ETU-LINK
Optical Communication System

XFP Series

XFP

EX85X-3LED03

10Gbps 850nm 300M XFP Optical Transceiver

- ➤ Supports 9.95Gbps to 11.1Gbps bit rates
- ➤ Maximum link length of 300m (50um,MMF,2000MHz.)
- ➤ 850nm VCSEL laser and PIN receiver
- ➤ XFP MSA Rev 4.5 Compliant
- ➤ No reference clock required
- ➤ +1.8V,+3.3V Supply Voltage
- ➤ Low Power Dissipation 1.5W Maximum
- ➤ XFI and lineside loopback Mode Supported
- ➤ -20ºC to 85ºC Operating Case Temperature
- ➤ Diagnostic Performance Monitoring of module temper
  Supply Voltages, laser bias current,
  transmit optical power, and receive optical power
- ➤ RoHS6 compliant (lead free)

Applications

- ➤ 10GBASE-SR/SW 10G Ethernet
- ➤ 1200-Mx-SN-I 10G Fiber Channel
- ➤ SONET OC-192 SR-1 SDH STM I-64.1
- ➤ Other optical links

Description

ETU-Link EX85X-3LED03 is compliant with the 10G Small Form-Factor Pluggable (XFP) Multi-Source Agreement (MSA), supporting data-rate of 10.3125Gbps (10GBASE-SR) or 9.953Gbps (10GBASE-SW), and transmission distance is up to 300m on 50μm MMF (2000MHz.km).

The transceiver module comprises a transmitter with 850nm a vertical cavity surface emitting (VCSEL) laser and a receiver with a PIN photodiode. Transmitter and receiver are separate within a wide temperature range of 0℃ to +70℃ and offers optimum heat dissipation and excellent electromagnetic shielding thus enabling high port densities for 10G systems.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typ	Max	Unit
Maximum Supply Voltage	Vcc3	-0.5		4.0	V
Storage Temperature	T_S	-40		85	°C
Case Operating Temperature	T_{case}	-20		85	°C

Electrical Characteristics (T_{OP} = -5 to 70 °C, V_{CC3} = 3.13 to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Supply Voltage #2	Vcc3	3.13		3.45	V	
Supply Current – Vcc3 supply	Icc3			450	mA	
Module total power	P			1.5	W	1
Transmitter						
Input differential impedance	Rin		100		Ω	2
Differential data input swing	Vin,pp	120		820	mV	
Transmit Disable Voltage	VD	2.0		Vcc	V	3
Transmit Enable Voltage	VEN	GND		GND+ 0.8	V	
Transmit Disable Assert Time				10	us	
Receiver						
Differential data output swing	Vout,pp	340	650	850	mV	4
Data output rise time	tr			38	ps	5
Data output fall time	tf			38	ps	5
LOS Fault	VLOS fault	Vcc – 0.5		VccHOST	V	6
LOS Normal	VLOS norm	GND		GND+0.5	V	6
Power Supply Rejection	PSR					7

Notes:

1) Maximum total power value is specified across the full temperature and voltage range.

2) After internal AC coupling.

3) Or open circuit.

4) Into 100 ohms differential termination.

5) These are unfiltered 20-80% values

6) Loss of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

7) Per Section 2.7.1. in the XFP MSA Specification[1].

Optical Characteristics (T_{OP} = -5 to 70 °C, V_{CC3} = 3.13 to 3.45 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Average Optical Power	P_{AVE}	-6		-1.0		1
Optical Wavelength	λ	840	850	860	nm	
Optical Extinction Ratio	ER	3.0	5		dB	
Transmitter and Dispersion Penalty	TDP			3.9	dB	
Average Launch power of transmitter	P_{OFF}			-30	dBm	
Tx Jitter	Tx_j				Per 802.3ae requirements	
Encircled Flux	<4.5µm			30	%	2
Relative Intensity Noise	$RIN_{12}OMA$			-128	dB/Hz	
Receiver						
Receiver Sensitivity@ 10.5Gb/s	R_{SENS}			-10	dBm	
Input Saturation Power (Overload)	Psat	+0.5			dBm	
Wavelength Range	λ_C	840		860	nm	
Receiver Reflectance	R_{rx}			-12	dB	
LOS De-Assert	LOS_D			-12	dBm	
LOS Assert	LOS_A	-30			dBm	
LOS Hysteresis		0.5			dB	

Notes:

1) Average power figures are informative only, per IEEE 802.3ae.

