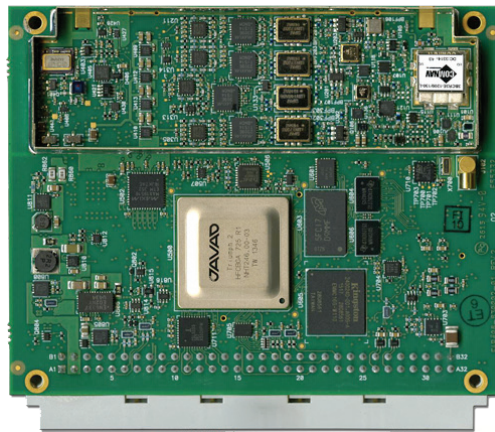# JAVAD

TRE-3N

GPS L1/L2/L2C/L5, Galileo E1/E5A/E5B/AltBoc
GLONASS L1/L2/L3, BeiDou B1/B2

864 GNSS channels of this board allow tracking all current and future satellite signals. TRE-3N is form, pin-out, and command compatible with the TRE-3 and TRE-G3T boards.

TRE-3N OEM

Description	i/O	Signal name	Pin #	Pin #	Signal name	I/O	Description
Power Ground		PGND	A1	B1	PGND		Power Ground
+4.5 to +40 VDC Power Input	I	PWR_IN	A2	B2	PWR_IN	I	+4.5 to +40 VDC Power Input
Factory use only, must be left open		FUO	A3	B3	COMMSW#	I	Active Low Command Input (FN Button) *1
Reserved		-	A4	B4	KA_PWR	I	Keep-Alive Power input for Real-Time Clock (+4.5 to +40 VDC, 10μA typ)
External LED Control *2	O	LED2_RED	A5	B5	LED1_RED	O	External LED Control *2
External LED Control *2	O	LED2_GRN	A6	B6	LED1_GRN	O	External LED Control *2
Signal Ground		GND	A7	B7	USB_PWR	I	USB port Power Input line
USB port D- line	I/O	USB_D-	A8	B8	USB_D+	I/O	USB port D+ line
Serial port A TXD line	O	TXDA	A9	B9	CTSA	I	Serial port A CTS line
Serial port A RXD line	I	RXDA	A10	B10	RTSA	O	Serial port A RTS line
Serial port C: RS232 TXD line or RS422 TX- line	O	TXDC/TXC-	A11	B11	CTSC/RXC+	I	Serial port C: RS232 CTS line or RS422 RX+ line
Serial port C: RS232 RXD line or RS422 RX- line	I	RXDC/RXC-	A12	B12	RTSC/TXC+	O	Serial port C: RS232 RTS line or RS422 TX+ line
Serial port D: RS232 RTS line or RS422 TX+ line	O	RTSD/TXD+	A13	B13	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+	A14	B14	RXDD/RXD-	I	Serial port D: RS232 RXD line or RS422 RX- line
Signal Ground		GND	A15	B15	-		Reserved
Reserved		-	A16	B16	-		Reserved
Serial port B TXD line	O	TXDB	A17	B17	CTSB	I	Serial port B CTS line
Serial port B RXD line	I	RXDB	A18	B18	RTSB	O	Serial port B RTS line
CAN1 port CAN-H line	I/O	CAN1H	A19	B19	CAN1L	I/O	CAN1 port CAN-L line
CAN2 port CAN-H line	I/O	CAN2H	A20	B20	CAN2L	I/O	CAN2 port CAN-L line
Factory use only, must be left open		FUO	A21	B21	-		Reserved
Signal Ground		GND	A22	B22	1PPSA	O	1 Pulse Per Second output A *3
Signal Ground		GND	A23	B23	1PPSB	O	1 Pulse Per Second output B *3
Signal Ground		GND	A24	B24	EVENTA	I	Event input A *4
Signal Ground		GND	A25	B25	EVENTB	I	Event input B *4
Configurable Logic-Level I/O 0 line	I/O	GPIO0	A26	B26	GPIO1	I/O	Configurable Logic-Level I/O 1 line
Configurable Logic-Level I/O 2 line	I/O	GPIO2	A27	B27	GPIO3	I/O	Configurable Logic-Level I/O 3 line
Signal Ground		GND	A28	B28	RESET_IN#	I	Active Low Reset input *5
Ethernet port TX+ line	O	LAN_TX+	A29	B29	LAN_TX-	O	Ethernet port TX- line
Reserved		-	A30	B30	LAN_LED	O	Ethernet port control for external LED
Ethernet port RX+ line	I	LAN_RX+	A31	B31	LAN_RX-	I	Ethernet port RX- line
Active Low input for ON/OFF switch *7	I	ONOFFSW#	A32	B32	IRIG_OUT	O	IRIG port output line *6

