

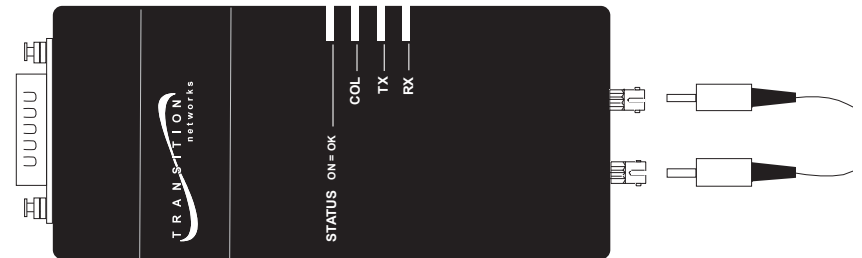
AUI/10BASE-FL

Transceiver

E-FRL-MC05

User's Guide

The Transition Networks E-FRL-MC05 series transceiver with LinkAlert™ is a media access unit (MAU) that connects the AUI port of any DTE, repeater, or other network device, either directly or through an AUI cable, to an Ethernet™ 10BASE-FL device. The 10BASE-FL device is connected to the E-FRL-MC05 media converter through multimode fiber OR singlemode fiber, selected by E-FRL-MC05 model number.



E-FRL-MC05

Provides an AUI connector and a set of RX (receive) and TX (transmit) ST connectors to 10BASE-FL **850nm multimode** fiber.

E-FRL-MC05(SC)

Provides an AUI connector and an RX (receive) /TX (transmit) SC connector to 10BASE-FL **850nm multimode** fiber.

E-FRL-MC05(SM)

Provides an AUI connector and a set of RX (receive) and TX (transmit) ST connectors to 10BASE-FL **1300nm singlemode** fiber.

E-FRL-MC05(L)

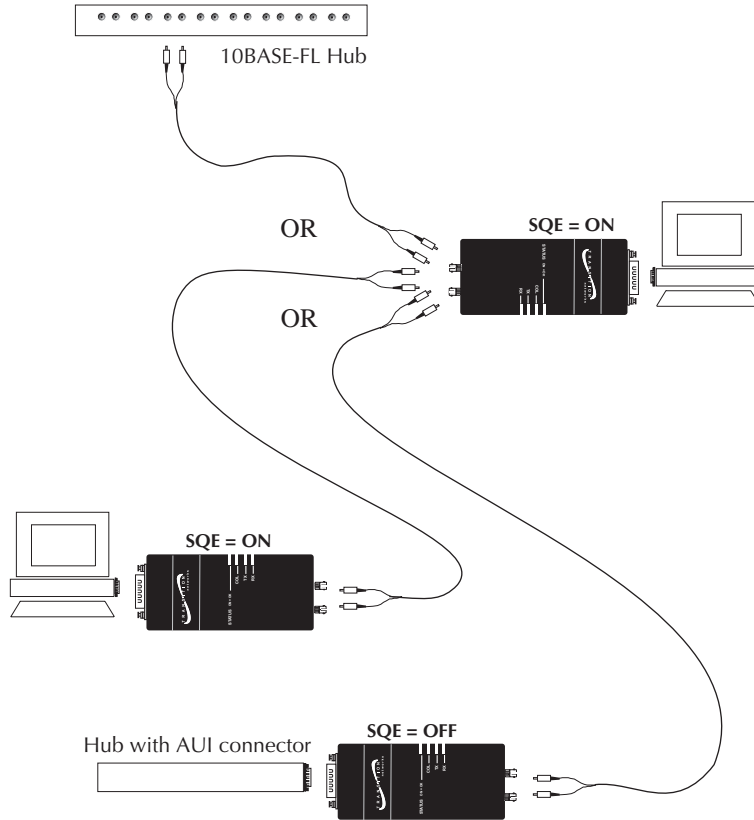
Provides an AUI connector and a set of RX (receive) and TX (transmit) **ST** 10BASE-FL connectors to **1300nm multimode** fiber cable.

The E-FRL-MC05 functions either in half-duplex mode or in full-duplex mode, depending upon the network devices to which the media converter is attached.

