

Trio Q

Licensed VHF | UHF
Ethernet and Serial data radio

QB150 | QB450 – Simplex, Half and Full Duplex



Product at a glance

Trio™ Q Data Radios are advanced, high-speed licensed digital data radios, providing both Ethernet and serial communications for complex and demanding applications in Point-to-Point and Point-to-Multipoint (Multiple Address Radio) Telemetry and remote SCADA systems.

Features such as ChannelShare+™ and web-based user configuration, together with powerful remote diagnostics and Network Management, make Trio Q Data Radios the complete licensed radio solution that works with leading host systems and remote equipment.

Combining both Ethernet and serial connectivity, Trio Q Data Radios are suitable for use with the latest SCADA technology and for providing a smooth transition from serial-based infrastructure to IP/Ethernet.

As a complement to the Trio QR half duplex remote radio, the Trio QB radio is ideal for deployment at base & repeater sites in systems using single or two-frequency operation. In high duty-cycle applications, the Trio QB delivers maximum-rated transmitter power in ambient temperatures up to +70 °C (158 °F).

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Specifications – QB150 | QB450

Radio

Frequency Range	<ul style="list-style-type: none"> • QB150: 135...175 MHz • QB450: 400...450 MHz (L-Band) or 450...518 MHz (H-Band)
Frequency Splits	User-configurable frequency splits, including: 4.5 MHz, 5 MHz, 5.2 MHz, 9.5 MHz, 9.8 MHz & 10 MHz
Channel Selection	<ul style="list-style-type: none"> • QB150: 3.125 kHz or 1.25 kHz channel steps • QB450: 3.125 kHz channel steps
Channel Spacing	12.5 kHz and 25 kHz (software selectable)
Frequency Accuracy	± 0.8 ppm, -40...70 °C (-40...158 °F) ambient
Aging	≤ 1 ppm/year
Radio Modes ¹	Simplex, Half Duplex & Full Duplex (model code dependent)
Duplexer ⁵	External duplexer filter may be required (not included) - Refer to note 5 for more information.
Tx/Rx Port Isolation Requirements	<ul style="list-style-type: none"> • QB150: >75 dB (Typical) • QB450: >70 dB (Typical)

Transmitter

Tx Power	<ul style="list-style-type: none"> • CPM: 0.05...10 W (+17...+40 dBm) • QAM QPSK: 0.05...5 W (+17...+37 dBm) • QAM 16-QAM: 0.05...3.2 W (+17...+35 dBm) • QAM 64-QAM: 0.05...2.5 W (+17...+34 dBm) • 0.1 dB resolution, user-configurable 			
Modulation ¹	Narrow band 2, 4, 8 and 16-level continuous phase modulation (CPM) QPSK, 16-QAM and 64-QAM quadrature amplitude modulation (QAM)			
Emission Designator	Region	Channel Bandwidth	CPM	QAM
	ACMA/ETSI	12.5 kHz	11K2F1D	12K0D1D
		25 kHz	20K1F1D	23K6D1D
FCC/ISED	12.5 kHz	11K2F1D	11K2D1D	
Tx Keyup Time	<1 ms			
Timeout Timer	Configurable 0...255 seconds			
Tx Spurious	≤ -36 dBm			
PTT Control	Auto (Data)			

Receiver^{1,6}

Topology	Hybrid single conversion / SDR
Frequency Error Compensation	Digital receiver frequency tracking up to +/- 2000 Hz
Maximum RF Level (Decoding)	-10 dBm
Adjacent Channel Rejection Ratio (Selectivity)	<ul style="list-style-type: none"> • 12.5 kHz: -44 dBm / 52 dB • 25 kHz: -37 dBm / 58 dB
CoChannel Rejection Ratio	QPSK: -12 dB / 64-QAM: -23 dB
Intermodulation Rejection	-30 dBm [65 dB]
Spurious Response Rejection	-30 dBm [65 dB]
Blocking or Desensitization	-5 dBm [90 dB]

