

# CODAR CURRENTS



## In this Issue:

- Are you up to date: Links to the latest software releases and advisories
- CODAR integrates Intel-based Macs into the SeaSonde platform
- A status report on California's efforts to map ocean currents
- Quick and easy bench tests for checking transmitter components in the SeaSonde transmit chassis
- Tech Corner: Tips for troubleshooting your transponder
- CODAR Quiz - Win Big Prizes!

## Links to the latest SeaSonde software below:

### Intel and PPC

#### Radial Software:

SSRadialSuiteCD\_10R5  
<http://SeaSonde.com>

#### Combine Software:

SSCombineCD\_10R5  
<http://SeaSonde.com>

### PPC (Power PC) Only

#### Radial Software:

SSRadialSuiteCD\_10R4u2  
<http://SeaSonde.com>

#### Combine Software:

SSCombineSuiteCD\_10R4u2  
Request download



**Advisories:** - After running Release4 installers (Updating from Release3), please check/change the Archivalist preferences before running the software. Default preferences installed will delete all but 7 days worth of CSS files!! Alternatively, you can back up the Archives folder before updating.

- A bug has been found in the Wave Model tools released in late 2005. Calculated "Wave Direction" measurements are incorrect. The tool has been corrected in Intel/PPC Release5 only. Cross Spectra can be re-processed with the new tools to obtain the correct measurements.

Note: CODAR Ocean Sensors, Ltd. no longer supports Mac OS 9 software. SeaSonde OS X software upgrades are free for all SeaSonde owners.

## **CODAR Goes Universal: a Word on the New Intel Macs and SeaSonde Compatibility**

- By William Rector  
CODAR Ocean Sensors

As you have probably already discovered, the new Apple Macintosh computers now use Intel processors exclusively. The Intel processor replaces the Motorola PowerPC (PPC) chip. This is a dramatic change in hardware and it means that translation software is required for older PowerPC programs to run on Intel Macs. This translation software is called Rosetta and it comes bundled with MacOS 10.4 and higher. Rosetta allows most (but not all) of the older Apple applications to run on Intel machines.

All SeaSonde 10 Release 4 applications will run under Rosetta except for SeaSondeAcquisition, SeaSondeController, and SeaSondeAwgiii.kext (the USB driver). What this means is that you can't use old SeaSonde software (that is SeaSonde10 Release4Update2 or earlier) on an Intel Mac to control your SeaSonde.

Our latest version of software, SeaSonde 10 Release 5 runs on Intel OR PowerPC machines using a single set of applications. Most of the SeaSonde applications have been updated to the Universal binary format, which contains both Intel and PowerPC code. OS X 10.4 (and higher) will automatically select which code to run. OS X 10.3.9 will automatically run the PowerPC code. You can tell if an application is Universal, Intel only, or PPC only by selecting the application in the Finder -> then selecting the menu command File -> Get Info and then look at the Kind: result.

SeaSonde 10 Release 5 available for download from SeaSonde.com. This release is a true Universal suite of tools that will run seamlessly on all OSX SeaSondes.

Our latest software is available for download on <http://www.SeaSonde.com> in the /Software folder

## **COCMP Installs Nine SeaSondes in Northern California During Year One**

- By Regan Long  
COCMP-SFSU and CODAR Ocean Sensors

In 2002, California passed two state propositions allocating funds to monitor ocean surface currents off the coast of California. As a result, the Coastal Ocean Currents Monitoring Program (COCMP) was established to develop an HF radar network and to deploy more than forty HF radar systems in California. The radars deployed north of San Luis Obispo belong to the Central and Northern Coastal Ocean Observing System (CenCOOS) and radars deployed south of San Luis Obispo are included in the Southern California Coastal Ocean Observing System (SCCOOS).

Prior to COCMP's inception more than a dozen CODAR systems had already been installed in Southern California. Up until now the coverage for California's coastline to the north had been very sparse with only ten systems existing north of Santa Barbara. The Northern coast constitutes the majority (approximately 70%) of California's 840 mile-long coastline. The existing radars included three 12MHz SeaSondes around Bodega Bay, six 12MHz radars on Monterey Bay and one 5MHz SeaSonde at Crescent City.

In COCMP's first year of funding, nine CODAR SeaSondes were added to the Northern California (CenCOOS) network. These include four 42MHz systems in San Francisco Bay and five 12MHz systems off the California coast near the Golden Gate Bridge. This has resulted in a contiguous string of HF radars running from Bodega Bay to Monterey Bay. Data from these radar networks can be accessed at [www.cencoos.org](http://www.cencoos.org), [www.cencalcurrents.org](http://www.cencalcurrents.org) and [www.norcalcurrents.org](http://www.norcalcurrents.org).

