

**EXTREME RANGE AIS MONITORING**

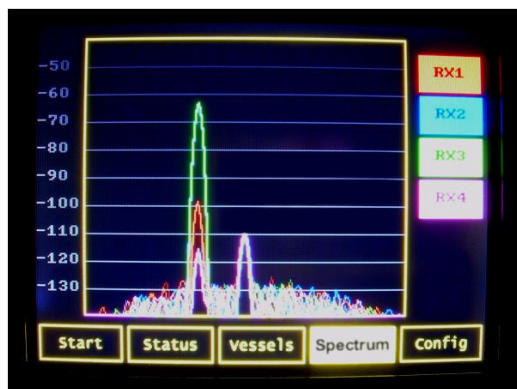
**The SM1680 is an Octal AIS Receiver Array for Maximum Tracking Range.**

The SM1680 "Octopus" gets its name from its phase-synchronous octal AIS receiver array that provides unparalleled sensitivity and performance. **Maximized tracking range**, often 200 NM or more\*, is achieved through **real-time signal processing** of four synchronized receivers on each AIS channel, using proprietary Shine Micro software and high-accuracy GPS disciplined timing.

The phase-synchronous octal array performs **packet-by-packet beam forming**, resulting in **sensitivity increases** of 6db or more while also providing **noise rejection** through **interferer nulling**. Beam forming is performed in software, enabling the SM1680 to effectively "point" in multiple directions simultaneously; achieving **co-channel rejection** never before possible. Four (4) waterproof inline Low Noise Amplifiers (LNAs) are included, and 120-240 VAC or 12 VDC power supply options are available.

**Atomic standard accuracy** allows SM1680 arrays many miles apart to form phase-synchronous virtual receivers via **Very Long Baseline Interferometry (VLBI)**. Powerful **anti-spoofing features**, including Time of Arrival (TOA) measurements, allow multiple installations to verify reported vessel positions via **Differential Time of Arrival (DTOA)**.

*\*Individual site performance will vary based on factors such as elevation, topography, and interference.*

**The SM1680 Features**

Full color, touch-screen display for:

- Spectrum Analysis
- Noise Floor Indication
- Signal Strength Monitoring
- Configuration and Administration
- AIS Messages
- Vessel Statistics
- GPS Position
- Status



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## EXTREME RANGE AIS MONITORING

### System Specifications

- **Designation:** AIS RX base station per ITU R M.1371-5
- **Interface:** TCP/IP Ethernet
- **Power Supply:** 120V-240VAC or 12VDC versions available.
- **Power Consumption:** <50 watts
- **Temperature Range:** -15 to +50 degrees C.

### Navigation Specifications

- **8 channel GPS disciplined time, frequency and position standard**
- **GPS antenna interface:** SMA connector

### Frequency Accuracy

- $1.16 \times 10^{-12}$  at 10 MHz

### Dimensions and Weights

- **Width:** 19"
- **Depth:** 13"
- **Height:** 3U (5.25")
- **Weight:** 10 lbs.

### Frequencies and Channel Bandwidth

- **RX AIS1:** 161.975 MHz at 25 kHz
- **RX AIS2:** 162.025 MHz at 25 kHz

### AIS Receivers

- **AIS Data Rate:** 9,600 bps
- **Individual Receiver Sensitivity:**  $\leq 20\%$  PER @ -119 dBm w/ SM1680LNA
- **System Sensitivity:**  $\geq -125$  dBm
- **Co-channel Rejection:** -10 dB
- **Adjacent Channel Selectivity:** 70 dB
- **Blocking:** 84 dB
- **Intermodulation:** 74 dB
- **Large Signal PER:** 1% or better
- **Image Rejection:** 70 dB
- **Spurious Rejection:** 70 dB
- **Antenna Interface:** Type N connector

### TCP/IP Interface Details:

The serial interface of the RadarPlus conforms to ITU R M.1371-5 and NMEA 0183 V4.0 with additional proprietary sentences.

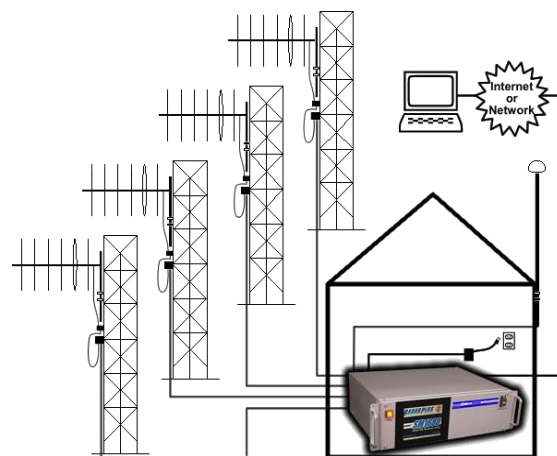
For full serial interface specifications, e-mail [info@shinemicro.com](mailto:info@shinemicro.com) or call Shine Micro at (360) 437-2503.

### Upgradeable

- The SM1680 is upgradeable and expandable via USB or Ethernet.

### LNA Specification

- **Enclosure:** IP67 Environmental Protection against Dust, Water, UV
- **Connector Type:** N
- **Frequency:** 162 MHz
- **Noise Figure:** < 1 dB
- **Gain:** > 20 dB
- **Power Supply:** Coax Bias
- Multi-Stage input protection



### WARRANTY INFORMATION

Shine Micro warrants its products to be free from defects for one full year from the date of purchase. Shine Micro will, at its sole discretion, repair or replace any components that fail in normal use. Labor and material costs for such repairs or replacement will be free of charge. This warranty does not cover failures due to abuse, misuse, accidents, or unauthorized alterations or repair.