Trio Q

Licensed VHF | UHF Ethernet and Serial data radio

Specifications – QB150 | QB450 – cont'd

Connections

Serial Interface 1/2	1 x DB9 female connector providing 2 x RS-232 3-wire serial ports or 1x RS-485 serial port (shared connector)
Serial Interface Data Rates	300...115,200 bps
Serial Interface Flow Control	Configurable hardware / 3-wire interface
Serial Interface DCD Control	Configurable DCD operation: activated on RF carrier or from user data output
Ethernet Port	3 x RJ45: 10/100 Mbps (auto-MDIX sensing) compliant with IEEE 802.3
USB Port	USB Type A Host supporting Zero-Touch Configuration
Antenna ⁵	<ul style="list-style-type: none"> • 2 x N female bulkhead (separate Tx and Rx ports - Full duplex) • 1 x N female bulkhead (shared Tx and Rx port - Simplex)
Power	10-pin locking, mating connector (11...30 Vdc)
Digital I/O	Optional 3 x digital inputs / 3 x digital outputs, which can be monitored or controlled by TVIEW+™ Diagnostics Software, EcoStruxure™ Geo SCADA Expert (ClearSCADA™) or SNMP
LED Display	Multimode Indicators for DC Power, Transmit, Receive, Synchronized Data, Serial Interface 1 & 2 Transmit & Receive Data, Ethernet 1 & 2 Transmit & Receive Data

Ethernet

Supported Protocols	Ethernet (including UDP, TCP, DHCP, ARP, ICMP, STP, IGMP, NTP & TFTP)
Ethernet Repeating	Automatic Peer-to-Peer repeating
Operating Modes	Layer-2 Ethernet Bridge mode / Layer-3 IP Router mode
Compression	Ethernet/IP/TCP/UDP/ESP Header (ROHC RFC-3095) and Advanced Payload Compression
Network Address Translation	Static NAT Port forwarding
VLAN	802.1Q VLAN
Quality of Service (QoS)	Eight priority lanes / Min-Max bandwidth / Flexible user-defined matches
Terminal Server	Legacy RS-232/RS-485 serial support via embedded terminal server (UDP/TCP)
Protocol Gateway	TCP <-> UDP and UDP <-> TCP Protocol Gateway with Unicast/Multicast Support
IP Configuration	Auto (DHCP) and Manual
SNMP	SNMP V1, V2c & V3, RFC 1213-compliant & radio diagnostics parameters (with notifications)
Modbus™ Gateway	Configurable Modbus/TCP-to-Modbus/RTU Gateway
Time Server	NTP Client / Server / Client-Server / Manual modes

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Specifications – QB150 | QB450 – cont'd

Modem

Regulatory Region	Bandwidth (KHz)	Forward Error Correction (FEC)	Modulation	RF Data Rate (Kbps)	RF 1×10^{-6} BER Sensitivity (dBm)
ACMA/ETSI (QAM)	12.5	None	64-QAM	60.0	-100
			16-QAM	40.0	-107
			QPSK	20.0	-113
		Min FEC	64-QAM	49.8	-105
			16-QAM	33.2	-111
			QPSK	16.6	-113
		Max FEC	64-QAM	43.2	-106
			16-QAM	20.8	-112
			QPSK	10.4	-113
ACMA/ETSI (QAM)	25	None	64-QAM	120.0	-96
			16-QAM	80.0	-104
			QPSK	40.0	-112
		Min FEC	64-QAM	99.6	-101
			16-QAM	66.4	-108
			QPSK	33.2	-112
		Max FEC	64-QAM	86.4	-102
			16-QAM	41.6	-109
			QPSK	20.8	-112
FCC/ISED (QAM)	12.5	None	64-QAM	55.4	-100
			16-QAM	36.9	-107
			QPSK	18.5	-113
		Min FEC	64-QAM	46.2	-105
			16-QAM	30.5	-111
			QPSK	15.7	-113
		Max FEC	64-QAM	39.7	-106
			16-QAM	19.4	-112
			QPSK	9.2	-113
ACMA/ETSI (CPM)	12.5	None	2-CPM	8.0	-113
	4-CPM		16.0	-110	
	8-CPM		24.0	-107	
	16-CPM		32.0	-100	
ACMA/ETSI (CPM)	25	None	2-CPM	14.0	-111
	4-CPM		28.0	-109	
	8-CPM		42.0	-106	
	16-CPM		56.0	-99	
FCC/ISED (CPM)	12.5	None	2-CPM	8.0	-113
	4-CPM		16.0	-110	
	8-CPM		24.0	-107	
	16-CPM		32.0	-100	

