

Trio Ethernet E-Series

Licensed-band Ethernet Data Radios

Features:

- 370-520MHz band operation
- Ethernet and serial interfaces
- Remote, base and hot-standby controller variants
- Maximum narrowband channel utilization
- Advanced commissioning tools and remote diagnostics including SNMP
- Up to 19,200bps over-air data rates
- High performance transmitter
- 128-bit AES encryption (North America/Australia only)
- Industry-standard protocol support
- Multistream™ simultaneous data stream support
- Fully compatible with serial only E-Series
- 3-year warranty (parts and labor)



Trio Ethernet E-Series licensed UHF radios are designed to wirelessly extend hard-wired Ethernet-based LANs and serial communication links across long-haul distances. They efficiently transmit remote process data to centralized data host or control centers and may also be used to bridge geographically dispersed LANs.

Ethernet E-Series radios are ideal for use in SCADA, telemetry and other information/control applications and integrate directly into existing serial only E-Series systems, thereby enabling easy system expansion and a smooth transition from serial to Ethernet-based infrastructure. Ethernet E-Series radios are available in remote, base and hot-standby configurations and come in a wide range of frequency bands.

As with all Trio solutions, the Ethernet E-Series can be rapidly deployed as a permanent or temporary alternative to wired communication networks which are costly to install and difficult to modify. When integrated into legacy systems or used as the communications backbone of a new system, Trio radios bring up-to-date communication technology and performance to the forefront.

Applications

E-Series radio are used across a wide range of industrial markets in traditional point-to-point and point-to-multipoint applications as well as repeater and store-and-forward systems, and are compatible with Trio M-Series data radios.

They are often used for remote interconnection of PLCs, RTUs, data loggers, and other data monitoring and control devices.

The radios are can be ordered as a CSA Class I, Division II-compliant product.

Features

Designed for maximum value and functionality Control Microsystems has incorporated a wide range of state-of-the-art features in the Ethernet E-Series:

Data modem: Advanced technology DSP-based GMSK digital data modem featuring error-checked high data throughput and true 19,200bps over-the-air data rates.

User-configurable data and LAN ports offer simultaneous data streams, collision avoidance, 128-bit AES encryption (within North America/Australia only) and support for Industry-standard serial protocols including Modbus, DNP3.0 and IEC 60870-5-101, and Ethernet/IP protocols UDP, TCP, DHCP, ARP, ICMP, STP etc. For use in legacy systems, RS-232 serial support is provided via embedded terminal server (UDP/TCP).

Radio: Dual independent, high frequency stability digital synthesizers, providing rapid Tx-Rx turnaround times and greater system capacity with optimized data quality. These highly flexible radios are universally applicable with compliance to FCC and ETSI radio communication regulatory requirements.

Configuration and Management

All Trio radios offer maximum versatility by providing local and over-the-air configuration options.

TView+

As the Network Management and Remote Diagnostics environment for all Trio radios this tool helps to eliminate system down-time and reduce maintenance costs. The software incorporates a wide range of efficient network management utilities including error rate testing, channel occupancy statistics and data error statistics. TView+ also includes a diagnostics utility that permits monitoring and logging of radio performance parameters for all units in the network.

Design, Environmental and Power

The Trio Ethernet E-Series is built using compact, lightweight housings, ensuring maximum reliability together with ease-of-installation and serviceability. Full specification operation is guaranteed over the entire -30 to +60°C, [-22 to 140°F] temperature range. Overall power consumption is optimized with a user-controlled shutdown mode.

Selection

The Ethernet E-Series consists of a basic half-duplex or extended feature full-duplex remote radio-modem ER45e, a performance-hardened base station EB45e and the EH45e Redundant 1+1 Base/ Repeater station.

