Carnegie Robotics®

swift NAVIGATION

Duro®

PRODUCT SUMMARY

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

Swift Navigation, in partnership with 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. Swift Navigation's 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.

BENEFITS

- 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

FEATURES

- 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 Voltage[1]	10 - 35 V DC
Typical Power Consumption[2]	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 Rates[3]

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 Limits[4]

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 Specifications[5]

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.

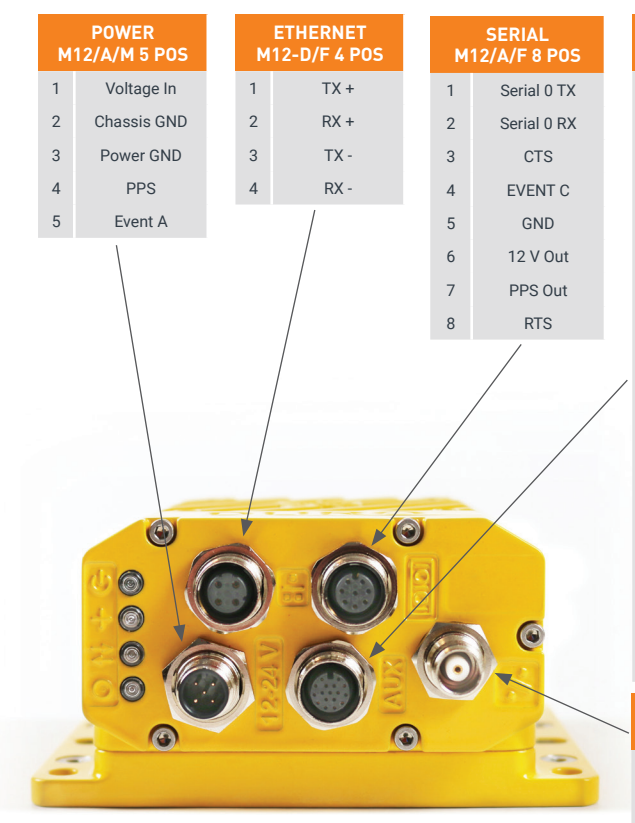
[2] Power draw ~ 5W.

[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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