Dynamic Speed Selection

- User-configurable packet error rate / SNR / RSSI based algorithm for automatic data rate selection
- User-configurable minimum and maximum data rates, FEC and fixed data rate modes

Forward Error Correction (FEC) Level	Modulation	FEC Sensitivity Gain (dB) with 10% Packet Error Rate due to Impulse Noise
Min FEC (0.52)	QPSK	5
	16-QAM	13
	64-QAM	17
Max FEC (0.83)	QPSK	6
	16-QAM	15
	64-QAM	22
Truncated interleaved BCH encoding with 0.52/0.72/0.83 coding rates		

Operating Modes

Base, remote, repeater or store-and-forward

Channelshare+

- Channelshare+ Advanced CSMA supervisory collision avoidance system (full-duplex)
- Channelshare+ Token Grant channel management system (half-duplex/simplex)

E/M-Series Compatibility²

Over-the-air compatibility with Trio E/M-Series radios

Firmware

Local and over-the-air flash-based firmware – upgradable patches with support for broadcast updates

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Specifications – QB150 | QB450 – cont'd

Security

Encryption ³	256-bit AES / AES-GCM with automatic rotating keys as per NIST SP 800-38D
HTML Interface	Password-protected HTTP and HTTPS configuration and management interface
Console Interface	Password-protected Telnet, SSHv2 and Serial console interface
User access control	Multi-User password-protected access control [read only, read/write, read/write with security, unrestricted] 256 max users
Centralized user access control	RADIUS (RFC2865) based user-authentication for remote or local logins with local user-access control fallback
Authentication	Certificate-based radio authentication using DTLS and X509.3v3
Packet-Filtering Firewall	Advanced and basic mode packet-filtering firewall with user-configurable Layer 2 and Layer 3 rules for radio and ethernet ports
Certificate Management	FIPS Level 2 certified Trusted Platform Module
Event Logging	Non-volatile time-stamped event log

Diagnostics

Diagnostics	<ul style="list-style-type: none"> Local (HTTP/HTTPS/Telnet/SSH/Console) or remote (Serial/TCP/UDP) access Compatible with TVIEW+ and EcoStruxure Geo SCADA Expert Network-wide access Non-intrusive protocol – runs simultaneously with the application Embedded history of diagnostics parameters and data statistics Embedded error rate testing capabilities Many diagnostics parameters available including Tx Power, RSSI, Supply Voltage, Temperature and VSWR
Logging	Embedded event and performance logs including time-stamped data statistics and channel occupancy
Configuration	<ul style="list-style-type: none"> Manual Configuration via embedded HTTP, HTTPS web interface and/or Telnet/SSH/Serial console with optional TFTP Automatic Zero-Touch configuration load via USB Automatic configuration save via TFTP/SCP serve
Ping Tester	Embedded ping test facility

General

Operating Temperature Range	-40...70 °C (-40...158 °F) ambient
Relative Humidity	Up to 95% at 40 °C (104 °F) ambient
Cooling	Built-in temperature-controlled fan
Input Voltage	11...30 Vdc
Input Power (Tx typical)	<ul style="list-style-type: none"> QB150: 26 W @ 30 dBm, 38 W @ 37 dBm, 46 W @ 40 dBm QB450: 34 W @ 30 dBm, 46 W @ 37 dBm, 59 W @ 40 dBm
Input Power (Rx typical)	14 W
Housing & Dimensions	483 mm (19 in.) 1 RU rack mount (Brackets adjustable for front, centre or proud mount). Without mounting brackets: 424 x 44.45 x 436.5 mm (16.7 in. x 1.75 in. x 17.18 in.)
Weight	5 kg (11 lbs.)

