



SHINE MICRO RADARPLUS® SM1680 "OCTOPUS"

PHASE-SYNCHRONOUS OCTAL AIS RECEIVER ARRAY

INTRODUCING THE RADARPLUS® SM1680:

The second in a series of disruptive technologies from Shine Micro, Inc.

Nick-named the "Octopus", each of the 8 AIS receivers in the **SM1680** provides unparalleled sensitivity and performance. **Maximized tracking range** is achieved through advanced, real-time signal processing of four **synchronized receivers** on each AIS channel, using proprietary Shine Micro software and high-accuracy GPS disciplined timing.

The octal array performs packet-by-packet "**beam forming**", resulting in effective sensitivity increases of **6db or more** while also providing **noise rejection** through "**interferer nulling**". **Beam forming** is performed in software, enabling the **SM1680** to "point" in multiple directions simultaneously; achieving co-channel rejection performance never before possible.

The SM1680 features:

- Atomic Standard Accuracy
- Digital Beam Forming
- Interferer Nulling
- Anti-Spoofing Tools
 - Time of Arrival (TOA)
 - Differential Time of Arrival (DTOA)

Full color, touch-screen display for:

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

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)**.





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System Specifications

- **Designation:** AIS RX base station per draft ITU R M.1371-2
- **Interface:** TCP/IP Ethernet
- **Power Supply:** 120V AC
- **Power Consumption:** 100 watts
- **Temperature Range:** -15 to +50 degrees C.

Navigation Specifications

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

Frequency Accuracy

- 1.16×10^{-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 bits/s
- **Individual Receiver Sensitivity:** $\leq 20\%$ PER @ -119 dBm w/ SM1680LNA
- **System Sensitivity:** ≥ -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 draft ITU R M.1371-2 and NMEA 0183 V3.0 with additional proprietary sentences.

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

Upgradeable

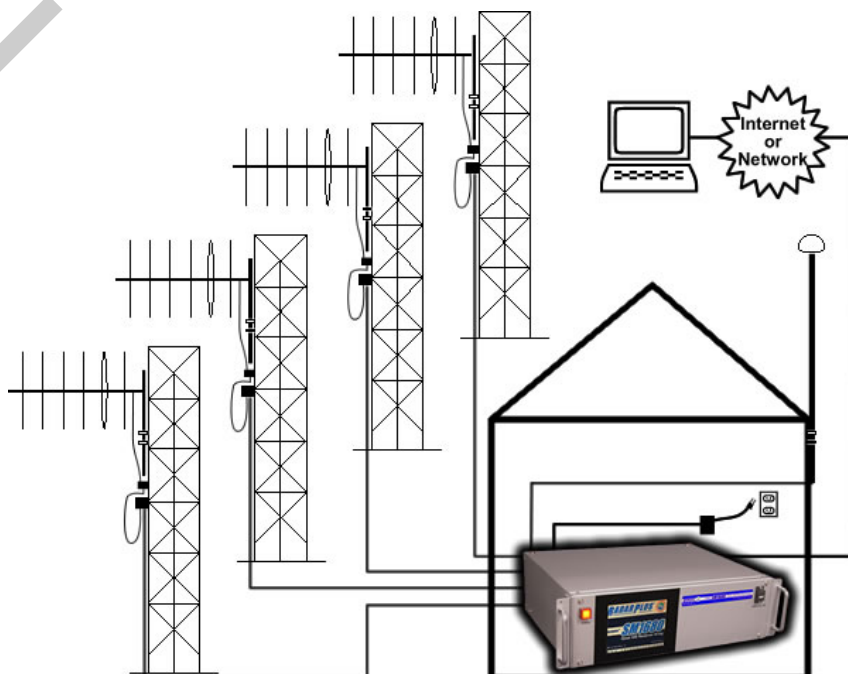
- The SM1680 is upgradeable and expandable via USB or Ethernet.

LNA Specification

- **Enclosure:** Weather Resistant
- **Connector Type:** N
- **Frequency:** 162 MHz
- **Noise Figure:** < 1 dB
- **Gain:** >12 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.



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