*1. Active Low input from the FN button of the MinPad. Must be left open if not used.

*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. Voh>1,8V at 50 Ohm load.

*4. Internal pull-up 5 kOhm to +3.3V

*5. Connect to ground to activate. Internal pull-up 2 kOhm to +3.3V.

*6. AM sine-wave signal; 2.1Vp-p (Mark), 0.7Vp-p (Space).

*7. Active Low input which is equivalent to ON/OFF button of the MinPad. After abnormal turn off because of external power failure, the boards turn on automatically when external power is restored.

Tracking Features

- Total 864 channels: all-in-view
- GPS: C/A, L1C (P+D), P1,P2, L2C (L+M), L5(I+Q)
- GLONASS: C/A, L2C, P1, P2, L3 (I+Q)
- Galileo: E1 (B+C), E5A (I+Q), E5B (I+Q), AltBoc
- BeiDou: B1, B1-2, B1C(P+D), B5A (I+Q), B2, B5B (I+Q)
- QZSS: C/A, L1C (P+D), L2C (L+M), L5 (I+Q), SAIF
- SBAS*: L1, L5
- IRNSS L5
- In-Band Interference Rejection
- 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**
    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 100 Hz update rate for real time position and raw data (code and carrier)
- 10 cm code phase and 1 mm carrier phase precision
- IEEE 1588 protocol support
- Hardware Viterbi decoder
- RTCM SC104 versions 2.x and 3.x Input/Output
- NMEA 0183 versions 2.x and 3.0 Output
- Code Differential Rover
- Code Differential 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

Input/Output

- Two high speed RS232 serial ports (up to 460.8 Kbps)
- Two high speed configurable RS232/RS422 serial ports (up to 460.8 Kbps)
- High speed USB 2.0 device port (480 Mbps)
- Full-duplex 10BASE-T/100BASE-TX Ethernet port
- Two CAN 2.0 A/B ports
- IRIG timecode output A134, A137, B124, B137
- Two 1 PPS outputs
    Synchronized to GPS, GLONASS or UTC
    Voltage level: Voh>1,8V at 50 Ohm load
    Output Impedance: 25 to 30 Ohm (typ)
- Two Event Marker inputs
- External Reference Frequency Input/Output
- MinPad interface: Four external LED drivers, ON/OFF control and External Command inputs
- Four Configurable Logic-Level GPIO ports V=3.3V

Electrical

- On-board power supply accepts any unregulated voltage between +4.5 to +40 Volts
- Keep-Alive Power input accepts any unregulated voltage between +4.5 to +40 Volts
- The central pin of the antenna connector outputs +5 VDC to power LNA. The sourced current is 0.12 A max.
- Power consumption: 4.5 Watt