The growing HF radar network in northern California has already proved its worth. The most recent installations near the mouth of the Golden Gate were integral to the [Safe Seas Project](#), a NOAA/HAZMAT oil spill simulation drill conducted in the Gulf of the Farallones National Marine Sanctuary. The radars' real-time mapping revealed a northward current flow during the drift-card deployment test and the majority of the released drift cards were found north of the Golden Gate Bridge as predicted by the real-time radar data.

Several Long-Range (LR) HF radar installations are planned for deployment in COCMP's second year. The COCMP-Northern California team is focused on installing long range radars between Crescent City and Mendocino to expand coverage of real-time surface current maps off the "Lost Coast". In addition, LR SeaSonde sites are being scouted near Point Arena and Half Moon Bay to extend the long range coverage southward.

The entire COCMP HF radar network is expected to be completed in early 2008.

## Easy Bench Tests for SeaSonde Transmitters

- By Hector Aguilar  
CODAR Ocean Sensors

The "Tech's Corner" feature in this issue describes some quick and easy bench tests that experienced SeaSonde users can perform to diagnose transmitter problems. These diagnostic tests can often resolve problems that would ordinarily require the SeaSonde receiver and transmitter to be sent back to our repair department.

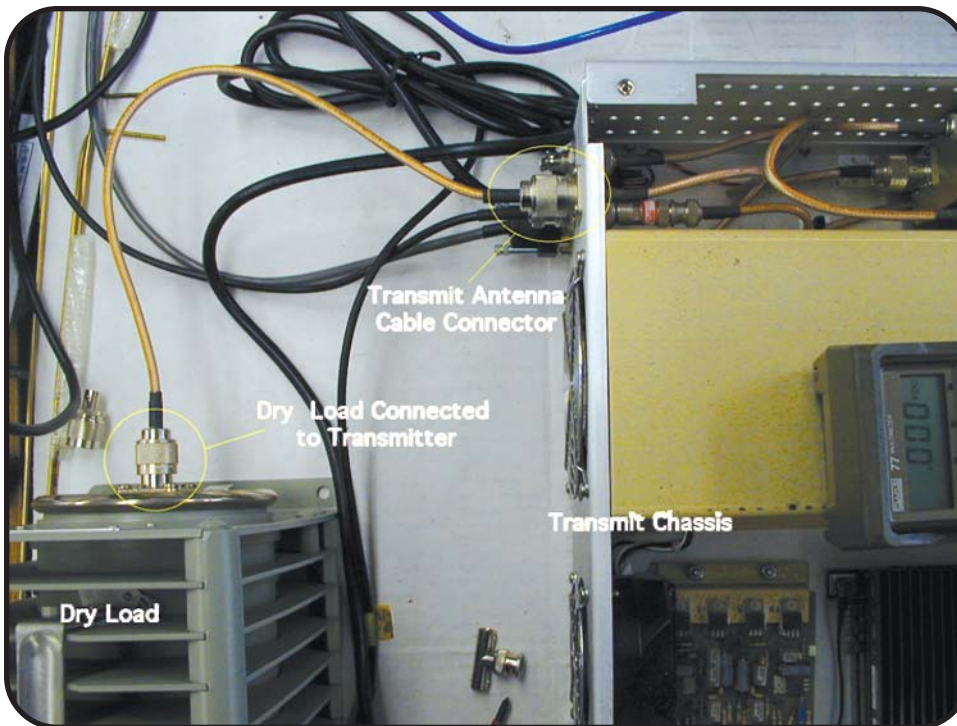
There are three components in the transmitter that can affect the power output to the antenna. If any one of them has failed or is compromised you will likely have no forward power (signal) being transmitted. The primary components are the 28 VDC Vicor power supply, the blanking board and the Kalmus amplifier.

### Tools you will need:

For these tests you will need a receiver chassis, a transmitter chassis, a multi-meter, a dummy load (also referred to as a dry load) and screwdrivers (flat bit and Phillips).

**A NOTE OF CAUTION:** Some of these bench tests will require disconnecting wires or probing components with a multi-meter while the hardware is plugged in. For safety, turn off the transmitter while preparing for each test and turn it on only when you are ready to take a reading. Always be aware of the power's on/off status.

Also, before beginning any tests on a transmitter that has an input signal from a SeaSonde receiver, please be sure to connect a dummy load to the transmitter's "N" type antenna connector (see photo below). Failure to do this could result in significant and expensive damage which may require replacement of the transmitter's amplifier.



