OEM BOARD

TR-2S

GPS L1/L2/L5, GALILEO E1/E5A/E5B/ALTBOC/E6,
GLONASS L1/L2/L3, BEIDOU B1/B1C/B2A/B2B/ALTBOC/B3,
QZSS L1/L2/L5/L6, SBAS L1/L5, IRNSS L5, L-BAND

The TR-2S OEM board is based on our TRIUMPH Technology. For the first time in the GNSS history, we offer up to 200 Hz RTK.
TR-2S can track and decode the QZSS L6 (both L61 and L62) signal messages. 874 GNSS channels of this board allow tracking all current and future satellite signals. We offer highly stable digital filters (band characteristics do not change with age, input voltages, or temperature), improved GLONASS inter-channel bias performance (due to our flat digital filter shape), excellent new multipath rejection technique, the best.
The onboard power supply on the TR-2S OEM board accepts any voltage from +4.0 to +40 volts and delivers clean filtered voltage where needed. This eliminates the risk of power contamination (ripples) when clean power is generated elsewhere and delivered to the board via cables. TR-2S board also includes drivers for four LEDs. In addition, the board comes with a large amount of flash for data storage.

DATA SHEET

VERSION 1.2 SEPTEMBER 17, 2021

Pinout

Description	I/O	Signal name	Pin#	Pin #	Signal name	I/O	Description
Power Ground		PGND	1	2	PGND		Power Ground
+4.0 to +40 VDC Power Input	I	PWR IN	3	4	PWR IN	I	+4.0 to +40 VDC Power Input
Reserved		-	5	6	-		Reserved
Reserved		-	7	8	FUO		Factory use only. Must be left open or grounded
Active Low Reset input *1	I	RESET IN*	9	10	GND		Signal Ground
Serial port A RS232 CTS line	I	CTSA	11	12	TXDA	O	Serial port A RS232 TXD line
Serial port A RS232 RTS line	O	RTSA	13	14	RXDA	I	Serial port A RS232 RXD line
Signal Ground		GND	15	16	CTSB/ RXB+	I	Serial port B: RS232 CTS line or RS422 RX+ line
Serial port B: RS232 TXD line or RS422 TX- line	O	TXDB/TXB-	17	18	RTSB/ TXB+	O	Serial port B: RS232 RTS line or RS422 TX+ line
Serial port B: RS232 RXD line or RS422 RX- line	I	RXDB/RXB-	19	20	LED1 GRN	O	External LED Control *2
External LED Control *2	O	LED1 RED	21	22	LED2 GRN	O	External LED Control *2
External LED Control *2	O	LED2 RED	23	24	-		Reserved
USB port, Vbus line	I	USB VBUS	25	26	GND		Signal Ground
USB port D+ line	I/O	USB D+	27	28	USB D-	I/O	USB port D- line
1 Puls Per Second output *3	O	1PPS	29	30	GND		Signal Ground
Event input *4	I	EVENT	31	32	GPIO0	I/O	Configurable Logic-Level I/O 0 line
Configurable Logic-Level I/O 1 line	I/O	GPIO1	33	34	GND		Signal Ground
CAN port CAN-HI line	I/O	CANH	35	36	CANL	I/O	CAN port CAN-LO line
Serial port D: RS232 RTS line or RS422 TX+ line	O	RTSD/TXD+	37	38	TXDD/ TXD-	O	Serial port D: RS232 TXD line or RS422 TX- line
Serial port D: RS232 CTS line or RS422 RX+ line	I	CTSD/RXD+	39	40	RXDD/ RXD-	I	Serial port D: RS232 RXD line or RS422 RX- line

*1. Connect to ground to activate, Vin low < 0.6V. Internal pull-up 3 kOhm to +3.3V.
*2. LED1 GRN and LED1 RED are used to control the STAT LED of the MinPad. LED2 GRN and LED2 RED are equivalent to the REC LED of the MinPad. The output is a +3.3V driver in series with 100 Ohm resistor for each LED. LEDs should be with common cathode.
*3. Output voltage 3.3V for CMOS load and 2.20V (typ) for 50 Ohm load.
*4. 5V-tolerant 3.3V CMOS input with configurable internal termination: either 5 kOhm pull-up to +3.3V or 50 Ohm pull-down to Ground. Vin high > 2.4V, Vin low < 0.6V.