2) Measured into Type A1a (50/125 µm multimode) fiber per ANSI/TIA/EIA-455-203-2.
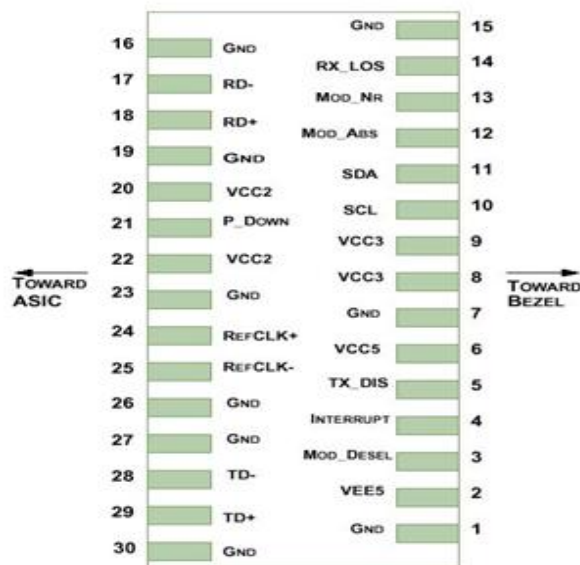
Pin Assignment

Diagram of Host Board Connector Block Pin Numbers and Name

Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – **Not required**	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	Interrupt	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply – **Not required**	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	
11	LVTTL-I/O	SDA	Serial 2-wire interface data line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready; ETU-LINK's defines it as a logical OR between RX_LOS and Loss of Lock in TX/RX.	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply – **Not required**	
21	LVTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset. Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply – **Not required**	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – **Not required**	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – **Not required**	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

Notes:

1) Module circuit ground is isolated from module chassis ground within the module.

2) Open collector; should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 3.15V and 3.6V.

3) A Reference Clock input is not required by the EX85X-3LED03. If present, it will be ignored.

General Specifications

Parameter		Symbol	Min	Typ	Max	Units	Ref.
Bit Rate		BR	9.95		11.3	Gb/s	1
Bit Error Ratio		BER			10^{-12}		2
Maximum Supported Distances							
Fiber Type	850nm OFL Bandwidth						
62.5µm	160MHz-km	Lmax			26	m	
	OM1 500MHz-km				33		
50µm	400MHz-km	Lmax			66	m	
	OM2 500MHz-km				82		
	OM3 2000MHz-km				300		

Notes:

1) 10GBASE-SR/SW, 1200-Mx-SN-I

2) Tested with 10.3Gbps, $2^{31} - 1$ PRBS

Digital Diagnostic Functions

As defined by the XFP MSA1, ETU-LINK XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

- Transceiver temperature
- Laser bias current
- Transmitted optical power
- Received optical power
- Transceiver supply voltage

It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected.