Dummy load Attached to Transmitter chassis

The first step (with the power off) is to remove the top covers from the receiver and transmitter chassis.

### Test 1: 28 volt (Vicor) Power Supply Check:

**Tools needed:** Multi-meter with thin probes

With the transmitter turned on, probe the two screws of the big blue capacitor (one probe on each screw) next to the Vicor power supply. Alternatively, you can place the probes on the two brass nuts on the back (output) of the Vicor power supply. You should get a reading of approximately 28 volts DC. If the

voltage is off by more than a volt or two and the voltage has been consistently low (or high) in your diagnostic STAT files, then assume that there may be a power supply problem and continue to the next test. If the voltage is significantly low (less than 18 VDC for example), this may be an indication that the Kalmus amplifier has failed and is "pulling down" the voltage output from the Vicor. We will check this in the next step by removing the "yellow wire bundle".

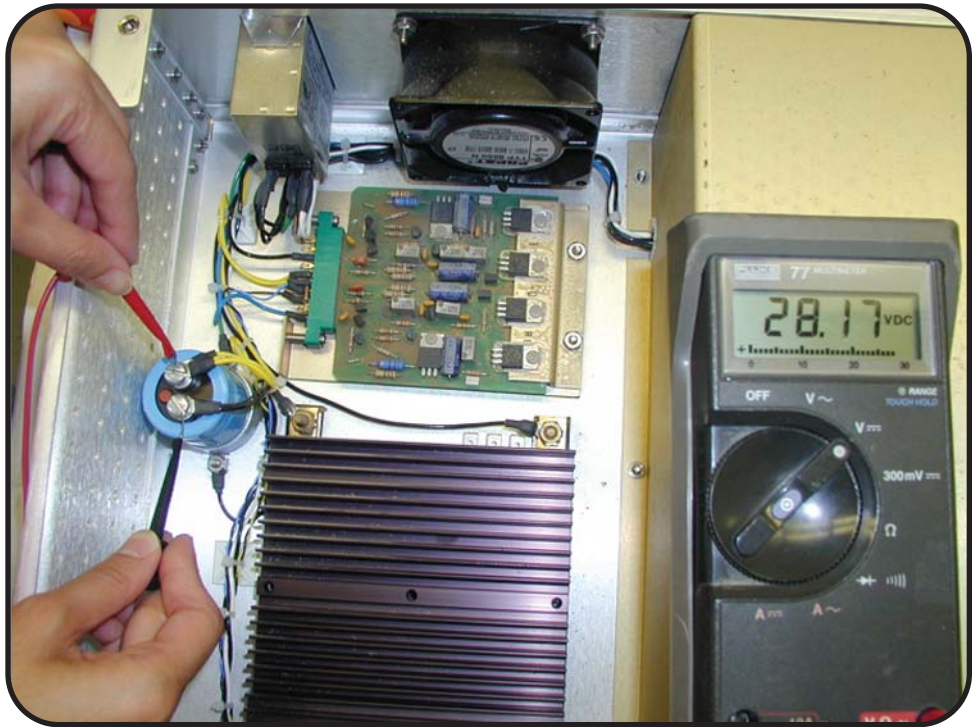
## Test 2: Amplifier Test

**Tools needed:** To test the DC voltage supply to the amplifier, use a multi-meter with thin probes. You will also need a medium flat blade screwdriver.

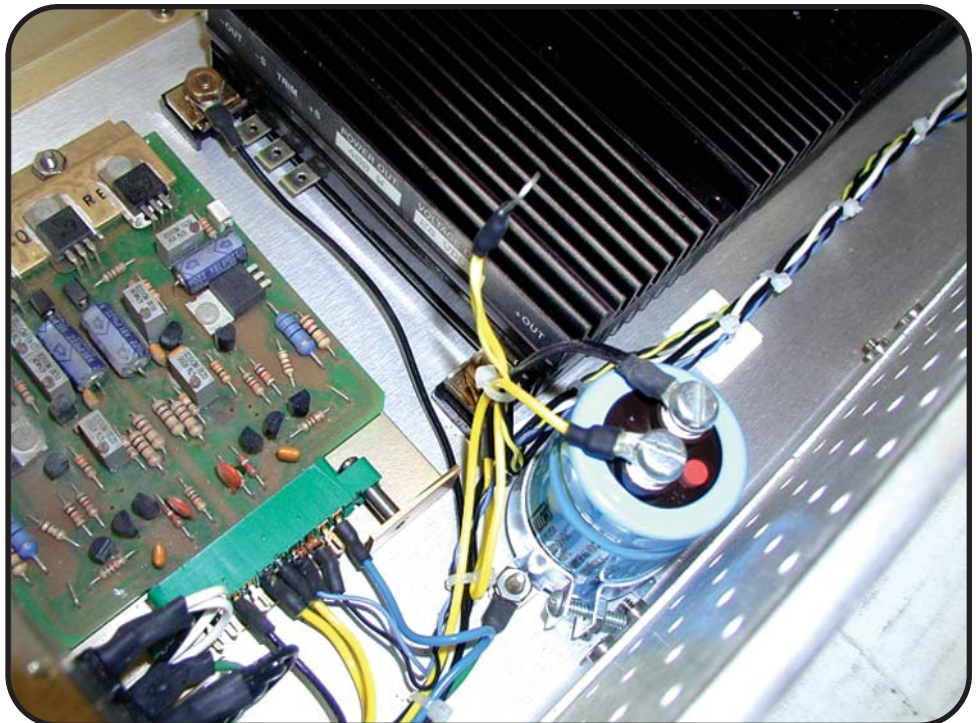
To test if the amplifier is receiving power at all or if it is "pulling down" the voltage coming from the Vicor supply, disconnect the yellow wire bundle from the blue capacitor as shown below.