Digital connector: Micro Header, 2x20 pos, 0.050" pitch. Samtec p/n FTSH-120-01-L-DV-K-A.
RF connector: MMCX Jack, edge mount. Amphenol p/n 908-22100. The central pin of the connector is power supply for LNA, +5 VDC with sourced current up to 115mA (max).

Specifications

TRACKING FEATURES

- GPS C/A, L1C(P+D) including TMBOC(6,1,4/33) , P1, P2, L2C(L+M), L5(I+Q)
- GLONASS C/A, P1, P2, L2C, L3(I+Q)
- Galileo E1(B+C) including CBOC(6,1,1/11), E5A(I+Q), E5B(I+Q), AltBoc, E6(B+C)
- QZSS C/A, L1C(P+D) including TMBOC(6,1,4/33) , L2C(L+M), L5(I+Q), L6(L61/L62), L1S, L1Sb, L5S
- BeiDou B1, B1C(P+D) including TMBOC(6,1,4/33) , B2B(I+Q), B2, B2A(I+Q), AltBoc, B3
- IRNSS L5
- L-band: 1525-1560 MHz
- SBAS [11] L1, L5(P+D)
- Spoofing detection
- Advanced Multipath Reduction
- Fast acquisition channels
- High accuracy velocity measurement

PERFORMANCE SPECIFICATIONS

- Autonomous: < 2 m
- Static, Fast Static Accuracy:
  Horizontal: 0.3 cm + 0.1 ppm * base_line_length[2]
  Vertical: 0.35 cm + 0.4 ppm * base_line_length
- Kinematic Accuracy:
  Horizontal: 1 cm + 1 ppm * base_line_length
  Vertical: 1.5 cm + 1 ppm * base_line_length
- RTK (OTF) Accuracy:
  Horizontal: 1 cm + 1 ppm * base_line_length
  Vertical: 1.5 cm + 1 ppm * base_line_length
- DGPS Accuracy:
  < 0.25 m post processing;
  < 0.5 m real-time
- Real-time heading accuracy:
  0.004/L [rad] RMS, where L is the antenna separation in [m]
- Cold/Warm Start/ Reacquisition:
  < 35 seconds / < 5 seconds / < 1 second

DATA FEATURES

- Up to 200 Hz update rate for real time position and raw data (code and carrier)
- 10 cm code phase and 1 mm carrier phase precision
- Hardware Viterbi decoder
- Hardware Reed-Solomon and LDPC decoders
- RTCM SC104 versions 2.x and 3.x Input/Output
- NMEA 0183 versions 2.x and 3.0 Output
- Spectrum data output
- BINEX data output
- Code Differential Rover/Base
- Geoid and Magnetic Variation models
- RAIM
- Different DATUMs support
- Output of grid coordinates

DATA STORAGE

- Up to 16 GB of onboard non-removable memory for data storage (TBD)

INPUT/OUTPUT

- High speed RS232 serial port (up to 460.8 Kbps)
- Two high speed configurable RS232 or RS422 serial ports (up to 460.8 Kbps)
- Built-in USB to RS232 FTDI converter. 460 Mbps USB 2.0 HighSpeed. Up to 12 Mbps RS232 speed
- CAN interface
- One Event Marker input
- One 1 PPS output synchronized to GPS or UTC
- Four external LED drivers
- External command inputs
- Two Configurable Logic-Level GPIO ports

ELECTRICAL

- On-board power supply accepts any unregulated voltage between +4.0 to +40 Volts
- Power consumption:
  GPS + GLO L1: 1.2-1.3 W
  GPS + GLO + GAL L1: 1.3-1.5W
  GPS + GLO + GAL + BDS L1: 1.3-1.5 W
  GPS + GLO + GAL + BDS L1 + L1C: 1.3-1.5 W
  GPS+GLO: 1.5-1.7 W
  Ail In view -L-Band off: 1.8-2.0 W
  All in view: 1.9-2.1 W

