Duro®

PRODUCT SUMMARY

Ruggedized Multi-Band, Multi-Constellation Centimeter-Accurate GNSS

Carnegie Robotics offers Duro—an enclosed version of the Piksi® Multi dual-frequency RTK GNSS receiver. Built for the outdoors, Duro combines centimeter-accurate positioning with military ruggedness at a breakthrough price.

BUILT TO BE TOUGH Duro leverages design principles typically used in military hardware and results in an easy-to-deploy sensor, protected against weather, moisture, vibration, dust, water immersion and unexpected circumstances that can occur in long-term, outdoor deployments.

EASY INTEGRATION

Duro's M12 connectors are sealed and industry standard, which balances ruggedization perfectly with user-friendliness and ease of integration. No external sealing is required to deploy in even the harshest conditions. A variety of interfaces are supported, including RS232 and Ethernet, to allow for simple and easy integrations.

CENTIMETER-LEVEL ACCURACY

Autonomous platforms require precise positioning—especially those that perform critical functions. Piksi Multi receiver within Duro utilizes real-time kinematic (RTK) technology, providing location solutions that are 100 times more accurate than traditional GNSS solutions.

FAST CONVERGENCE TIMES

Multiple signal bands enable faster convergence times to high-precision mode. Single band RTK systems converge in minutes, while Piksi Multi converges to a high-precision solution within seconds. This allows for faster time to first fix (TTFF), as well as faster reacquisition times which are critical in high dynamic autonomous applications within a variety of environments.

LEVERAGES PIKSI MULTI

Multiple signal bands enable fast convergence times and multiple satellite constellations enhances availability. Piksi Multi supports GPS L1/L2, GLONASS G1/G2, BeiDou B1/B2 and Galileo E1/E5b for RTK measurements and positioning along with SBAS for robust sub-meter positioning in non-RTK mode.

BENEFIT S

- Ruggedized Sensor for Long-Term Deployment
- Uses Swift Navigation's Piksi Multi
- Highly-Competitive Pricing
- Flexible Mounting Interfaces
- Future-Proof Hardware with In-Field Software Upgrades
- Intuitive LEDs for Status and Diagnostics
- Electrical Protection on all I/O
- Durable and Chemical Resistant Powder-Coating
- Passive Thermal Design

FE ATURE S

- IP67 rated
- Centimeter-Level Positioning
- Dual Frequency RTK GNSS
- Raw IMU Measurements from the On-Board MEMS IMU

Duro

Physical & Environmental

Dimensions	130 mm x 130 mm x 65 mm
Weight	0.8 kg (Cast Al Housing)
Temperature	
Operating	-40° C to +75° C
Storage	-40° C to +85° C
Humidity	95% non-condensing
Sealing	IP67
Vibration	
Operating and Survival (Random Vibe)	7.7 g
Operating and Survival (Sinusoidal Vibe)	5 g
Mechanical Shock	
Operating	40 g
Survival	75 g

Electrical & I/O

Power

Input Voltage1	10 - 35 V DC
Typical Power Consumption2	5.0 W

Antenna LNA Power Specifications

Output Voltage	4.85 V DC
Max Output Current	100 mA

External Connector Ports

- 2 x RS232 Serial Ports with Optional Hardware Flow Control
- Ethernet Support up to 100 Mbps
- PPS, PV, 3 x Event Inputs
- Configurable Digital Inputs and Outputs
- 12 V at 1A and 5 V at 250 mA Power Outputs

GNSS Characteristics

GNSS Signal Tracking

GPS L1/L2, GLONASS G1/G2,
BeiDou B1/B2, Galileo E1/E5b
SBAS (WAAS, EGNOS, GAGAN, MSAS)

GNSS Data Rates3

Measurements (Raw Data)	Up to 10 Hz
Standard Position Outputs	Up to 10 Hz
RTK Position Outputs	Up to 10 Hz
Swift Binary Protocol (SBP) and NMEA-0183	