**CAUTION:** be sure to turn off the transmitter before disconnecting this then turn it back on again.

Replace the screw on the positive post of the capacitor and tighten gently. Set the receiver to "pulse" mode using your normal operational settings so that a transmit signal is being sent from the receiver to the transmitter. The transmit drive cable and the serial control cable must be connected and a dummy load attached. If you have an oscilloscope you can measure the small input signal on the transmit drive cable where it attaches to the transmitter.

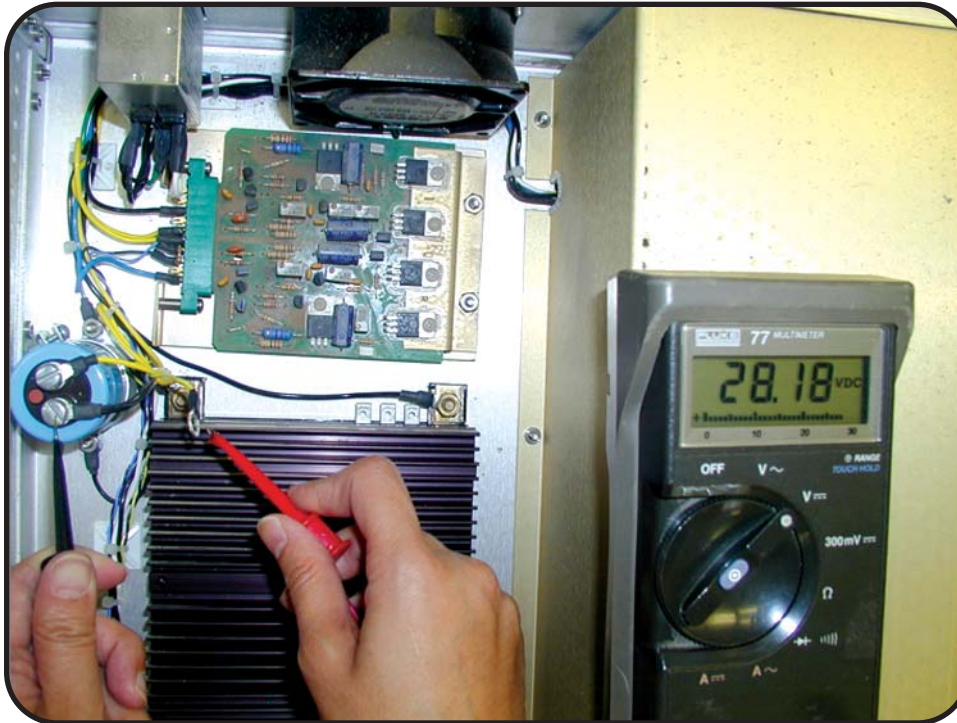


Measuring the Vicor 28 VDC Power Supply



Yellow Wire Bundle Shown Disconnected

Turn on the transmitter and probe between the yellow wire bundle that you disconnected from the capacitor and the negative post of the capacitor as shown below:



Measuring the voltage to the amplifier

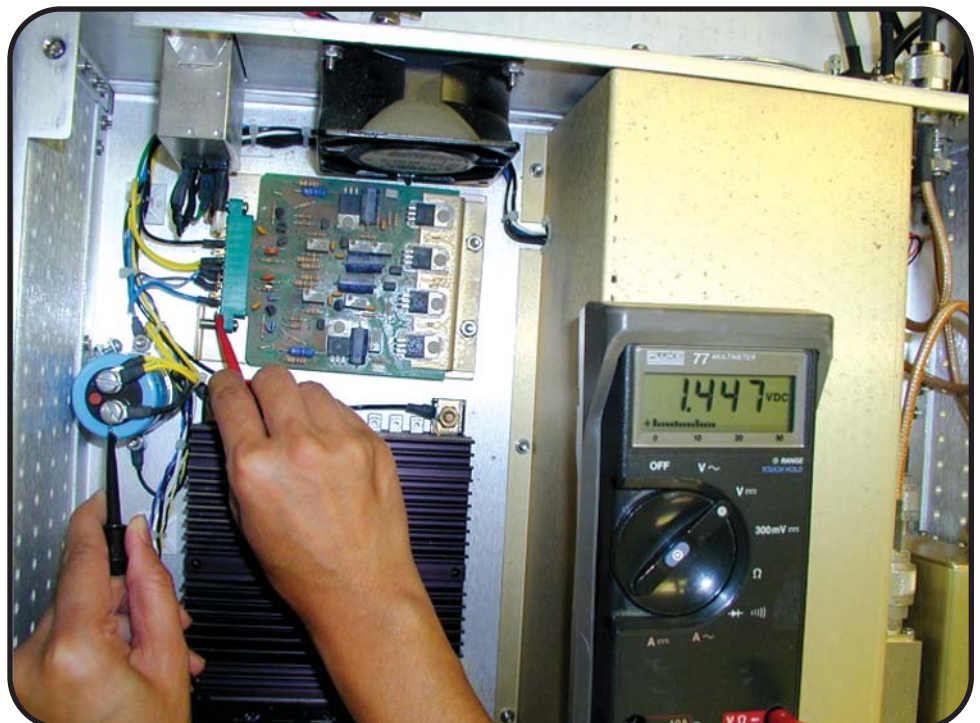
The reading on the multi-meter should be around 28 Volts DC. If the reading is lower than 28 volts by more than one volt then there may be a problem with the Vicor power supply. If the reading was previously ~ 18 VDC or less and is now reading 28 VDC with the wire bundle removed, then your Kalmus amplifier has failed.

If your power supply voltages are good and you still are unable to transmit, the problem may be your blanking board. First, do the obvious and check to be sure the serial cable and transmit drive cable are in good condition and attached then proceed with the test below. Note: If you have a newer model transmitter, a blinking yellow light will indicate that you are receiving a signal and the blanking board is functioning properly.

### Test 3: Blanking Board Check:

**Tools needed:** To test the blanking board, use a multi-meter with thin probes. An oscilloscope can also be used in lieu of the multi-meter. To determine if the input signal is reaching the blanking board, place the positive probe (red in this photo) on the first wire terminal lug (a.k.a. pin "10") of the blanking board. Place the black probe on the negative post of the blue capacitor, the reading should be approximately 1.4-1.5 volts DC. If it is not and you're sure that the transmit drive cable and transmit serial control cables are in good shape, then you can assume the blanking board has failed. Blanking boards are user replaceable (for experienced users). Remove the two chassis mounting screws and unplug the board from its socket. Replace with a new board and re-assemble. If this solves the problem then you won't have to return your SeaSonde transmitter to COS.

If the three major components are functioning properly and you still believe your transmitter is not putting out adequate power, you may want to conduct the test below to measure the actual output at the transmitter.



Measuring the Blanking Board Voltage

## Test 4: Amplifier Forward Power Test:

**Tools needed:** To test the amplifier forward power use the built-in wattmeter and/or an external wattmeter like the one shown below. You will also need a medium flat blade screwdriver.

This test can be done onsite but it is more convenient to do on the bench with a dummy load attached. If the transmit chassis in question does not come equipped with an built-in wattmeter then an external wattmeter will be required similar to the one shown in the picture below:

First setup up the transmit and receive chassis as you would in the field but without turning on the power to the receiver or transmitter. Open SeaSondeController and set the attenuation up to 10 dB.

