SCADAWave E-Series
Licensed Digital Data Radios

Features:

- 370-520MHz band operation
- Up to 19,200bps over-air data rates
- Superior receiver sensitivity
- 128-bit AES encryption
- Industry-standard protocol support
- Multistream™ simultaneous data stream support
- User friendly Windows-based configuration and diagnostics interface
- 3-year warranty (parts and labor)

SCADAWave E-Series licensed UHF radio modems are designed to efficiently transmit data for SCADA, telemetry and other information, and control applications. E-Series radios use advanced digital modulation and signal processing techniques to achieve exceptionally high data throughput efficiency using traditional licensed narrow band radio channels. The products are available in a wide range of frequency bands and carry the best warranty in the business.

As with all SCADAWave radio solutions, the 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, SCADAWave radios bring up-to-date communication technology and performance to the forefront.

Applications

E-Series radio products 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 SCADAWave 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 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 ports offer simultaneous data streams, collision avoidance, 128-bit AES encryption and support for Industry-standard protocols including Modbus, DNP3.0 and IEC 60870-5-101.

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 & Management

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

SCADAWave Manager

As the Network Management and Remote Diagnostics environment for all SCADAWave 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. SCADAWave Manager 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 SCADAWave 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 E-Series consists of a basic half-duplex remote radio-modem ER50, extended feature full-duplex remote radio-modem ER55, a performance-hardened base station EB60 and a Hot Standby base station controller unit EH70.

SCADAWave ER50& ER55 Specifications

Functional		
Location	Remote station	
Licensed Radio Frequency Range	370-520MHz (various sub-frequency bands available)	
Operational Modes	Simplex, half-duplex (ER50) or full-duplex (ER55)	
RF Channel Data Rate	4800/9600/19,200bps	
Features		
Configuration Interface	SCADAWave Manager: configuration, network management and diagnostic windows GUI software	
Radio Frequency Accuracy	±1ppm (-30 to 60ºC) (-22 to 140ºF) 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 (on data) / RTS line (Port A or B) / System Port Override
Receiver	Sensitivity:	-118dBm for 12dB SINAD
	Selectivity:	Better than 60dB
	AFC Tracking:	Digital receiver frequency tracking
	Mute:	Programmable digital mute
Connections	User Data Ports:	2 x DE9 female ports wired as DCE (modem)
	System Port:	RJ45 for diagnostic, configuration and re-programming
	Antenna:	N female bulkhead Separate N (Tx) and SMA (Rx) connectors for full-duplex (ER55)
	Power:	2 pin locking, mating connector supplied
	LED Display:	Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs (for both port A and B)
Modem	Data Serial Port A:	RS-232, DCE, 600-57,600bps asynchronous
	Data Serial Port B:	RS-232, DCE, 300-38,400bps 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
	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-upgradeable Flash memory
General	Temperature:	-30 to +60ºC, (-22 to 140ºF)
	Power Supply:	13.8VDC nominal (10-16VDC)
	Transmit Current:	750mA nominal @ 1W 1600mA nominal @5W
	Receive Current:	<125mA nominal
	Sleep Mode:	External control, < 1mA
	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	Network-wide operation from any remote terminal Non-intrusive protocol - runs simultaneously with the application Over-the-air re-configuration of all 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, Division II, Groups (A, B, C, D) for Hazardous Locations ANSI/UL equivalent
	CE:	Directive 1999/5/EC
Warranty	3-Year parts and labor	