The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

For more detailed information including memory map definitions, please see ETU-LINK's Application Note AN-2035 "Digital Diagnostic Monitoring Interface for XFP Optical Transceivers", or the XFP MSA Specification1.
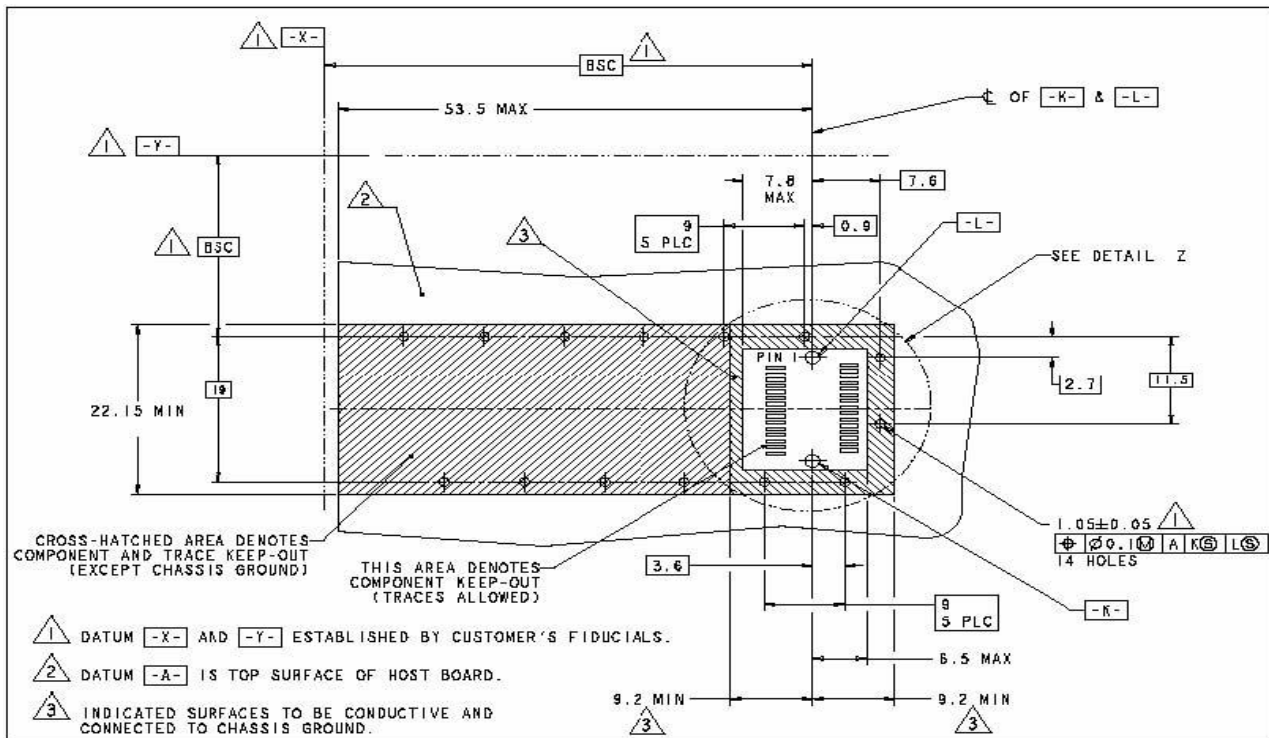
Mechanical Specifications