Environmental

- Operating Temperature: -40°C to +80°C
- Storage Temperature: -40°C to +85°C
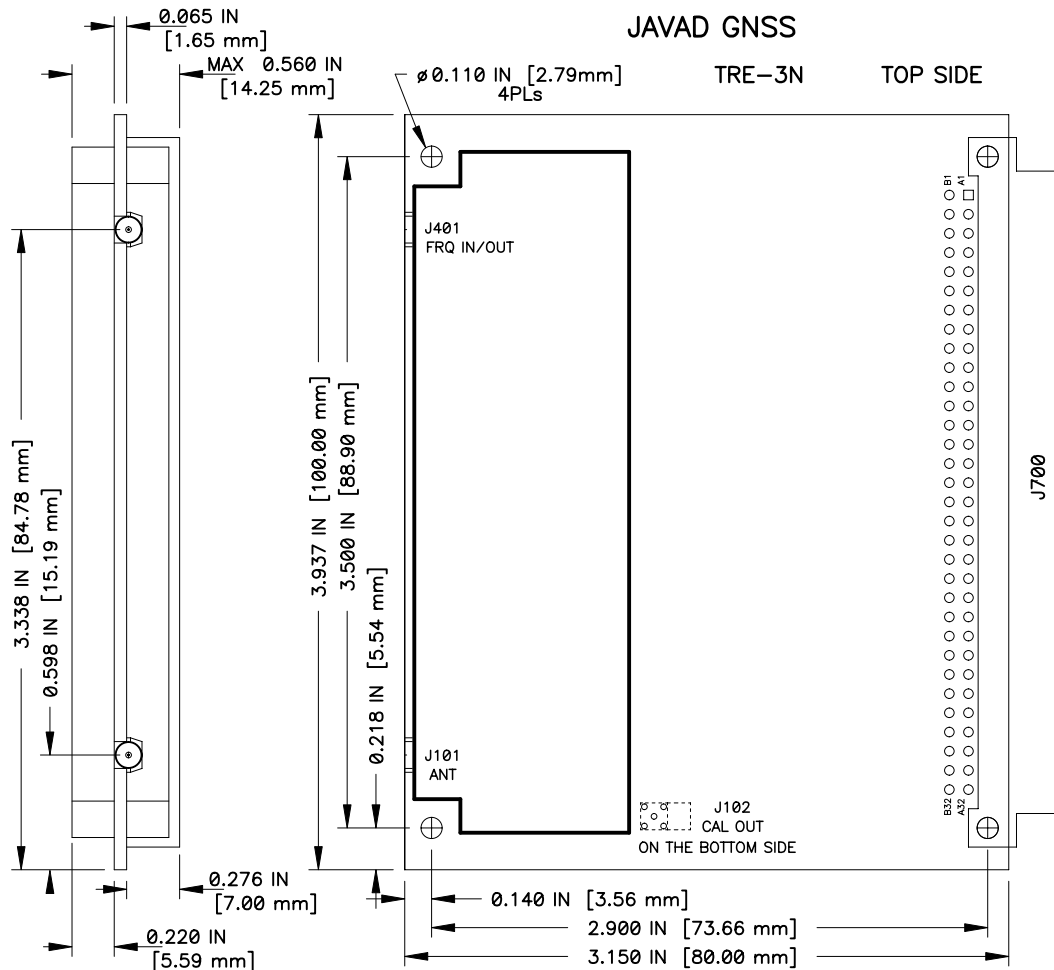- High shock and vibration resistance

Physical

- Dimensions: 3.9 x 3.1 inches (100x80 mm)
- Weight: 0.19 lbs (87 g)
- Digital connector: 64-pin DIN41612 type B Right Angle, AMP p/n 536052-5.
- RF connectors: MMCX Jack, edge mount, AMPHENOL, P/N 908-22100
- J101 is GNSS antenna input connector.
- J102 is Calibrator Out;
- J401 is External Reference Frequency connector.
- Analog reference clock input: 0.6Vpp to 3Vpp, 5/10/20 MHz.
- Reference oscillator output with frequency values 5, 10, and 20 MHz (all sinlike) (about 0.5Vpp@50 Ohm load).

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

TRE-3N OEM

JAVAD GNSS

TRE-3N   TOP SIDE

ø0.110 IN [2.79mm]
4PLs

0.065 IN
[1.65 mm]

MAX 0.560 IN
[14.25 mm]

J401
FRQ IN/OUT

J101
ANT

J102
CAL OUT
ON THE BOTTOM SIDE

J700

3.338 IN [84.78 mm]

0.598 IN [15.19 mm]

3.937 IN [100.00 mm]

3.500 IN [88.90 mm]

0.218 IN [5.54 mm]

0.276 IN
[7.00 mm]

0.220 IN
[5.59 mm]

0.140 IN [3.56 mm]

2.900 IN [73.66 mm]

3.150 IN [80.00 mm]

B1
A1

B32
A32