Compliance^{1,4}

Europe (ETSI)	ETSI EN 300 113 V2.2.1 RED, ETSI EN 302 561, EN 301 489, EN 50385, EN 50383 and EN 300 019-2-3
United States (FCC)	47CFR PART 2, PART 15 A & B, PART 90, IEC 60950-14
Canada (ISED)	RSS-Gen, RSS-102, RSS-119, IEC 60950-14
Australia (ACMA)	AS/NZS 4295-2004, AS/NZS 60950.1
Substation	Communications ports substation hardened to IEC-61850-3

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Model Code

TBURQB4HN-E00E1L00 represents a typical part number

Model	Trio QB Data Radio
TBURQ	Q Data Radios

Code	Select: Unit Type
B	Simplex/Half-Duplex/Full-Duplex Radio - 19" 1RU

Code	Select: Frequency Band & Sub Band
1M	VHF Mid Band: 135 to 175MHz
4L	UHF Low Band: 400 to 450MHz
4H	UHF High Band: 450 to 518MHz

Code	Select: Reserved for future use
N	Reserved for future use

Code	Select: Regulatory Region ¹
E00	ETSI/ACMA Region
F00	FCC Region

Code	Select: Encryption ³
E	256-bit AES encryption (standard)
N	No encryption

Code	Select: Reserved for future use
1	Reserved for future use

Code	Select: Software Licensed Features
L	Ethernet & Serial (three Ethernet & two Serial Ports)

Trio Q

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Model Code cont'd

TBURQB4HN-E00E1L00 represents a typical part number

Code	Select: Power Supply
0	11...30 Vdc

Code	Select: Radio Exciter Type
0	Separate Tx/Rx Ports with Half/Full Duplex Capability
E	User-configurable common (Single) Tx/Rx port or separate Tx/Rx ports with half duplex/simplex capability

Example: TBURQB4LH-E00E1L00 specifies: Trio QB450 full duplex radio, 400 to 450 MHz, ETSI/ACMA Regulatory Region, 256-bit Encryption enabled, three Ethernet & two Serial Ports, 11...30 Vdc power supply.

Radio Regulatory Standards:

FCC – Federal Communications Commission

ISED – Innovation, Science and Economic Development Canada

ETSI – European Telecommunication Standards Institute

ACMA – Australian Communications and Media Authority

Footnotes

1: Availability of radio models is dependent on country of deployment. Local and regulatory conditions may determine the performance and suitability of the radio in different countries. It is the responsibility of the buyer to ensure the radio model meets the regulatory conditions required. Some parameters depend on model type and/or mode of operation. Contact your local Schneider Electric sales office for more details.

2: Backward-compatibility is not available for all types & models of Trio E radio. Not all features are available when operating in backward-compatible mode. The following modulations are supported in E/M compatibility mode (as of Firmware Version 1.3.6.3674):

E-Series	M-Series
9600 12.5 kHz ACA 4 Level	9600 25.0kHz ACA M-Series
19200 25.0 kHz ACA 4 Level	4800 12.5kHz ACA M-Series
9600 12.5 kHz FCC 4 Level	4800 25.0kHz ACA M-Series
19200 12.5 kHz FCC 4 Level	2400 12.5kHz ACA M-Series
19200 25.0 kHz FCC 2 Level	9600 12.5kHz FCC M-Series
9600 12.5 kHz ETSI 4 Level	4800 12.5kHz ETSI M-Series

For BER specifications and/or sensitivities, refer to the corresponding E or M Series datasheet.

3: Export and import restrictions may apply.

