

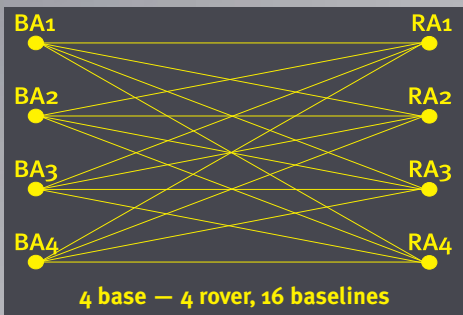
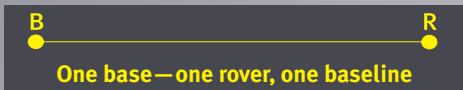
TRIUMPH-4X

TRIUMPH-4X is equivalent of 4 independent TRIUMPH-1 receivers packaged in the same small box. Furthermore, these 4 independent receivers are operating synchronously using the same local oscillator. A central processor coordinates internal activities of these four receivers as well as communications and data transmission with outside. **And all is done with a single TRIUMPH Chip inside. This is why it is neither heavy nor expensive.**

In a giant step forward along with introducing TRIUMPH-4X, we also introduce Cluster RTK, or 4x4 RTK, where sixteen baselines are processed in every single RTK measurement. For the first time in the history of GNSS, the power of survey techniques and network adjustments comes to RTK but without the burdens and complications. The operation is similar to conventional RTK. Surveyors and geodesists can now trust RTK measurements while improving accuracy, reliability and availability.

Now when we say 20 Hz RTK, we mean measuring 16 baselines of 8 points and performing equivalent of geodetic network adjustment on 16 baselines, removing outliers and providing reliable geodetic quality RTK solutions 20 times per second! One TRIUMPH-4X base and one rover results in a 16-baseline RTK system. While systematic and correlated errors can be removed in single RTK systems, the uncorrelated errors degrade the RTK accuracy. In TRIUMPH 4x4 systems the uncorrelated (random) errors are reduced significantly. This improved accuracy and reliability is especially important in critical applications like machine control.

**4X4
ALL WILL DRIVE
RTK!**



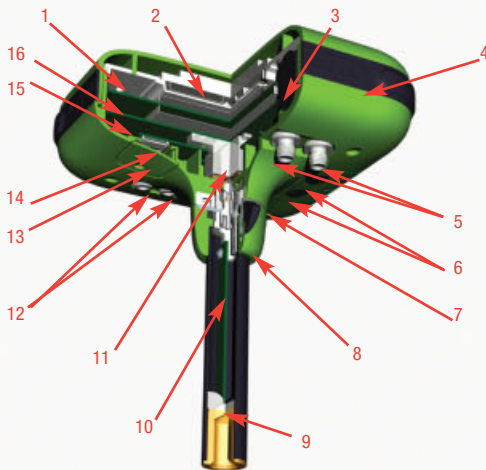
TRIUMPH-4X

Standard Configuration

- TRIUMPH-4X-G2T Receiver (0 MB)
- GPS L1/L2/L2C/L5
- Galileo E1/E5A
- RAIM
- Internal GNSS antenna
- MinPad Interface
- RS232 Serial Port (460.8 kbps)
- Rechargeable Li-Ion Battery

Optional Feature

- Update Rate 1 Hz, 5Hz, 10Hz & 20Hz
- RTK Rate 1 Hz, 5Hz, 10Hz & 20Hz
- Data Recording up to 2048MB
- Multi-Base Code Differential Rover
- Code Differential Base
- Advanced Multipath Reduction
- Up to 2 high Speed (460.8 kbps) RS232 Serial Ports
- USB port
- Internal GSM/GPRS/EDGE Module
- Internal UHF Modem
- Ethernet
- Bluetooth® Interface
- Wi-Fi (IEEE 802.11b/g)
- KFK WAAS/EGNOS (SBAS)
- Internal IMU