ETU-LINK's XFP transceivers are compliant with the dimensions defined by the XFP Multi-Sourcing Agreement (MSA).
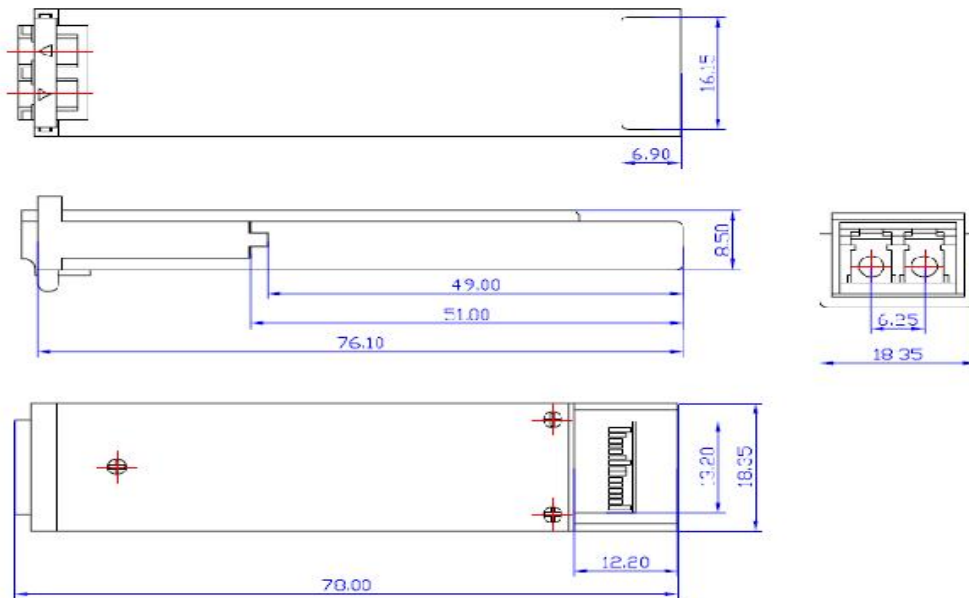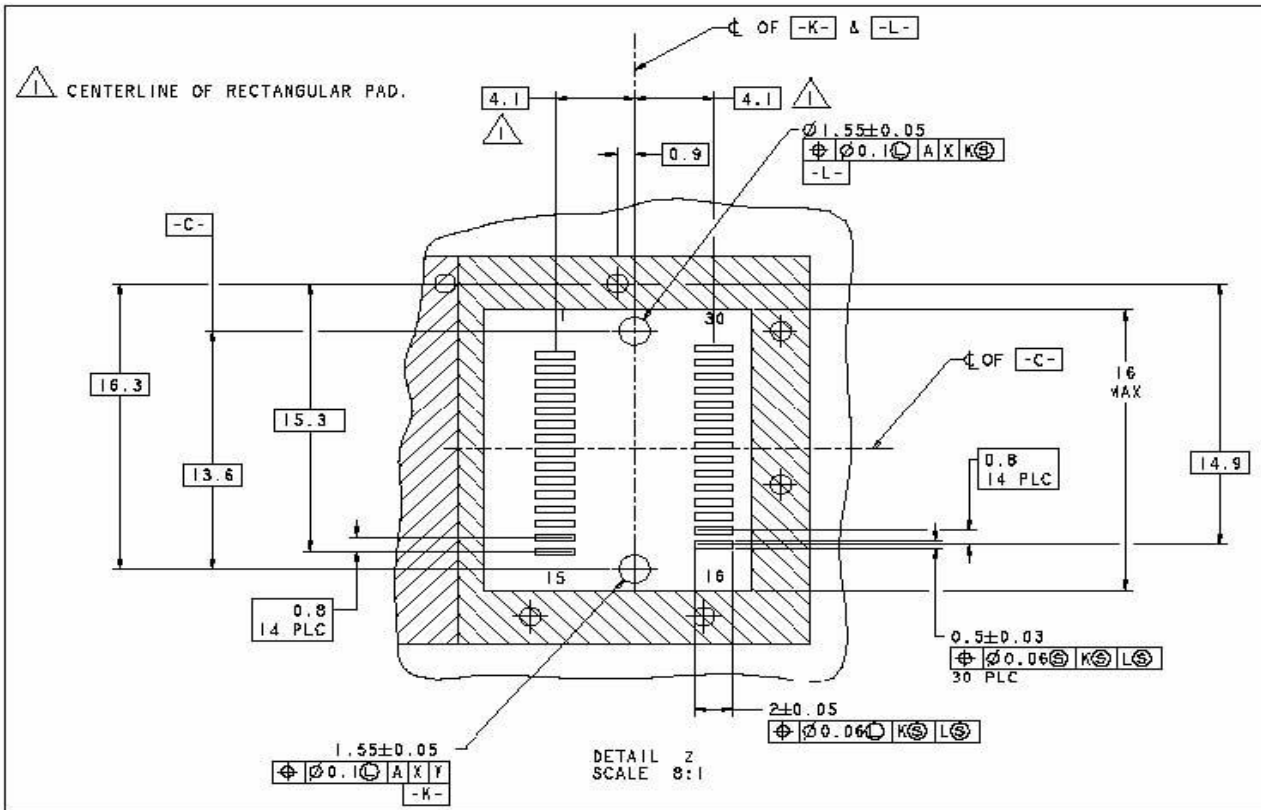