Maximum Operating Limits4

Velocity	515 m/s

Communication

Navigation Outputs	SBP and NMEA 0183 (Configurable)
Reference Inputs / Outputs	RTCM 3.x
Network Protocol Supported	NTRIP Client

Position Performance Specifications5

Position, Velocity & Time Accuracy

Horizontal Position Accuracy (CEP 50 in SBAS Mode)	0.75 m
Velocity Accuracy	0.03 m/s RMS
Time Accuracy	60 ns RMS
Real Time Kinematic (RTK Accuracy 1σ)	
- Horizontal	0.010 m + 1 ppm
- Vertical	0.015 m + 1 ppm
RTK Initialization Parameters	
- Initialization Time	< 10 s
- Initialization Reliability	> 99%
- Solution Latency	< 30 ms

[1] Maximum allowed input Voltage range. Recommended Voltage input range from 12 - 24 V.

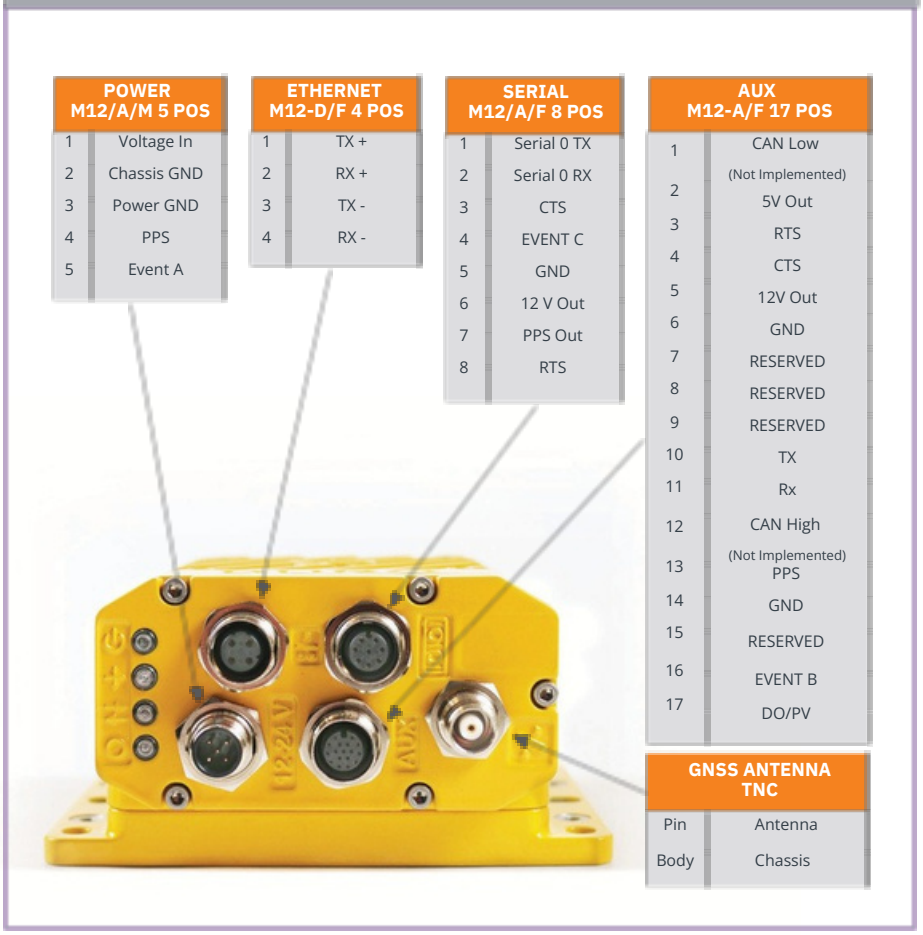
[2] Power draw ~ 5W.

[3] Please refer to the Piksi Multi product summary for additional specifics.

[4] As required by the U.S. Department of Commerce to comply with export licensing restrictions.

[5] In open sky and strong signal conditions.

Duro Input/Output



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