1. Ground Plane
2. Internal GNSS Antenna
3. Rechargeable Li-Ion Battery Pack
4. Guard Bumper
5. External GNSS Antenna Connectors
6. On/Off and Control Buttons and LEDs
7. Bluetooth / WiFi Antenna
8. Quick Realise with Lock
9. 5/8-11" Mounting Thread
10. Integrated UHF / GSM Antenna
11. IMU Unit
12. Communication and Power Ports
13. SIM Card Door
14. User Accessible SIM Card
15. GNSS Receiver and Power Board with on-board Memory
16. GNSS RF and Communication Board with on-board SIM Card

Description

Total 216 channels: all-in-view (GPS L1/L2/L2C/L5, Galileo E1/E5A, SBAS) integrated receiver, rugged plastic and magnesium housing complete with MinPad interface

Tracking Specification

| | |
|-------------------|--|
| Tracking Channels | GPS L1/L2/L2C/L5 Galileo E1/E5A SBAS |
| Signals Tracked | L1/L2 C/A and P Code & Carrier |

Performance Specifications

| | |
|---|--|
| Autonomous Static, Fast Static Accuracy | <2 m Horizontal: 0.3 cm + 0.5 ppm * base_line_length Vertical: 0.5 cm + 0.5 ppm * base_line_length |
| Kinematic Accuracy | Horizontal: 0.6cm+1ppm * base_line_length Vertical : 0.9cm+1ppm * base_line_length |
| RTK (OTF) Accuracy | Horizontal: 0.6cm+1ppm * base_line_length Vertical : 0.9cm+1ppm * base_line_length |
| DGPS Accuracy | < 0.25 m Post Processing, < 0.5 m Real Time |
| Angular (pitch, roll, heading) accuracy (sigma) | 0.65 grad (using Umbrella, without IMU) 0.3 grad (using Umbrella, with IMU) 0.61 grad / antenna_separation (antennas are mounted on a mobile object) |
| Cold Start | <35 seconds |
| Warm Start | <5 seconds |
| Reacquisition | <1 second |

Power Specification

| | |
|----------------------|--|
| Battery | Two internal Li-Ion batteries (7.4 V, 4.4 Ah each) with internal charger |
| Operation Time | No less than 10 hours (typ) |
| External power input | +10 to +30 volts |

GNSS Antenna Specifications

| | |
|--------------|--------------------------------|
| GNSS Antenna | Integrated |
| Antenna Type | Microstrip (Zero Centered) |
| Ground Plane | Antenna on a flat ground plane |

Radio Specifications

| | |
|----------------------|--|
| GSM/GPRS/EDGE Module | Internal GSM/GPRS/EDGE quad-band module, GPRS/EDGE Class 1 |
| UHF Radio Modem | Internal 406-470MHz radio transceiver, up to 38.4kbps |
| Base Power Output | 1 Watt |

IMU Specification

| | |
|---------------|---|
| Gyroscope | 3 |
| Accelerometer | 3 |

I/O

| | |
|---------------------|---|
| Communication Ports | 2x serial (RS232) up to 460.8 kbps High speed USB 2.0 device port (480 Mbps) Full-duplex 10BASE-T/100BASE-TX Ethernet port Wi-Fi (IEEE 802.11b/g) Bluetooth V2.0+EDR Class 2 supporting SPP Slave and Master Profiles Six LEDs, two function keys (MinPad) |
| Status Indicator | Six LEDs, two function keys (MinPad) |

Memory & Recording

| | |
|------------------------------|--|
| Internal Memory | Up to 2048MB of onboard non-removable memory for data storage |
| Raw Data Recording Data Type | Up to 20 times per second (20Hz) Code and Carrier from GPS L1, L2, Galileo E1/E5A |

Data Output

| | |
|------------------------|--|
| Real time data outputs | RTCM SC104 versions 2.x and 3.x Input/Output |
| ASCII Output | NMEA 0183 versions 2.x and 3.0 Output |
| Output Rate | Code and Carrier |

Environmental Specifications

| | |
|-----------------------|--|
| Enclosure | Molded magnesium alloy and plastic, waterproof |
| Operating Temperature | -30° C to +55° C |
| Dimensions | W:178 mm x H:93 mm x D:178 mm |
| Weight | 1850 g |

Specifications are subject to change without notice.



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