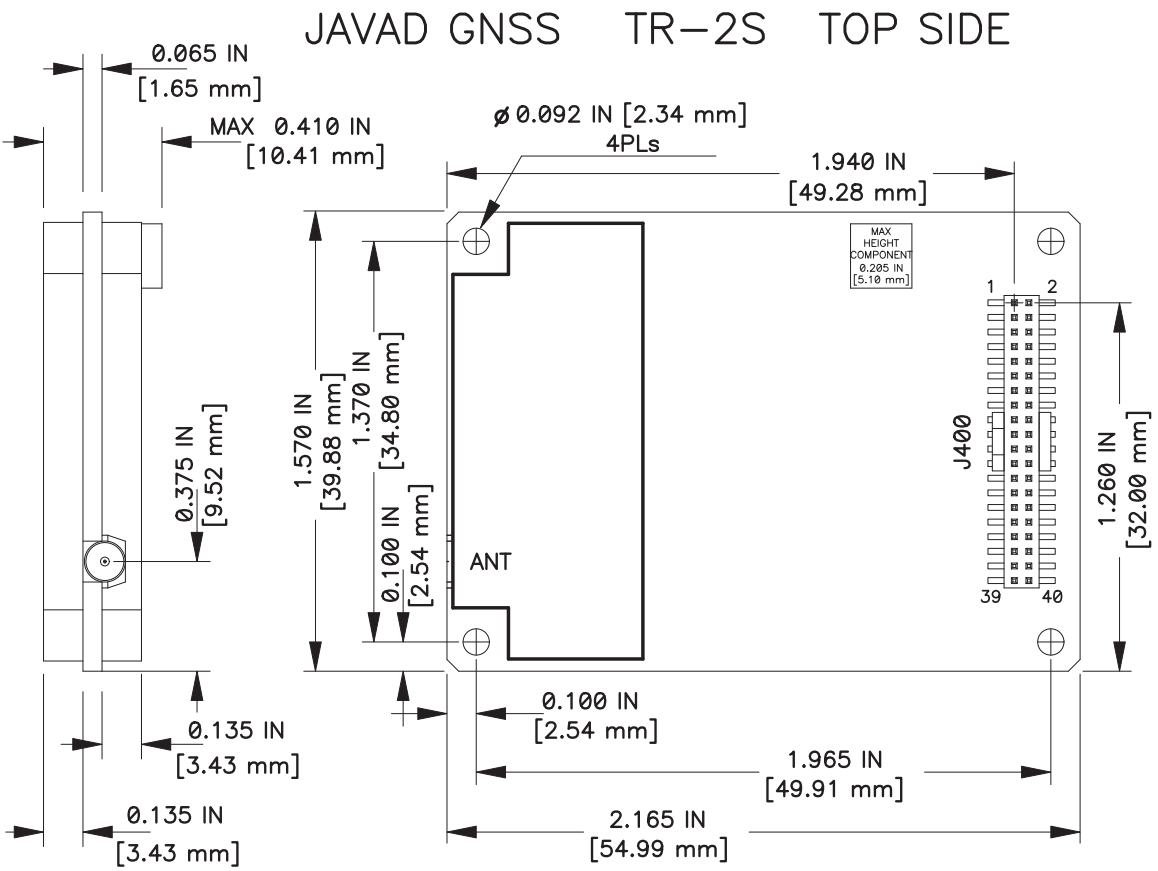
ENVIRONMENTAL & PHYSICAL

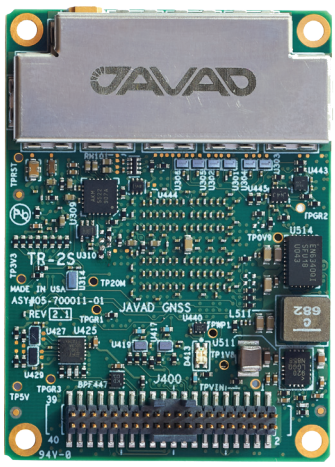
- Temperature:
  Operating: -40 °F to 176 °F (-40 °C to +80 °C)
  Storage: -40 °F to 185 °F (-40 °C to +85 °C)
- High shock and vibration resistance
- Dimensions: 2.16x1.57x0.43 in (55 x40 x11 mm)
- Weight: 0.044 lbs (20 g)
- Connectors: 40 pins for digital, MMCX for antenna

1 US WAAS, European EGNOS, Russian SDCM, Indian GAGAN, Japanese MSAS, and similar future satellite systems
2 For good observation conditions and proper length of observation session

TR-2S

Dimensions





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