

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).

Green Premium™ ecolabel product – Sustainable performance, by design

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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 ²	External duplexer filter may be required (not included) - Refer to note 2 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 ¹	<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) • QAM 256-QAM: 0.05...2.2 W (+17...+33.5 dBm) • 0.1 dB resolution, user-configurable 			
Modulation ¹	Narrow band 2, 4, 8 and 16-level continuous phase modulation (CPM) QPSK, 16-QAM, 64-QAM and 256-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
25 kHz		N/A	16K0D1D	
Tx Keyup Time	<1 ms			
Timeout Timer	Configurable 0...255 seconds			
Tx Spurious	<= -36 dBm			
PTT Control	Auto (Data)			

Receiver^{1,3}

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"> • Compliant at all RF speeds - ETSI EN 300 113 V2.2.1 RED • Compliant at all RF speeds - ETSI EN 302 561 V2.1.1 RED
Co-Channel Rejection Ratio	QPSK: -12 dB / 64-QAM: -23 dB
Intermodulation Rejection	-33 dBm [62 dB]
Spurious Response Rejection	-30 dBm [65 dB]
Blocking or Desensitization	-5 dBm [90 dB]

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Specifications – QB150 | QB450 – cont'd

Connections

Serial Interface 1/2	1 x DB9 socket connector providing 2 x RS-232 3-wire serial ports or 1 x 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 ²	<ul style="list-style-type: none"> • 2 x N socket bulkhead (separate Tx and Rx ports - Full duplex) • 1 x N socket 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 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 / Mixed Layer-2 Layer-3 modes
Compression	Ethernet/IP/TCP/UDP/ESP Header (ROHC RFC-3095) and Advanced Payload Compression
Network Address Translation	Static NAT Port forwarding and 1:1 Destination NAT
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

RF Channel Data Rate ^{1,5}

Regulatory Region	Bandwidth (KHz)	Forward Error Correction (FEC)	Modulation	RF Data Rate (Kbps)	RF 1x10 ⁻⁶ BER Sensitivity (dBm)
ACMA/ETSI (QAM)	12.5	None	256-QAM 64-QAM 16-QAM QPSK	80.0 60.0 40.0 20.0	-92 -100 -107 -113
		Min FEC	256-QAM ⁴ 64-QAM 16-QAM QPSK	66.4 [76.0] 49.8 33.2 16.6	-98 [-92] -105 -111 -113
		Max FEC	256-QAM 64-QAM 16-QAM QPSK	57.6 43.2 20.8 10.4	-99 -106 -112 -113
ACMA/ETSI (QAM)	25	None	256-QAM 64-QAM 16-QAM QPSK	160.0 120.0 80.0 40.0	-84 -96 -104 -112
		Min FEC	256-QAM ⁴ 64-QAM 16-QAM QPSK	132.8 [153.6] 99.6 66.4 33.2	-94 [-84] -101 -108 -112
		Max FEC	256-QAM 64-QAM 16-QAM QPSK	115.2 86.4 41.6 20.8	-95 -102 -109 -112
FCC/ISED (QAM)	12.5	None	256-QAM 64-QAM 16-QAM QPSK	73.8 55.4 36.9 18.5	-92 -100 -107 -113
		Min FEC	256-QAM ⁴ 64-QAM 16-QAM QPSK	61.3 [70.8] 46.0 30.6 15.4	-98 [-92] -105 -111 -113
		Max FEC	256-QAM 64-QAM 16-QAM QPSK	53.1 39.9 19.2 9.6	-99 -106 -112 -113
FCC/ISED (QAM)	25	None	256-QAM 64-QAM 16-QAM QPSK	120.0 90.0 60.0 30.0	-86 -98 -105 -110
		Min FEC	256-QAM ⁴ 64-QAM 16-QAM QPSK	99.6 [115.2] 74.7 49.8 24.9	-94 [-86] -102 -108 -114
		Max FEC	256-QAM 64-QAM 16-QAM QPSK	86.4 64.8 31.2 15.6	-95 -103 -109 -114
ACMA/ETSI (CPM)	12.5	None	2-CPM 4-CPM 8-CPM 16-CPM	8.0 16.0 24.0 32.0	-113 -110 -107 -100
ACMA/ETSI (CPM)	25	None	2-CPM 4-CPM 8-CPM 16-CPM	14.0 28.0 42.0 56.0	-111 -109 -106 -99
FCC/ISED (CPM)	12.5	None	2-CPM 4-CPM 8-CPM 16-CPM	8.0 16.0 24.0 32.0	-113 -110 -107 -100

