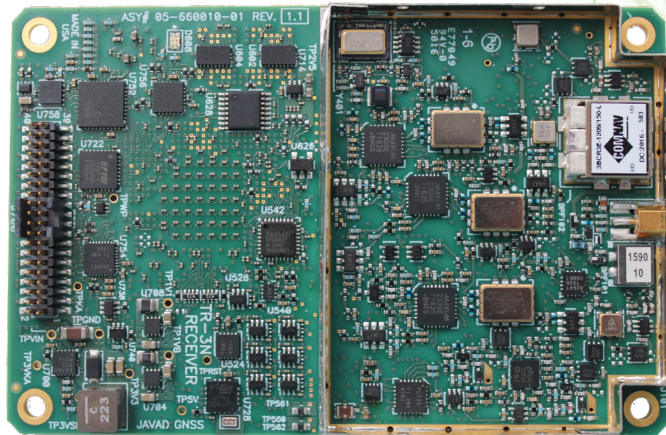
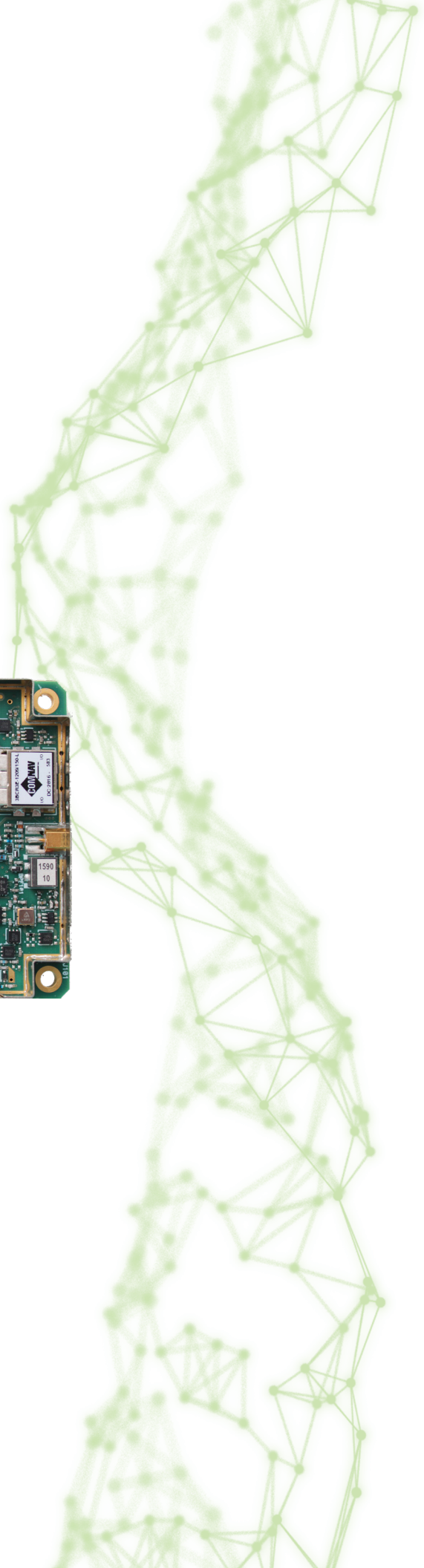