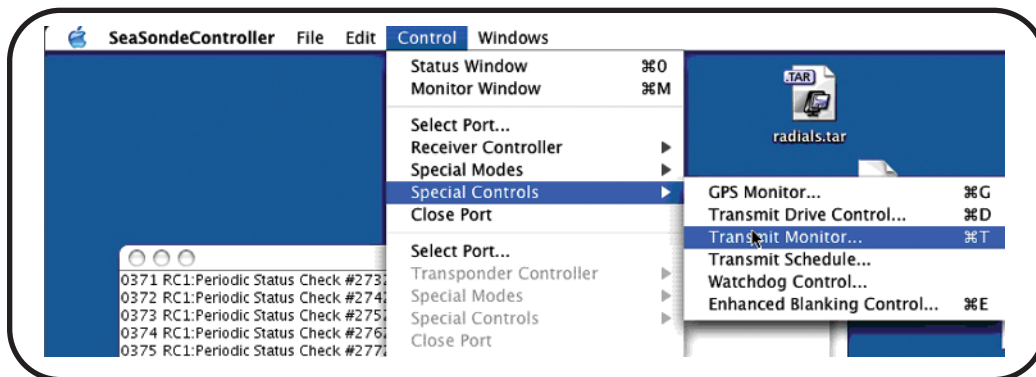
The next steps will depend on whether you have an built-in wattmeter or require an external SWR wattmeter. If you have a built-in wattmeter (standard on SeaSondes shipped after ~ July 2002) simply open the Transmit Monitor window in SeaSonde Controller by going to the menu bar and selecting Control->Special Controls-> Transmit Monitor as shown below:



This particular wattmeter can be found the following link:  
<http://www.mfjenterprises.com/products.php?prodid=MFJ-864>

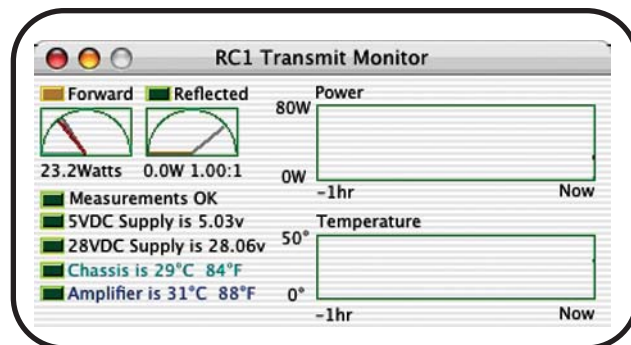
"Advanced Controller" during normal operation. This will increase the life span of the amplifier. When the test is complete turn off the transmitter BEFORE removing the dry load if the test was done on a bench.

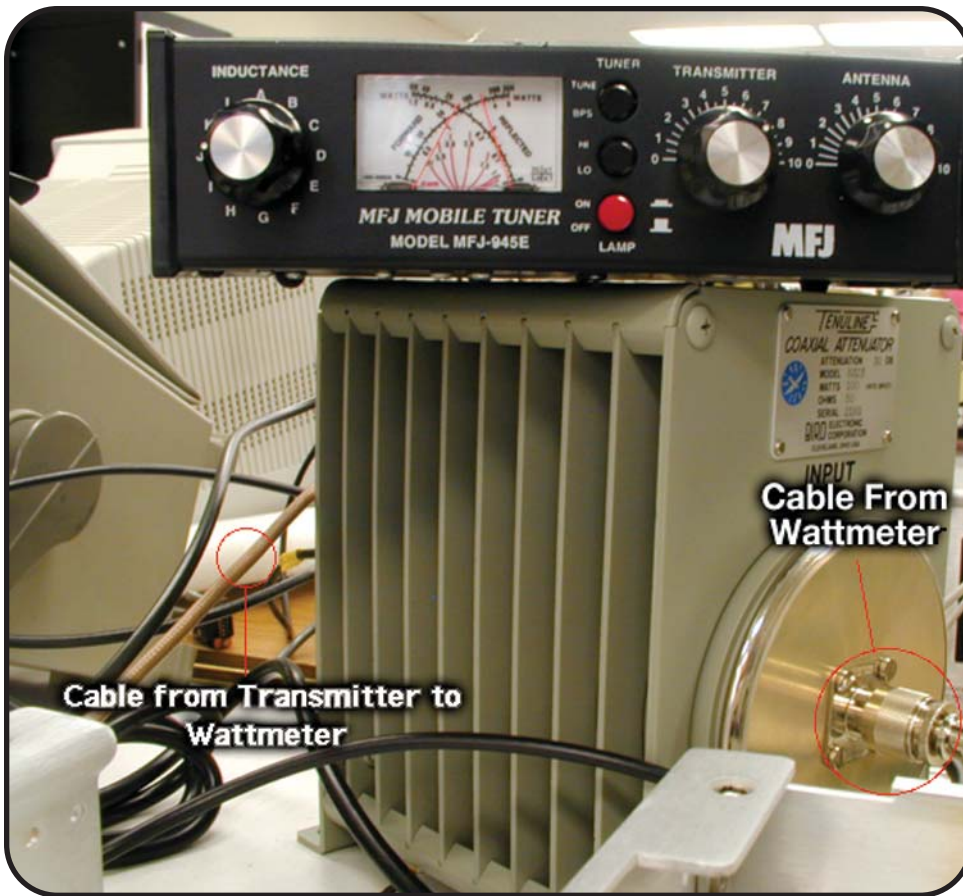
For transmitter chassis that do not come equipped with wattmeters:  
Connect the external wattmeter in line with the transmit antenna. Install the wattmeter as close to the transmit antenna as possible to get a more accurate reading of actual forward power at the antenna.