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Specifications – QB150 | QB450 – cont'd

Dynamic Speed Selection	<ul style="list-style-type: none"> 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	Modulation	Forward Error Correction (FEC) Level	FEC Sensitivity Gain (dB) with 10% Packet Error Rate due to Impulse Noise
	QPSK	Min FEC (0.83) Max FEC (0.52)	5 6
	16-QAM	Min FEC (0.83) Max FEC (0.52)	13 15
	64-QAM	Min FEC (0.83) Max FEC (0.72)	17 22
	256-QAM	Min FEC (0.83) Max FEC (0.72)	21 26
	Truncated interleaved BCH encoding with .52/0.72/0.83/0.96 ³ coding rates		
Operating Modes	Base, remote, repeater or store-and-forward		
Channelshare+	<ul style="list-style-type: none"> Channelshare+ Advanced CSMA supervisory collision avoidance system (full-duplex) Channelshare+ Token Grant channel management system (half-duplex/simplex) 		
E/M-Series Compatibility ⁶	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		

Security

Encryption ⁷	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
Certificate Management	Automatic managed signed certificates compatible with Microsoft® Certificate Authority™
Console Interface	Password-protected Telnet, SSHv2 and Serial console interface
Role Based Access Control	Multi-User password-protected access control [read only, read/write, read/write with security, unrestricted]
Managed Directory Services	Integrated with Active Directory™ using LDAP/LDAPS or RADIUS (RFC2865) with cached fallback
Authentication	Certificate-based radio authentication using DTLS and X509
Packet-Filtering Firewall	Advanced and basic mode packet-filtering firewall with user-configurable Layer 2 and Layer 3 rules for radio and Ethernet ports
Event Logging	Non-volatile time-stamped event log with support for integration into SYSLOG servers

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Specifications – QB150 | QB450 – cont'd

Diagnostics	
Diagnostics	<ul style="list-style-type: none"> • Local (HTTP/HTTPS/Telnet/SSH/Console) or remote (Serial/TCP/UDP) access • Command line interface • 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 network list of peer radios • Embedded error rate testing capabilities • Many diagnostics parameters available including Tx Power, RSSI, Supply Voltage, Temperature and VSWR • Embedded Wireshark™ packet capture tool
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/SCP • Embedded configuration database with up to 100 different configurations • Command line interface • Automatic Zero-Touch configuration load via USB • Automatic configuration save via TFTP/SCP server • Time-based configuration change
Ping Tester	Embedded ping test facility
Manufacturing	Embedded manufacturing test report (PDF)
General	
Operating Temperature Range	-40...70 °C (-40...158 °F) ambient
Relative Humidity	Up to 95% at 40 °C (104 °F) ambient
Altitude	0...3000 m (0...9843 ft.) above mean sea level
Barometric Pressure	75...106 kPa (0.75...1.06 Bar)
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, center 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, 5}	
Europe (ETSI)	ETSI EN 300 113 V2.2.1 RED, ETSI EN 302 561, EN 301 489, EN 62638-1, 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 ^{1,5}
E00	ETSI/ACMA Region
F00	FCC Region

Code	Select: Encryption ⁷
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)

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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 Two Frequency Full Duplex
E	User-configurable common (Single) Tx/Rx port or separate Tx/Rx ports with half duplex/simplex capability

Example: TBURQB4HN-E00E1L00 specifies: Trio QB450 Simplex/Half-Duplex/Full-Duplex Radio, 450 to 518 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: The QB is a full duplex radio and needs to 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 TBUMDUPLXBPXXCOA. For information regarding duplexers, contact your local sales office or refer to the Wireless Accessories data sheet.

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

4: 256-QAM full data rate (without FEC) may not be obtainable under all hardware operating conditions. For this reason, dynamic speed selection may select 256 QAM with [FEC 0.96] providing close to full data rate with minimal overhead in conjunction with FEC 0.83 to achieve improved sensitivity.