ER45e Specifications

Functional		
Location	Remote station	
Licensed Radio Frequency Range	370-520MHz (various sub-frequency bands available)	
Operational Modes	Simplex, half-duplex or full-duplex	
RF Channel Data Rate	4800/9600/19,200bps	
Features		
Configuration Interface	TView+: configuration, network management and diagnostic windows GUI software	
Radio Frequency Accuracy	± 1ppm [-30 to 60°C] [-22 to 140°F] ambient	
Transmitter	Power:	0.05 - 5W (+37dBm) 1dB, user-configurable with over-temperature and reverse power protection
	Modulation:	User-configurable narrow band digitally filtered GMSK or 4 Level FSK
	PTT Control:	Auto [Data] / RTS line (Port A or B) / System Port Override
Receiver	Sensitivity:	-118dBm for 12dB SINAD
	Selectivity:	Better than 60dB
	Intermodulation:	Better than 70dB
	Spurious Response:	Better than 70dB
	AFC Tracking:	Digital receiver frequency tracking
	Mute:	Programmable digital mute
Connections	User Data Ports:	1 x RS232 DB9 female DCE. 300-38,400 bps.
	Ethernet Port:	10/100 Mbps (auto-MDIX sensing) compliant with IEEE 802.3
	System Port:	RJ45 for diagnostic, configuration and re-programming
	Antenna:	N female bulkhead Separate N (Tx) and SMA (Rx) connectors for full-duplex
	Power:	2 pin locking, mating connector supplied
	LED Display:	Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs and LAN LEDs
Ethernet	Protocols:	Ethernet/IP (including UDP, TCP, DHCP, ARP, ICMP, STP, IGMP, SNMP & TFTP)
	Terminal Server:	Legacy RS-232 serial support via embedded terminal server (UDP/TCP)
	DHCP Modes:	Auto and Manual
	Telnet:	Telnet access to programming and diagnostics interface
	SNMP:	SNMP V1/V2 access to diagnostics and radio information
Modem	Data Port:	RS232, DCE, 300-38,400 bps asynchronous
	System Port:	RS-232, 19,200bps asynchronous
	Flow Control:	Selectable hardware/software/3-wire interface
	Data Buffer:	16Kbyte of on-board RAM
	Bit Error Rate:	< 1x10 ⁻⁶ @ -110dBm (4800 bps)
		< 1x10 ⁻⁶ @ -108dBm (9600 bps)
		< 1x10 ⁻⁶ @ -106dBm (19,200 bps)
	Encryption:	128-bit AES encryption (within North America/Australia only)
	Collision Avoidance:	Channelshare™ supervisory channel collision avoidance system
	Data Stream:	Simultaneous delivery of multiple data streams (protocols) provided by Multistream™
	Data Turnaround Time:	<10mS
Firmware:	Field-upgradable Flash memory	
General	Temperature:	-30 to +60°C, [-22 to 140°F]
	Power Supply:	13.8VDC nominal (10-16VDC)
	Transmit Current:	750mA nominal @ 1W
		1600mA nominal @5W
	Receive Current:	<180mA nominal
	Shutdown Mode:	External control, < 10mA
	Enclosure:	Rugged die-cast, w/ fitted mounting plate
	Dimensions:	170 x 150 x 42mm (6.7 x 5.9 x 1.65 inches)
	With mounting plate:	190 x 150 x 47mm (7.5 x 5.9 x 1.85 inches)
	Weight:	1.27kg (2.8lbs.)
Diagnostics	TVIEW+™ Configuration, Network Management and Diagnostic Windows GUI Software	
	Network-wide operation from any remote terminal	
	Non-intrusive protocol - runs simultaneously with the application	
	Over-the-air re-configuration of user parameters	
	Storage of data error and channel occupancy statistics In-built Error Rate testing capabilities	
Approvals and Certifications	ETSI:	EN300113, EN301489, EN60950
	FCC:	PART 15, PART 90
	IC:	RS119, ICES-001
	ACA:	AS4295-1995 (Data)
	CSA:	Class I, Div 2, Groups (A,B,C,D) for Hazardous Locations, ANSI/UL equivalent Pending
Warranty	3-Year parts and labor	

EB45e Specifications

Functional	
Location	Base Station (EB450) Hot-Standby Base Station (EH450)
Licensed Radio Frequency Range	380-520MHz (various sub-frequency bands available)
Operational Modes	Full duplex (optional internal or external duplexer available for single and dual antenna operation)
RF Channel Data Rate	4800/9600/19,200bps full-duplex
Features	
Configuration Interface	TView+ (Windows™-based GUI software) for configuration, network management and diagnostics
Radio Frequency Accuracy	± 1ppm (-30 to 60°C) [-22 to 140°F] ambient
Transmitter	Power: 1W to 5W (+30dBm to 37dBm) ± 1 dB or 5W to 20W (+37dBm to 43dBm) ± 1 dB User-configurable with over-temperature and reverse power protection Modulation: User-configurable narrow band digitally filtered GMSK or 4 Level FSK
	Sensitivity: -118dBm for 12dB SINAD Selectivity: Better than 60dB Intermodulation: Better than 70dB Spurious Response: Better than 70dB AFC Tracking: Digital receiver frequency tracking Mute: Programmable digital mute
Connections**	Serial Port: 1 x DB9 female DCE 300 - 38,400bps Ethernet Port: 10/100 MBps (auto MDIX sensing) 802.3 compliant System Port: RJ45 (front and rear) for diagnostics, configuration and programming Antenna: 2 x N female bulkhead (separate Tx and Rx ports) 1 x N female bulkhead (with optional internal-duplexer) Power: 2 pin locking, mating connector(s) supplied LED Display: Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs (for both port A and B)
Modem	Data Buffer: 16Kbyte of on-board RAM Bit Error Rate: < 1x10 ⁻⁶ @ -110dBm (4800 bps) < 1x10 ⁻⁶ @ -108dBm (9600 bps) < 1x10 ⁻⁶ @ -106dBm (19,200 bps) Encryption: 128-bit AES encryption Collision Avoidance: Channelshare™ supervisory channel C/DSMA collision avoidance system Data Stream: Simultaneous delivery of multiple data streams (protocols) provided by Multistream™ Data Turnaround Time: <10mS Firmware: Field-upgradable Flash memory
General	Temperature: -30 to +60°C, [-22 to 140°F] Power Supply: 13.8VDC nominal (11-16VDC) Transmit Current: 5W Version: 2.0 A Nom @ 1 W 3.2 A Nom @ 5 W Receive Current: <1 A Dimensions (5W/20W): 5W: 19" 2 RU rack mount 485 x 90 x 420/446 mm (Including heatsink) 19 x 3.5 x 16.5 /17.5 inches Weight: 12.7 kg (28lbs) (excluding optional duplexer) Digital I/O: 2 Inputs monitored by TView+
Diagnostics	Network-wide operation from any remote terminal Non-intrusive protocol - runs simultaneously with the application Over-the-air re-configuration of user parameters Storage of data error and channel occupancy statistics In-built Error Rate testing capabilities
Approvals and Certifications	ETSI: EN300113, EN301489, EN60950 FCC: PART 15, PART 90 IC: RS119, ICES-001 ACA: AS4295-1995 (Data)
Warranty	3-Year parts and labor

