TRIMBLE TMR1 BOARD LEVEL

KEY FEATURES

Software-defined dual-band (865-870 and 902-928 MHz) data link using Frequency Hopping Spread Spectrum (FHSS) technology

ISM (license-free) operation certified around the world

Supports up to 2.6 Mbps throughput

Dual data ports for simultaneous communication with both TCP/IP and serial devices

Upload configurations and firmware upgrades over the air or over the Internet

Radios in rugged, waterproof housings also available

TRIMBLE TMR1 BOARD LEVEL

SOFTWARE-DEFINED HIGH-SPEED DATA LINK FOR INDUSTRIAL COMMUNICATIONS

TRIMBLE IS COMMITTED TO DEVELOPING NEXT GENERATION INDUSTRIAL COMMUNICATIONS NETWORKS WITH HIGH SPEED DATA LINKS OFFERING THE HIGHEST LEVEL OF PERFORMANCE

WORLD LEADER IN INDUSTRIAL TECHNOLOGY

Trimble® is the world leader in a wide range of positioning technologies including GPS, laser, optical and inertial technologies with application software and information services to provide complete industrial solutions. None of this would have been possible without the support of Trimble's wireless communications technology, from mobile radios for RTK surveying to satellite networks for world-wide data communications.

LICENSE-FREE, CERTIFIED AROUND THE WORLD

The Trimble TMR1 Board Level is a dual ISM band (865-870 and 902-928 MHz) networked transceiver supporting license-free wireless communications around the world. With available throughput up 2.6Mbps, the TMR1 allows you to seamlessly integrate both serial and Ethernet traffic as well as having the throughput available for video. Range as high as 70 miles has been demonstrated in low noise environments. The TMR1 Board Level's high performance and versatility make it ideal for oil/gas, water and electric utilities, environmental monitoring and agricultural applications.

ADAPTIVE SPEED/MODULATION TECHNOLOGY

The Trimble TMR1 supports both point-to-point and point-to-multipoint network topologies. With most networked radios operating in point-to-multipoint mode, the speed of the access point radio is restricted to the speed and modulation of the weakest link. For example, if one link can only maintain 256 kbps with 2FSK modulation, all links will operate at the same reduced speed/modulation. But the Trimble TMR1 supports multiple speed/modulation pairs within a single network allowing a TMR1 master radio to select the optimal speed for each individual remote radio. This unique capability automatically adapts to changing signal and noise levels by selecting the highest link rate/modulation pair maintainable for each individual radio link without forcing the entire network to operate at the speed of the slowest link. So a distant radio or changing noise levels won't drag down the speed of the whole network.

DUAL DATA PORTS FOR BOTH SERIAL AND IP COMMUNICATION

The Trimble TMR1 Board Level is equipped with two RJ45 connectors: one for serial and one for Ethernet. This allows you to attach sensors to the TMR1 Board Level in the field and to communicate with any TMR1 Board Level via Ethernet cables, a LAN/WAN or the Internet. All links can be protected by AES 128- and 256-bit data encryption and VLAN segregation, so only you can communicate with your network.

Trimble Wireless Infrastructure

TRANSMITTER	900 ISM Band	868 ISM Band
Frequency	902-928 MHz	864.9-870 MHz
Output Power	1 mW to 1W	3 mW to 500 mW
Range – LOS	70+ miles	50+ km
Modulation	MSK, 2FSK, BPSK, QPSK, 8PSK	MSK, QPSK, 8PSK, 16QAM, 32QAM
RF Data Rate	57 kbps to 2.6 Mbps	10 kbps to 736 kbps
Occupied Bandwidth	6.25 kHz to 1.5 MHz	50 kHz, 100 kHz, 250 kHz
Frequency Stability	1.0 ppm	1.0 ppm
Duty Cycle	Continuous	50% (10% in 250 KHz channels)
Output Impedance	50 Ohms	

RECEIVER SENSITIVITY	900 ISM Band	868 ISM Band
@ BER = $1X10^{-6}$	-114 @ 57 kbps MSK	-110 @ 38 kbps MSK
	-112 @ 114 kbps MSK	-108 @ 74 kbps MSK
	-111 @ 153 kbps MSK	-107 @ 76 kbps QPSK
	-107 @ 229 kbps MSK	-104 @ 120 kbps QPSK
	-104 @ 663 kbps 2FSK	-103 @ 177 kbps MSK
	-105 @ 884 kbps BPSK	-100 @ 280 kbps QPSK
	-101 @ 1768 kbps QPSK	-94 @ 420 kbps 8PSK
	-95 @ 2651 kbps 8PSK	-86 @ 736 kbps 32QAM
RF Selectivity	50 dB	50 dB

CONNECTIVITY
- Ethernet
  - RJ45 connector
  - IEEE 802.3, TCP/IP, UDP, Modbus, Profibus DP, DNP3 & IEC-61850 and many more industrial protocols due to fully transparent communication
- Serial/Power
  - RJ45 connector
  - RS232/485
  - Up to 230.4 kbps
- Power
  - Phoenix 2-pin connector

ERROR DETECTION
- Up to 32-bit CRC with retransmit on error

SECURITY
- AES 128- and 256-bit encryption
- VLAN network segregation
- Password authentication
- FHSS technology

OPERATING MODES
- Point to Point
- Point to Multipoint
- Adaptive Speed/Modulation
- Repeater

CONFIGURATION SOFTWARE
- Web-based configuration and diagnostics software application

ANTENNA CONNECTION
- SMA female
- Works with all 50 Ohm antennas

ELECTRICAL
- Input voltage range: 10-32 VDC +/- 1%
- Input current:
  - 902-928 MHz: 430 mA @ 12 V, 1W RF output
  - 869.4-869.65 MHz: 860 mA @ 12V, 500 mW RF output

PHYSICAL
- Dimensions: 127 x 61 x 13 mm (5.0 x 2.4 x 0.5")
- Weight: 80 grams

ENVIRONMENTAL
- Vibration/Shock: 9.8 gRMS, 2000 Hz
- Temperature range:
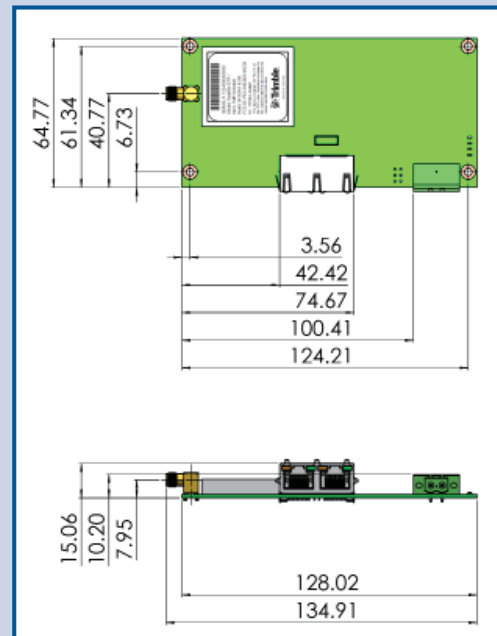 - Operating: -50 to +75°C
  - Storage: -50 to +85°C

COMPLIANCE
- FCC, ETSI, IC, Australia

APPLICATIONS
- SCADA communications
- Ethernet bridge to remote sites
- Remote sensing
- Video surveillance
- RTK corrections for precise positioning
- Marine construction

PART NUMBER
- TMR1 Board Level, dual band   101921-00

Specifications subject to change without notice.

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