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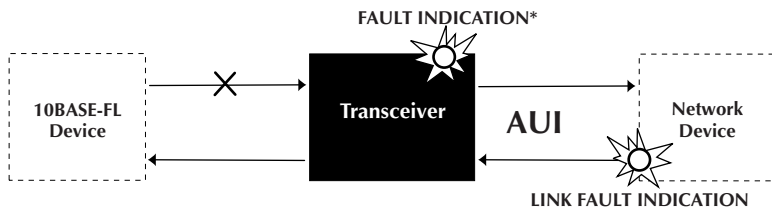
E-FRL-MC05 in the Network

NOTE: AUI drop cable also can be used to connect to the transceiver.



Using LinkAlert™

The LinkAlert™ feature allows the transceiver to pass 10BASE-FL-side link faults to the AUI side and to pass AUI-side link faults to the 10BASE-FL side.



Installation

Set Switches

NOTE: UP enables the indicated function on the 4-position switch located to the right of the 10BASE-FL connector and DOWN disables the indicated function.



- 1 **SQE Test:** (UP) Enable SQE test function when connecting to other devices. (DOWN) Disable SQE test function when connecting to IEEE 802.3 compliant repeaters. *Default is enabled (UP).*
- 2 **LinkAlert:** (UP) Enable the LinkAlert™ function. (DOWN) Enable standard Link Integrity Test. *Default is enabled (UP).*
- 3 **Half-Duplex/Full-Duplex Mode:** (UP) Enable half-duplex mode when connecting to half-duplex network devices. (DOWN) Enable full-duplex mode when connecting to full-duplex network devices. *Default is enabled (UP) DO NOT USE FULL-DUPLEX WHEN CONNECTING THE TRANSCEIVER TO A REPEATER. .*
- 4 **Not Used**

Install Cable

NOTE: See page 6 for cable specifications and configurations.

FIBER

- Locate or build 10BASE-FL compliant fiber cable with male two-stranded TX to RX connectors at both ends.
- Connect male TX and RX cable connectors at one end of cable to TX and RX female connectors, respectively, on media converter.
- Connect female TX and RX cable connectors at other end of cable to RX and TX connectors of 802.3 compliant fiber device.

AUI

DROP CABLE

- Connect AUI drop cable female connector to male AUI (DTE) connector on E-FRL-MC05.
- Connect other end of AUI drop cable to 10BASE-5 network.

NETWORK DEVICE

- Connect device female connector to male AUI (DTE) connector on E-FRL-MC05.

Connect to Power

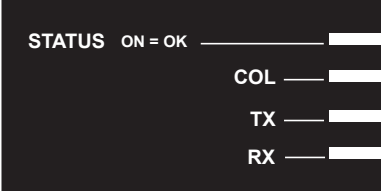
The E-FRL-MC05 is powered through the AUI connection.

Operation

After installation, the transceiver should function without operator intervention.

Status LEDs

Use the status LEDs to monitor transceiver operation in the network.

STATUS ON=OK	Steady green LED indicates normal operation. <i>Link Down:</i> One (1) continuous, flashing blink indicates no data packet or link integrity pulse being received over fiber. <i>Local Jabber:</i> Two (2) continuous, flashing blinks indicate AUI packets are too long. Dark LED indicates NO connection to external power.	
COL(lision):	Illuminated amber LED indicates signal collisions on the Ethernet cable.	
TX	Flashing or illuminated amber LED indicates packet transmission (AUI to fiber).	
RX	Flashing or illuminated amber LED indicates packet reception (fiber to AUI).	

Troubleshooting

If the transceiver fails, determine the answers to the following questions:

1. Is the **STATUS LED on the transceiver illuminated?**

NO

- Verify that the transceiver is installed properly in the AUI port and that the DTE device is powered ON?
- Contact Technical Support: (800) 260-1312.

YES

- Proceed to step 2.

2. Is the **RX LED illuminated?**

NO

- Check fiber cables for proper connection.
- Contact Technical Support: (800) 260-1312.

YES

- Proceed to step 3.

3. Is the **TX LED illuminated?**

NO

- Check AUI cables for proper connection.
- Restart the workstation to restart the initialization process.
- Contact Technical Support: (800) 260-1312.

YES

- Contact Technical Support: (800) 260-1312.

Cable Specifications

The physical characteristics of the media cable must meet or exceed IEEE 802.3 specifications.