Model Code

Code T	Select: Model Type
E	E-Series
Code y	Select: Unit Type
R	Remote Station
B	Base / Repeater Station
H	Hot-Standby Base / Repeater
Code xx	Generic Frequency Band
45	370 to 518MHz
Code y	Data Ports
e	One Ethernet and one serial
Code aa	Select: Frequency (400MHz bands)
46	370 to 388MHz [Tx & Rx]
47	380 to 396MHz [Tx & Rx]
48	395 to 406MHz [Tx & Rx]
50	403 to 417MHz [Tx & Rx]
63	406 to 421MHz [Tx & Rx]
64	415 to 430MHz [Tx & Rx]
56	418 to 435MHz [Tx & Rx]
57	428 to 444MHz [Tx & Rx]
55	436 to 450MHz [Tx & Rx]
51	450 to 465MHz [Tx & Rx]
65	455 to 470MHz [Tx & Rx]
52	465 to 480MHz [Tx & Rx]
53	480 to 494MHz [Tx & Rx]
60	490 to 500MHz [Tx & Rx]
54	505 to 518MHz [Tx & Rx]

Note: Other frequency bands available upon request.

Code bbb	Select: RF Channel Data Rate & Bandwidth (Internal Modem)
F01	FCC/IC 9600 / 19k2bps 12.5kHz ≈
F02	FCC/IC 19,200bps 25kHz
E01	ETSI 4800/9600bps 12.5kHz -4800bps provides M-Series compatibility for Europe
A01	ACA 4800 / 9600bps 12.5kHz ≈
A02	ACA 9600 / 19k2bps 25kHz

Tyxy-aabbb-cde represents the part number matrix

Code c	Select: Options 1
D	No Encryption (mandatory outside North America/Australia)
X	No Encryption and Full Duplex Operation requires selection of one or two external Duplexers: (mandatory outside North America/Australia)
E	Encryption (mandatory within North America/Australia)
Y	Encryption and Full Duplex Operation requires selection of one or two external Duplexers: (mandatory within North America/Australia)
Code d	Select: Options 2
O	No Class 1 Div 2 (EB450 & EH450 only)
H	Hazardous Environment Class1 Div2 (ER450 only)

Note: Specify internally or externally fitted duplexers. Externally fitted require feeder tails.

Code e	Select: Hot-Standby Configurations
O	None
A	Single External Duplexer (not included) with switching via Hot-Standby Controller
B	Dual Redundant External Duplexers (not included)
C	Single Internal Band Reject Duplexer with switching via Hot-Standby Controller
D	Dual Redundant Internal Band Reject Duplexers

Notes:

≈ M-Series-compatible EB45e/EH45e Base Stations are Type F01 or A01

Communications Standards:

- FCC – Federal Communications Commission (USA)
- IC – Industry Canada
- ETSI – European Telecommunication Standards Institute
- ACA – Australian Communications Authority

Example: ER45e-63F01-EH0 specifies: Trio Ethernet E-Series, Remote Station, Generic 450MHz band with a specific frequency range of 406 to 421MHz, FCC/IC 9600/19200bps modem with a bandwidth of 12.5kHz, Encryption, Class1 Div2 and no hot-standby options.

Accessories (Contact Sales Support Department for up-to-date list)

Model Number	Description	Part Number
Duplexers+		
DUPLX450BP	450 MHz Band Pass Duplexer, 19" Rack Mount	210095
Programming and Communication Cables		
	TView+ E & K Series Programming Cable	297816
	Trio Communication Cable, DE-9M to DE-9F - Modem, 10 feet {3.05m}	297820
	Trio Communication Cable, DE-9M to RJ45M - Modem, 10 feet {3.05m}	297821
Other		
	TView+ Configuration/Diagnostics software package	297826

+ Frequencies must be specified at time of order