OEM BOARD  
TR-3N



DATA SHEET  
VERSION 1.3 JULY 13, 2018



## PINOUT

Description	I/O	Signal name	Pin #	Pin #	Signal name	I/O	Description
Power Ground		PGND	1	2	PGND		Power Ground
+4.5 to +40 VDC Power Input	I	PWR_IN	3	4	PWR_IN	I	+4.5 to +40 VDC Power Input
Keep-Alive Power Input for Real-Time Clock (+4.5 to +40 VDC, 12 $\mu$ A typ)	I	KA_PWR	5	6	COMMSW*	I	Active Low Command Input (FN Button) <sup>1</sup>
Active Low input for ON/OFF switch <sup>2</sup>	I	ONOFFSW*	7	8	FUO		Factory use only, must be left open
Active Low Reset input <sup>3</sup>	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 <sup>4</sup>
External LED Control <sup>4</sup>	O	LED1_RED	21	22	LED2_GRN	O	External LED Control <sup>4</sup>
External LED Control <sup>4</sup>	O	LED2_RED	23	24	IRIG_OUT	O	IRIG port output line <sup>5</sup>
USB port , Power Input line	I	USB_PWR	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 <sup>6</sup>	O	1PPS	29	30	GND		Signal Ground
Event input <sup>7</sup>	I	EVENT	31	32	GPIO0	I/O	Configurable Logic-Level I/O, Line 0
Configurable Logic-Level I/O, Line 1	I/O	GPIO1	33	34	GND		Signal Ground
CAN port, CAN-H line	I/O	CANH	35	36	CANL	I/O	CAN port, CAN-L 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. Active Low input from the FN button of the MinPad. Internal pull-up 10 kOhm to +3.3V. Must be left open if not used.

2. Active Low input which is equivalent to ON/OFF button of the MinPad. Internal pull-up 10 kOhm to +3.5V. After abnormal turn off because of external power failure, the boards turn on automatically when external power is restored

3. Connect to ground to activate. Internal pull-up 2.2 kOhm to +3.5V.

4. 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.

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

6. Voh > 2.0V (typ) at 50 Ohm load.

7. Internal pull-up 5 kOhm to +3.3V or internal pull-down 50 Ohm to GND with software selection.

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 and sourced current up to 0.12A (max).

### 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
- Advanced Multipath Reduction
- Fast acquisition channels
- High accuracy velocity measurement

### PERFORMANCE SPECIFICATIONS

- Autonomous: < 2 m
- Static, Fast Static Accuracy:
- Horizontal:  $0.3 \text{ cm} + 0.1 \text{ ppm} * \text{base\_line\_length}^{**}$
- Vertical:  $0.35 \text{ cm} + 0.4 \text{ ppm} * \text{base\_line\_length}$
- Kinematic Accuracy:
- Horizontal:  $1 \text{ cm} + 1 \text{ ppm} * \text{base\_line\_length}$
- Vertical:  $1.5 \text{ cm} + 1 \text{ ppm} * \text{base\_line\_length}$
- RTK (OTF) Accuracy:
- Horizontal:  $1 \text{ cm} + 1 \text{ ppm} * \text{base\_line\_length}$
- Vertical:  $1.5 \text{ cm} + 1 \text{ ppm} * \text{base\_line\_length}$
- 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
- 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

- High speed RS232 serial port (up to 460.8 Kbps)
- Two high speed configurable RS232 or RS422 serial ports (up to 460.8 Kbps)
- Full speed USB device port (12 Mbps)
- CAN interface
- IRIG timecode output
- One Event Marker input
- One 1 PPS output
- Synchronized to GPS, GLONASS or UTC
- Voltage level:  $V_{oh} > 2.0V$  (typ) at 50 Ohm load.
- Output Impedance: 25 to 30 Ohm (typ)
- MinPad interface: ON/OFF control input, External command input, Four drivers for external LEDs
- Two Configurable Logic-Level GPIO ports

### ELECTRICAL

- On-board power supply accepts any unregulated voltage between +4.5 to +40 Volts and power consumption 3.5 Watt (typical, without antenna current)
- Keep-Alive Power input accepts any unregulated voltage between +4.5 to +40 Volts, 12 $\mu$ A typical
- central pin of the antenna connector is power supply for LNA, +5 VDC and sourced current up to 0.12A (max)
- Power consumption: 3.5 Watt

### ENVIRONMENTAL

- Operating Temperature: -40°C to +70°C
- Storage Temperature: -40°C to +85°C
- High shock and vibration resistance