Fiber Cable

Multimode Cable Recommended: 62.5 / 125 μ m multimode fiber
 Optional: 100 / 140 μ m multimode fiber; 85 / 125 μ m multimode fiber
 50 / 125 μ m multimode fiber;
 Singlemode Cable Recommended: 9/125 μ m singlemode fiber
 Bit error rate: 10^{-9}

850 nm MULTIMODE

Fiber-optic Transmitter Power: min: -19.0 dBm max: -14.0 dBm
 Fiber-optic Receiver Sensitivity: min: -32.5 dBm max: -14.0 dBm
Typical Maximum Cable Distance*: 2 kilometers (6,600 feet)

1300 nm MULTIMODE

Fiber-optic Transmitter Power: min: -19.0 dBm max: -15.0 dBm
 Fiber-optic Receiver Sensitivity: min: -32.5 dBm max: -14.0 dBm
Typical Maximum Cable Distance*: 5 kilometers (66,000 feet)

1300 nm SINGLEMODE

Fiber-optic Transmitter Power: min: -27.0 dBm max: -10.0 dBm
 Fiber-optic Receiver Sensitivity: min: -34.0 dBm max: -14.0 dBm
Typical Maximum Cable Distance*: 20 kilometers (66,000 feet)

*Actual distance dependent upon physical characteristics of network installation.

The fiber optic transmitters on this device meet Class I Laser safety requirements per IEC-825/CDRH standards and comply with 21 CFR1040.10 and 21CFR1040.11.

AUI (DB-15) Interface

Parameter	Minimum	Typical	Maximum
Transmit			
Transmit threshold voltage level:	-140mV	-170mV	-190mV
Transmit turn on delay:			100ns
Transmit steady propagation delay:		15ns	50ns
Transmit loop back start up delay:			500ns
Transmit turn off to data idle:	400ns		2100ns
SQE test delay:	0.6 μ sec		1.6 μ sec
SQE test duration:	0.5 μ sec	1.0 μ sec	1.5 μ sec
Receive			
Receive turn on delay:			350ns
Receive steady propagation delay:	15ns	50ns	
Differential output voltage (RX(-/+)):	(+/-)550mV		(+/-)1200
Differential output voltage (col(-/+)):	(+/-)550mV		(+/-)1200
Differential output rise time (RX(-/+), col(-/+)):	4ns		
Differential output fall time (RX(-/+), col(-/+)):	4ns		
Collision			
Time for SQE to deact. after collision:	450ns		700ns
Collision frequency:	8.5MHz		11.5MHz
Collision pulse duty cycle:	40%	50%	60%
SQE test delay:	0.6 μ sec		1.6 μ sec
Jabber activation delay:	20ms	70ms	150ms

Technical Specifications

Standards	IEEE 802.3	
Case Dimensions	3.8 x 1.65 x .94 inches (95 x 42 x 24 mm)	
Weight	3.5 oz. (99.2 g)	
Environment	Tmra*:	0-40°C (32° to 104° F)
	Humidity	10-90%, non condensing
	Altitude	0-10,000 feet
Power	11.4 - 16.5 VDC, 175 mA (typical), 300 mA (maximum)	


Warranty Lifetime

*Manufacturer's rated ambient temperature.

Product is certified by the manufacturer to comply with DHHS Rule 21/CFR, Subchapter J applicable at the date of manufacture.

CAUTION: Visible and invisible laser radiation when open. Do not stare into the beam or view directly with optical instruments.

CAUTION: Use of controls, adjustments or the performance of procedures other than those specified herein may result in hazardous radiation exposure.

TRANSITION networks		Declaration of Conformity	
Name of Mfg:	Transition Networks 6475 City West Parkway, Minneapolis MN 55344 USA		
Model:	AUI/10BASE-FL Transceiver		
Part Number:	E-FRL-MC05, E-FRL-MC05(SC), E-FRL-MC05(SM), E-FRL-MC05(L)		
Regulation:	EMC Directive 89/336/EEC		
Purpose:	To declare that the E-FRL-MC05 to which this declaration refers is in conformity with the following standards. EMC-CISPR 22: 1985 Class A; EN 55022: 1988 Class A; EN 50082-1:1992; EN 60950 A4:1997; IEC 801.2, IEC 801.3, and IEC 801.4; IEC 950		
I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).			
 Stephen Anderson, Vice-President of Engineering			November 11, 1999 Date

Compliance Information

CISPR/EN55022 Class A

FCC Regulations

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Canadian Regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Regulations

Warning

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Achtung !

Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Attention !

Ceci est un produit de Classe A. Dans un environnement domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilisateur de prendre les mesures spécifiques appropriées



CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentliches Telekommunikationsnetz in den EG-Mitgliedstaaten verstößt gegen die jeweiligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

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