SCADAWave EB60 & EH70 Specifications

Functional		
Location	Base Station (EB60) Hot Standby Base Station (EH70)	
Licensed Radio Frequency Range	370-520MHz (various sub-frequency bands available)	
Operational Modes	EB60: Full and half-duplex, simplex EH70: Full or half-duplex Optional internal or external-duplexer available for single antenna operation	
RF Channel Data Rate	4800/9600/19,200bps full-duplex	
Features		
Configuration Interface	SCADAWave Manager (Windows™-based GUI software) for configuration, network management and diagnostics	
Radio Frequency Accuracy	±1ppm (-30 to 60ºC) (-22 to 140ºF) ambient	
Transmitter	Power:	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 (on data) / RTS line (Port A or B) / System Port Override
Receiver	Sensitivity:	-118dBm for 12dB SINAD
	Selectivity:	Better than 60dB
	AFC Tracking:	Digital receiver frequency tracking
	Mute:	Programmable digital mute
Connections**	User Data Ports:	2 x DE9 female ports wired as DCE (modem)
	System Port:	RJ45 for diagnostic, 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 supplied
	LED Display:	Multimode Indicators for Pwr, Tx, Rx, Sync, TxD and RxD data LEDs (for both port A and B)
Modem	Data Serial Port A:	RS-232, DCE, 600-57,600bps asynchronous
	Data Serial Port B:	RS-232, DCE, 300-38,400bps 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
	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-upgradeable Flash memory
General	Temperature:	-30 to +60ºC, (-22 to 140ºF)
	Power Supply:	13.8VDC nominal (11-16VDC)
	Transmit Current:	EB60: 1.3A nominal @ 1W, 2.5A nominal @ 5W EH70: 2.0A nominal @ 1W, 3.2A nominal @ 5W
	Receive Current:	EB60: < 350mA EH70: < 1A
	Sleep Mode:	External control, < 1mA
	Enclosure:	EB60: 19" 2 RU rack mount EH70: 19" 5 RU rack mount
	Dimensions:	EB60: 485 x 90 x 420 mm (19 x 3.5 x 16.5 inches) including heat sink EH70: 485 x 225 x 420 mm (19 x 8.9 x 16.5 inches) including heat sink
	Weight:	EB60: 1.27kg (2.8lbs.) EH70: 12.7kg (28lbs) (excluding optional-duplexer)
	Digital I/O:	2 Inputs monitored by SCADAWave Manager**
Diagnostics	Network-wide operation from any remote terminal Non-intrusive protocol - runs simultaneously with the application Over-the-air re-configuration of all 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)
	CE:	Directive 1999/5/EC
Warranty	3-Year parts and labor	

Model Code

Tyxxx-aabbb-cde represents the part number matrix

Code T	Select: Model Type
E	E-Series

Code y	Select: Unit Type
R	Remote Station (ER50/ER55)
B	Base / Repeater Station (EB60)
H	Hot Standby Base / Repeater (EH70)

Code xxx	Select: Generic Frequency Band
450	370 to 518MHz

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 9600bps 12.5kHz
E02	ETSI 19k2bps 25kHz
A01	ACA 4800 / 9600bps 12.5kHz ≈
A02	ACA 9600 / 19k2bps 25kHz

Code c	Select: Options 1
D	Diagnostics
X	Full Duplex Operation and Diagnostics (must be selected when ordering ER55; requires selection of one or two external Duplexers)

Code d	Select: Options 2
0	No Class 1 Div 2 (EB60 & EH70 only)
H	Hazardous Environment Class1 Div2 (ER50 & ER55 only)

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

Code e	Select: Hot Standby Configurations
0	None
A	Single External Duplexer and Antenna (not included) with RF switching via Hot Standby Controller
B	Dual Redundant External Duplexers and Antennas (not included)

Notes:
≈ M-Series-compatible EB60/EH70 Base Stations are Type F01 or A01

Communications Standards:
FCC – Federal Communications Commission (USA)
IC – Industry Canada
ETSI – European Telecommunication Standards I nstitute
ACA – Australian Communications Authority

Example: ER450-63F01-DH0 specifies: SCADAWave 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, Diagnostics, 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		
SCADAWave Manager E & K Series Programming Cable		297816
SCADAWave Communication Cable, DE-9M to DE-9F - Modem, 10 feet (3.05m)		297820
SCADAWave Communication Cable, DE-9M to RJ45M - Modem, 10 feet (3.05m)		297821
Other		
EDOVM	Digital Order Wire Voice Module (E-Series only)	210128
SCADAWave Manager Configuration/Diagnostics software package		297826

+ Frequencies must be specified at time of order

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