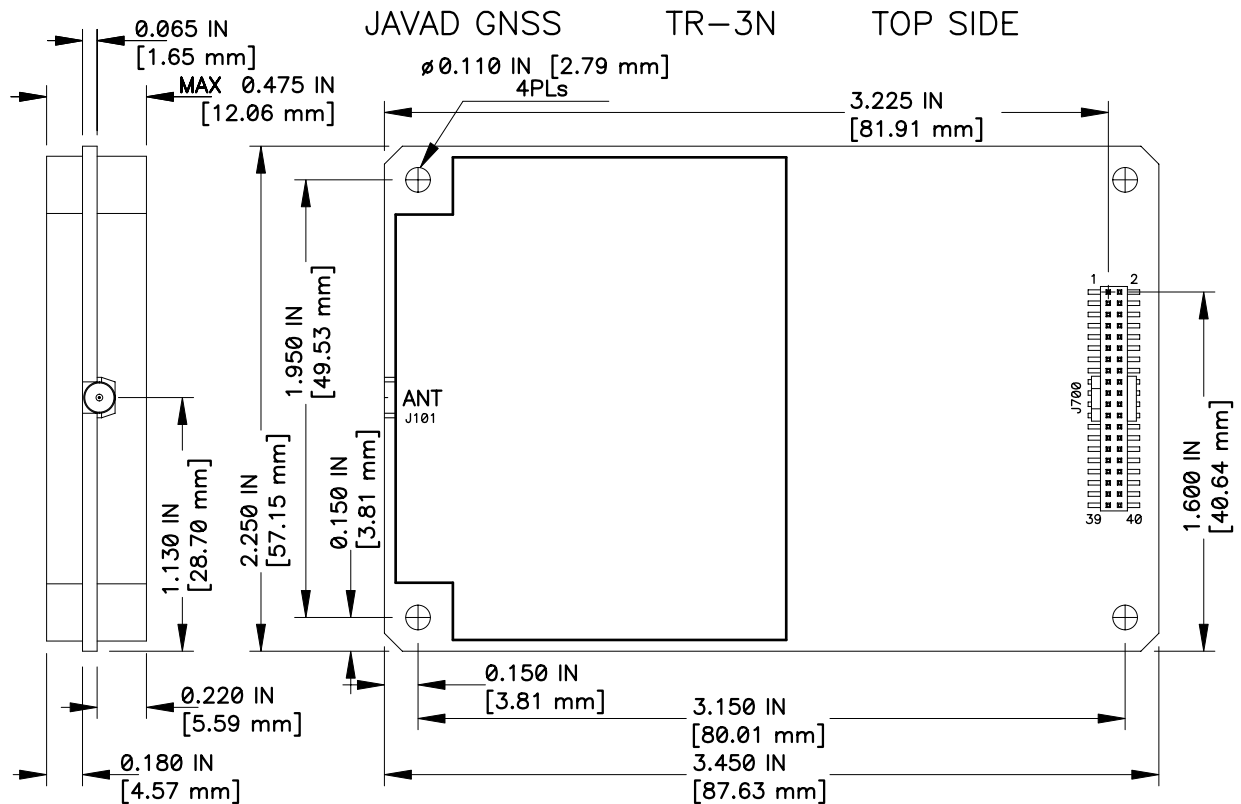
### PHYSICAL

- Dimensions: 2.24x3.46x0.47 inches (57x88x12 mm)
- Weight: 0.12 lbs (54 g)
- Connectors: 40 pins for digital, MMCX for antenna

\* 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

## Dimensions



864 GNSS channels of this board allow tracking all current and future satellite signals. The onboard power supply on TR-3N OEM board accepts any voltage from +4.5 to +40 volts and delivers cleanly filtered voltage where needed. This eliminates the risk of power contamination (ripples) that can be created when clean power is generated elsewhere and delivered to the board via cables. TR-3N board also includes drivers for four LEDs, ON/OFF and function button controllers. Also, the board comes with a significant amount of flash for data storage. The CAN interface in TR-3N board is provided complete with all associated hardware and firmware, not just the CAN bus. The same is true with all the serial RS232/RS422 ports on our board. In addition to timing strobe and event marker, the TR-3N OEM board includes the option of complete IRIG timing system.

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