance Testing

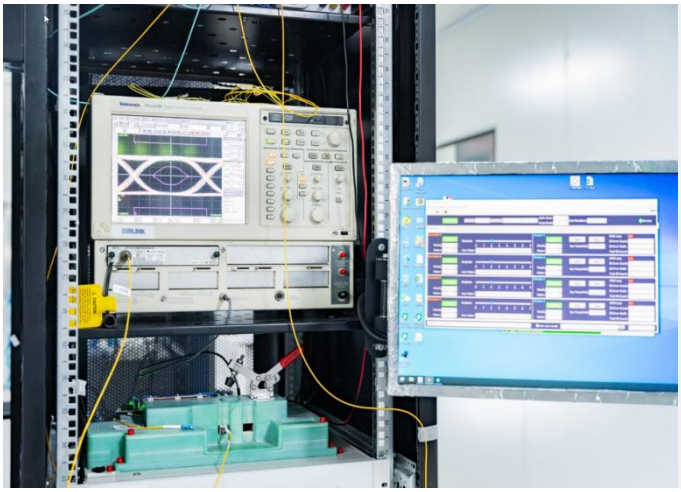
Every fiber optic transceiver is thoroughly tested by the LSOLINK Assurance Program, which is equipped with the world's most advanced analytical equipment to ensure that our transceivers meet the industry's international public protocol standards while still functioning flawlessly in your facility.



Optical Spectrum Inspection

Using the industry's leading optical spectrum analyser to check in real time that the parameters of the optical transceiver's laser comply with industry standards.

- **Peak:** Peak wavelength and peak level
- **2nd Peak:** Side-mode wavelength and level
- **Mean WI:** Center wavelength
- **Total Power:** Total power of spectrum
- **SMSR:** Side-Mode Suppression Ratio



Optical Signal Quality Inspection

Using highly efficient sampling oscilloscopes and BERT testers, equipped with an automated test platform to accurately test the signal quality of the transceiver, test records are kept for up to 5 years to ensure the traceability of each transceiver.

- **Eye Mask Margin(NRZ)**
- **TDECQ(PAM4):**transmitter dispersion eye closure
- **OMA:** Optical modulation amplitude
- **BER:** Bit error rate
- **ER:** Extinction Ratio

Flow Pressure Test

Using multi-protocol network traffic analyser with various brands of switches to test the transceiver's ability to transmit at full speed.

- **Bandwidth:** Actual transceiver bandwidth on the port
- **Packet Loss**
- **Packet Errors:**CRC Errors/PCS Errors/Symbol Errors
- **LinkDown Counts**
- **latency**

Aboveis part of our test bed network equipment. For more information, Please click download for optical transceiver performance test report.

2. Quality Control

We adopt advanced quality management solutions. Each transceiver is self-inspected, including:20x microscope inspection, 200x microscope inspection, and QC process inspection.

visual inspection

Microscopic inspection: 20X

Microscopic inspection: 200X

Reliability Verification

Optical endface inspection

OQC Inspection

3. Compatibility Testing

Each optical transceiver is tested in LSOLINK's library of compatibility test equipment to ensure perfect compatibility with multiple brands on the market.

Ubiquiti ES-48-Lite

MikroTik CRS354-48G-4S+2Q+RM

Huawei S6720-30L-HI-24S

Huawei S5700-28P-LI-AC

HPEFlexFabric5900AF-48G-4XG-2QSFP+

Cisco Catalyst WS-C2960L-24TS-LL

Aboveis part of our test bed network equipment. For more information, Please click download to get the compatibility test report of each brand of optical transceiver.

Order Information

Part Number	Length(m)	Wire Gauge(AWG)	Connector Type	Cable Type	Cable Jacket
SFP-25G-CU1	1	30	SFP28 to SFP28	Passive Copper	PVC
SFP-25G-CU1.5	1.5	30	SFP28 to SFP28	Passive Copper	PVC
SFP-25G-CU2	2	28	SFP28 to SFP28	Passive Copper	PVC
SFP-25G-CU2.5	2.5	28	SFP28 to SFP28	Passive Copper	PVC
SFP-25G-CU3	3	28	SFP28 to SFP28	Passive Copper	PVC
SFP-25G-CU4	4	26	SFP28 to SFP28	Passive Copper	PVC
SFP-25G-CU5	5	26	SFP28 to SFP28	Passive Copper	PVC

Further Information

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Email | For Sales@lsolink.com

Disclaimer

1. We are committed to continuous product improvement and feature upgrades, and the contents con t ained in this manual are subject to change without notice.

2. Nothing herein should be construed as constituting an additional warranty.

3. LSOLINK assumes no responsibility for the use or reliability of equipment or software not provided by LSOLINK.