This will activate the "Transmit Monitor" window and will show the forward and reflected power measured where it exits the amplifier.

Slowly decrease the attenuation on the "Advanced Controller" window by increments of 2 dB until zero attenuation is reached. Forward power should increase as attenuation is removed until it reads at least 40 watts at zero dB attenuation. If the forward power displayed is more than 65-70 watts then attenuation should be increased slightly in the





## Transponder Tips

- By Hector Aguilar and Hardik Parikh  
CODAR OS

Recently we have had several users ask what they can do to assure a good antenna pattern measurement after all the preparations have been made.

There are three hardware factors that are often overlooked when preparing for an antenna pattern measurement (APM) and these can affect the the quality of APM data. These are 1) the antenna set used for the antenna pattern measurement, 2) the quality of the ocean ground and 3) the condition and charge of the transponder battery.

### 1) Selecting an antenna configuration for your APM:

Selecting the appropriate antenna for use on the transponder is an important step for a successful antenna pattern measurement. The type of antenna needed for an APM is dependent on the operating frequency being used. The following table provides recommended antenna whip lengths and hardware needed. Failure to use anything other than the recommended antenna configuration, could cause a weak (inadequate) signal return from the transponder.

**Note:** A 12 MHz transmit head is used for 5 &

Make sure that the wattmeter is reading the power traveling from the transmitter to the wattmeter and out to the load (or the transmit antenna) before proceeding. Begin decreasing the attenuation by increments of 2 dB making sure the reflected power doesn't become more than 20% of the relative forward power registered. At zero attenuation the forward power should be 30-50 watts. When the test is complete turn off the transmitter before removing the wattmeter and/or the dummy load.

These tests will help the operator to quickly and easily identify a faulty component in the transmitter chassis. Each test is designed to determine if power is reaching a specific component and the values are normal. The last test determines if the transmitter is producing power at the output.

For more information please contact [support@codar.com](mailto:support@codar.com).

Seasonde Model	Antenna Configuration (Boat Run)	Antenna Configuration (Walking)
5MHz	12MHz head + 4-part whip, OCEAN GND	3 White whips (sides and top)
12MHz	12MHz head + 4-part whip, OCEAN GND	3 White whips (sides and top)
25Mhz	Three white whips (sides and top)	3 White whips (sides and top)
42MHz	Three white whips (sides and top)	3 White whips (sides and top)

12MHz APMs conducted from boats. The cable used to connect the head to the transponder has an "N" connector on one end (connects to the head) and the other end has a pigtail (i.e. two cables) with eyes soldered onto the coax braid and center wire. The coax braid connects to the side terminal with a 3/8" x 32 TPI bolt. The center wire's eye is connected with a bolt to the top of the transponder and the braided wire's eye is connected to one of the side terminals on the transponder. A continuity test and checks for corrosion (on the

cables connectors) should be done periodically. If you do not have one these cables or if yours is in poor condition, contact CODAR for assistance.

## **2) Transponder ground configuration:**

When conducting a land based APM a two white whips, 8 feet in length, are threaded into the side ports of the transponder. A transmit whip is also screwed into the top of the lid. The horizontal whips on the side should provide enough grounding for walking patterns. When the transponder is on a boat, a ground wire of sufficient length to connect the transponder to the ocean is needed. A weight or rigid metal rod is often used to keep the ground wire from lifting out of the water as the boat moves. It is very important that during the run, the ground wire is completely immersed throughout the entire arc; otherwise, intermittency noise or loss of signal will occur as the wire bounces out of the water.

## **3) Transponder battery state:**

A good transponder battery is also critical. If you experience a weak transponder signal on one of your transponder runs you should consider the battery as a possible cause of the problem. Unlike Nickel-Cadmium batteries, the lead-acid battery used by our transponders does not like to be completely drained. A good practice is to never allow the battery to run completely flat. If necessary, a spare battery can be swapped in at the completion of the first arc.

Batteries should also be checked for proper voltage levels and should be replaced if ever discharged completely or if they are over a year old. A voltage reading on a fully charged battery below 12 volts is indicative of a bad battery that should probably be replaced. Keep in mind that a battery is cheap when compared to boat charges and personnel time.