4: Other country and radio regulatory regional approvals are available upon request. Contact your local Schneider Electric sales office for more details.

5: The QB is a full duplex radio and must be deployed with suitable isolation between transmitter and receiver. Isolation may be achieved by the use of band pass duplexer, external filters or suitably spaced separate antennas. Internal duplexers and filters are not available.

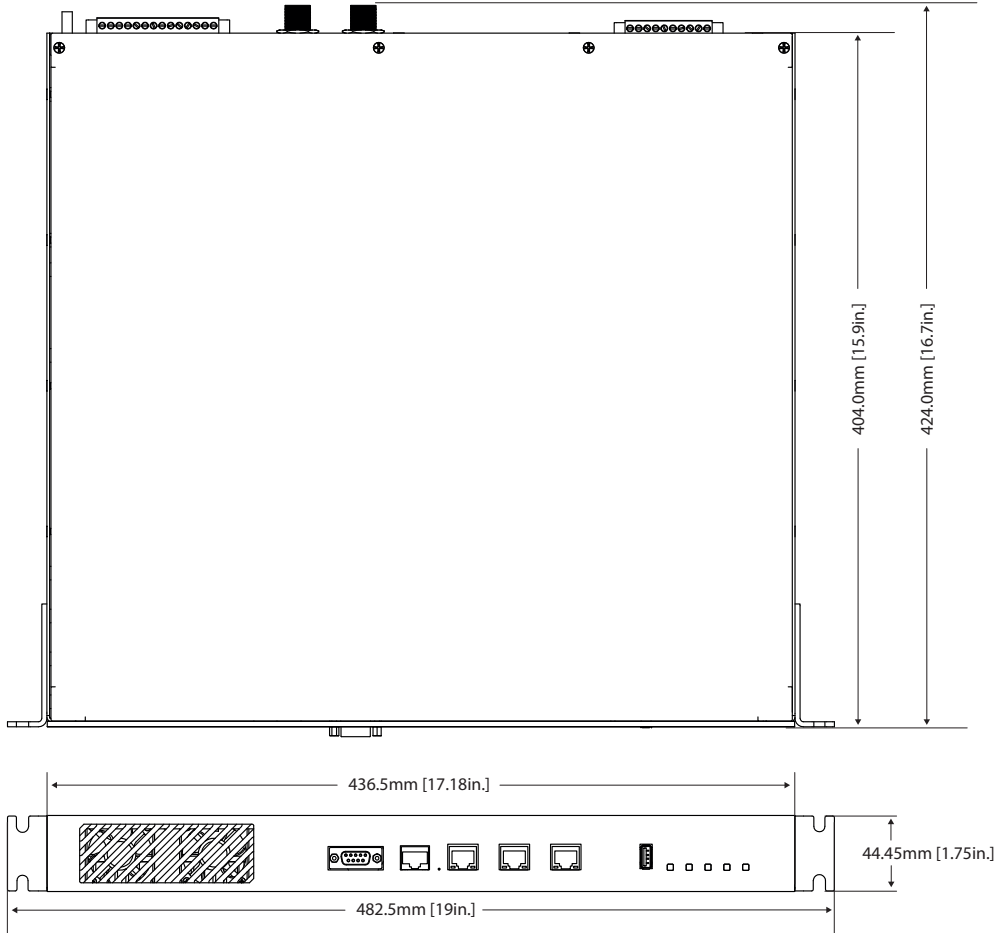
Suitable duplexers include TBUMDUPLXBPXXXCOA. For information regarding duplexers, contact your local sales office or refer to the Wireless Accessories data sheet.

6: Typical figures shown based on QPSK modulation in 12.5 kHz ETSI channel without Forward Error Correction unless otherwise specified.

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Dimensions – QB – Full Duplex Radio



This is a Green Premium product and is RoHS-compliant. Accessories sold separately.

Disclaimer: Not all product features are available in every mode of operation. Schneider Electric reserves the right to change product specifications. For more information visit www.se.com.

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