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

6: 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 25.0 kHz ACA M-Series
19200 25.0 kHz ACA 4 Level	4800 12.5 kHz ACA M-Series
9600 12.5 kHz FCC 4 Level	4800 25.0 kHz ACA M-Series
19200 12.5 kHz FCC 4 Level	2400 12.5 kHz ACA M-Series
19200 25.0 kHz FCC 2 Level	9600 12.5 kHz FCC M-Series
9600 12.5 kHz ETSI 4 Level	4800 12.5 kHz ETSI M-Series

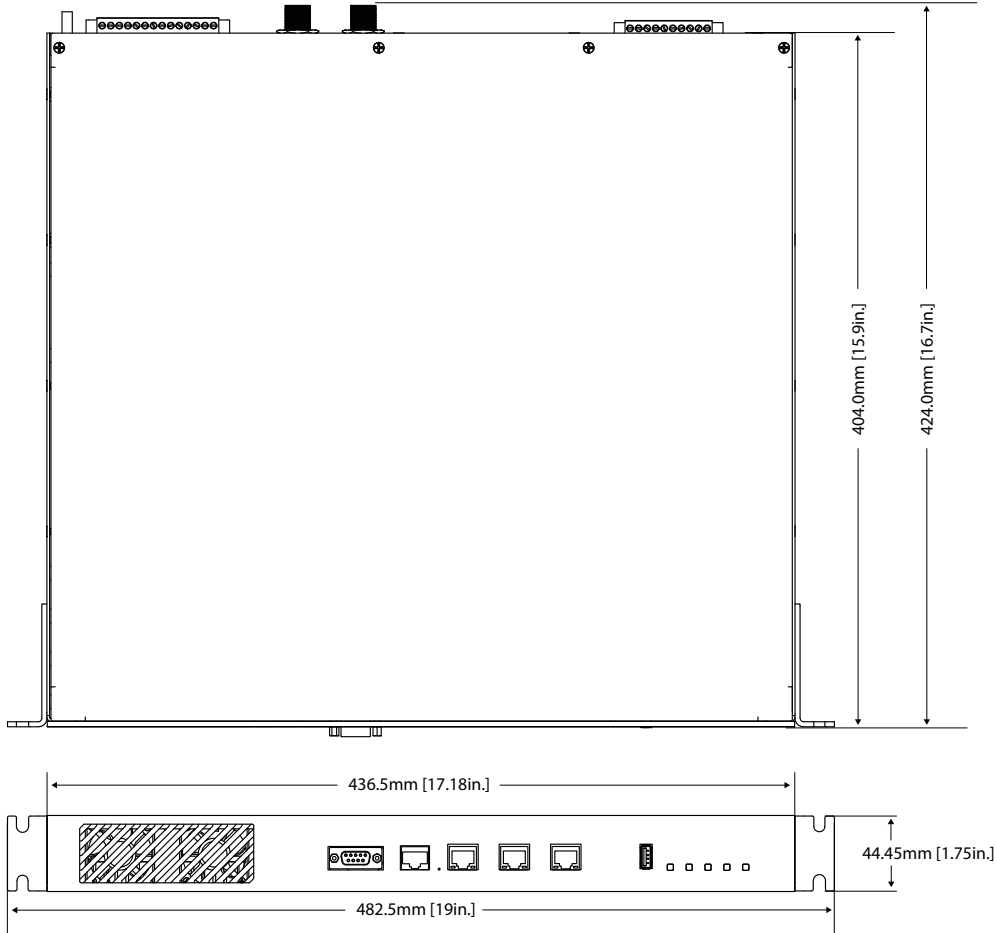
For BER specifications and/or sensitivities, refer to the corresponding E or M Series datasheet.

7: Export and import restrictions may apply.

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Dimensions – QB – Full Duplex Radio



Note: Accessories sold separately.

Disclaimer:

The information provided in this document contains general descriptions and/or technical characteristics of the performance of the described products or services. For detailed specification, performance and instruction of use, refer to corresponding Catalogs and user guides if available.

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Schneider Electric

35 rue Joseph Monier
 92500 Rueil-Malmaison, France
 Email: RemoteOperations@se.com

www.se.com

Life Is On



Part Number TBULM08003-41 v40



Green Premium™

Schneider Electric's commitment to deliver products with best-in-class environmental performance.



More than 75% of our product sales offer superior transparency on the material content, regulatory information and environmental impact of our products:

- RoHS compliance
- REACH substance information
- Industry leading # of PEP's*
- Circularity instructions

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Green Premium delivers strong value propositions through third-party labels and services. By collaborating with third-party organizations we can support our customers in meeting their sustainability goals such as green building certifications.



Learn more
about
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*PEP: Product Environmental Profile (i.e. Environmental Product Declaration)