The part numbers for two battery suppliers are listed below... or you can contact [support@codar.com](mailto:support@codar.com) for advice.

### **Transponder Battery Suppliers:**

**Allied Electronic, Part Number:** #621-1229  
<http://www.alliedelec.com/Search/ProductDetail.asp?SKU=621-1229&SEARCH=&ID=&DESC=PS%2D1229&R=621%2D1229&sid=45872B807A9B617F>

**Powersonic, Part Number:** #PS-1229  
<http://www.power-sonic.com/site/doc/prod/83.pdf>

For a refresher on conducting a proper APM please refer to:  
[APM Crib\\_rev6.pdf](#)



## CODAR Quiz

Now for a refreshing change after all of the grueling technical reading!

We decided to add a little fun and a chance to win "CODAR-Wear" by offering a quarterly quiz in our newsletters:

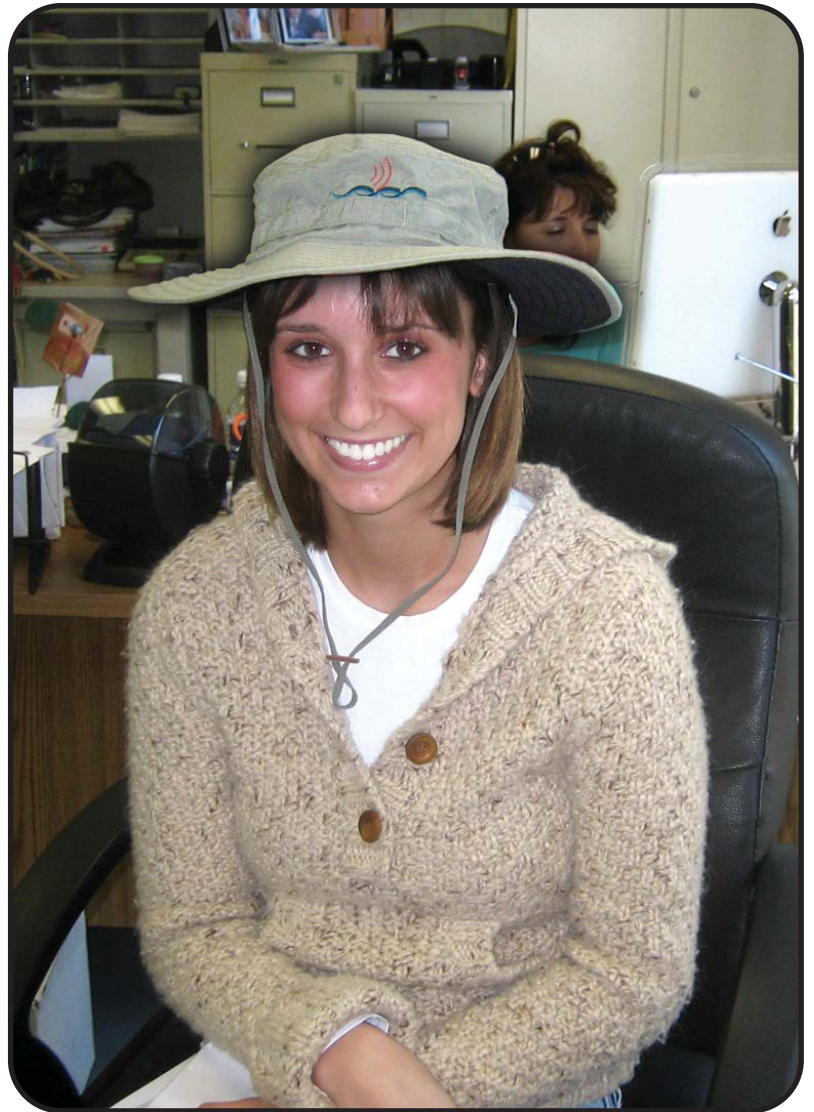
### Rules of the game:

- You must be able to provide a valid SeaSonde serial number (if asked) or be on our newsletter mailing list in order to play the game.
- Only one entry per person is allowed
- CODAR employees are not eligible
- One winner will be drawn from all of the correct responses submitted before December 31, 2006 at midnight.

Send your answer to [quiz@codar.com](mailto:quiz@codar.com) (failure to use this email address will result in disqualification). The Fall Issue prize will be .... a very stylish foul weather hat complete with "CODAR" logo and now the question:

### In what country is the city of Codar located?

More than one answer? ....be prepared to back up your response with latitude and longitude.



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