XFP Transceiver (dimensions are in mm)
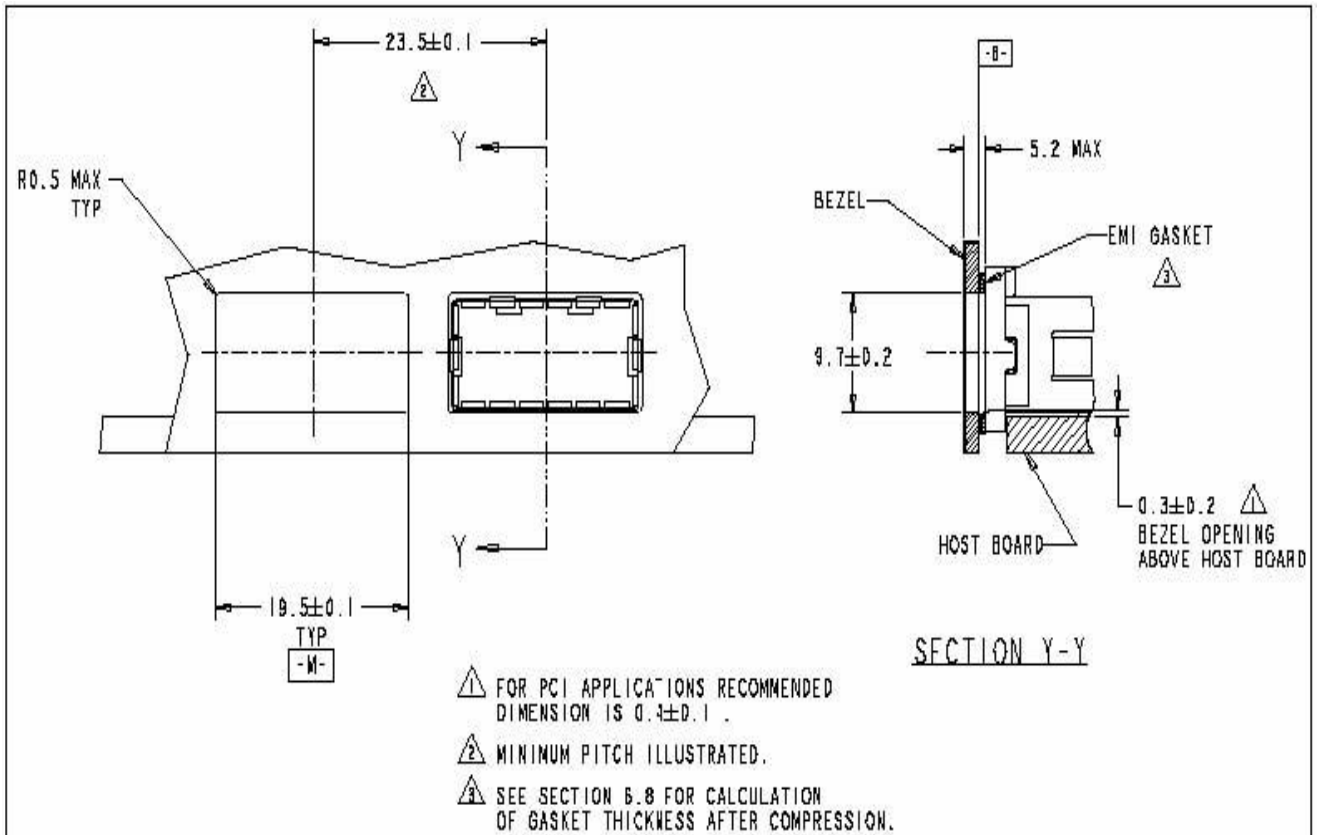
PCB Layout and Bezel Recommendations

PCB Layout and Bezel Recommendations

XFP Host Board Mechanical Layout (dimensions are in mm)

XFP Detail Host Board Mechanical Layout (dimensions are in mm)

SECTION Y-Y

⚠ FOR PCI APPLICATIONS RECOMMENDED
DIMENSION IS 0.4±0.1.

⚠ MINIMUM PITCH ILLUSTRATED.

⚠ SEE SECTION 6.8 FOR CALCULATION
OF GASKET THICKNESS AFTER COMPRESSION.

Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge（ESD）	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1, 2	Class 1 laser product
Component Recognition	IEC/EN 60950, UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

Compatibility Test

In order to ensure the product compatibility, our products will be tested on the switch before shipment. Our modules can compatible with many mainstream brand switches, such as Cisco, Juniper, Extreme, Brocade, IBM, H3C, HP, Huawei, D-Link, Mikrotik, ZTE, TP-Link...

Our test equipment: VOLKTEK MEN-4110, HP 2530-8G, CRS226-24G-25+RM, Catalyst 2960G Series, Catalyst 3850 XS 10G SFP+, Catalyst 3750-E Series, HUAWEI S5700Series, H3C S3100V2 Series, Juniper-EX4200, etc.

Cisco Catalyst 3850

HUAWEI S5700

H3C S3100V2

HP J9264AR

Juniper EX 4200

Alcatal 6850E-U24X

Mikrotik CR5226-24G-25+RM

Cisco Catalyst 2960G

Volktek MEN-4110

Product Production Process

Quality Assurance

Continuous introduction of new equipment, produced by strict standards, strict quality inspection, to guarantee the high quality standard of each product.
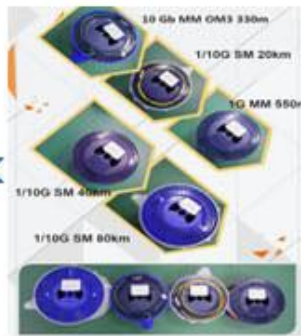

Standardized Production Line

Professional Welding

Assembling

Aging Testing

Distance Testing

Cleaning end face

Product Initial Test

Switch Testing

Product Final Test

Packaging

ETU-Link provides two kinds of packaging, 10pcs/Tray and individual package.

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Addresses and phone number also have been listed at www.etulinktechnology.com.

Please e-mail us at sales@etulinktechnology.com or call us for assistance.