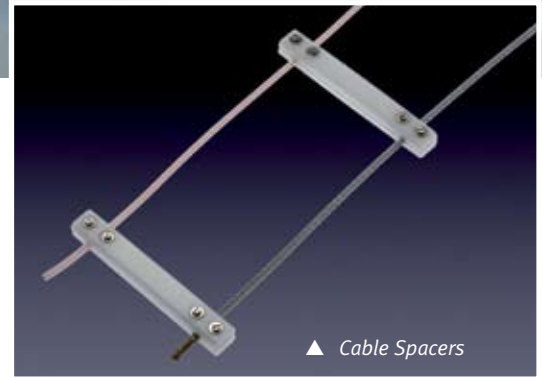




▲ The cable connecting the ATU to the backstay forms part of the antenna, so should be spaced off the uninsulated sections to avoid signal loss.



▲ Cable Spacers

Is Your SSB Ready for the Atlantic?

Yachtfunk.com's Guide to a Good SSB Installation

Joerg Drexhagen and his team of marine radio experts from Yachtfunk.com look at some of the common installation faults based on the findings amongst the ARC 2007 fleet.

Author: Thorsten Bitter from Yachtfunk.com

Even experienced sailors, planning to acquire long-range communication systems for their trans-ocean sailing, tend to react with restraint when it comes to SSB equipment. This is very unfortunate as modern SSB technology has so much to offer that sailors can benefit from: SSB-radios allow for ship-to-ship conferences over several thousand nautical miles, a service no other communication method can provide. When crossing the Atlantic with the ARC in a fleet of over 200 yachts, it is reassuring to know that you can speak easily to other yachts, which are often best placed to provide the fastest assistance in an emergency.

Even without facing an emergency, you will be able to take part in the sailor's community on the way to and in the Caribbean. There has always been a lot of activity over SSB radio amongst sailors sharing valuable hints and experiences.

Furthermore, you can connect a Pactor modem to your radio, which will enable you to transmit e-mails and GRIB-files, with just a modest annual fee, once you have subscribed to a continuously growing network such as sailmail.com that provides worldwide coverage. Additionally, you can receive weather fax and Navtex on the same equipment.

In Las Palmas last year we discovered that most of the uncertainty towards SSB on board is due to a lack of knowledge on how to properly operate and install the equipment. Operational issues can either be figured out by spending some time with the handbook, or by visiting one of Yachtfunk.com's SSB workshops. The aim of this article will be to give you some basic, but important, guidelines to a good SSB installation to get all the use and the benefit from the equipment, to encourage you to think about getting 'SSB ready' for your voyage.

Providing the troubleshooting service for yachts sailing in ARC 2007, we came across some installation mistakes we had not expected; most of which were crucial to transmissions being heard or not. Apart from loose connections and unsoldered plugs, we found poor ground for radios transmitting 150Watts of high frequency (HF) power; distances between the antenna tuner and the ground plates that were too great; unsuitable cables used between the tuner and the backstay, or the whip antenna, and many more inaccuracies. In the following text, I will discuss the basic considerations for a proper installation along three different aspects: ground, contact, and distance.

Beginning with ground, one needs to understand that every unsymmetrical antenna needs ground, respectively sea-ground. The basic antenna suitable for HF-frequencies is a dipole, a symmetrical type of antenna, consisting of two poles / arms that would need to be fixed at the masthead. As most vessels do not have two masts, the type of antenna Yachtfunk.com usually installs on vessels is not a dipole, thus one pole is cut off. The missing pole therefore needs to be grounded.

Grounding on metal-vessels is relatively easy. Even if you apply antifouling, contact to seawater can be achieved with the help of capacitive coupling. The metal hull acts as one plate of the capacitor, seawater as the other. However, with a GRP hull, things become a bit trickier.

Traditionally, boatyards have installed dynaplates, which allow for a direct contact to seawater, which is a good electrical conductor. At first glance, dynaplates seem to be a clever solution, looking at the way they are built; they consist of little pellets making the contact surface bigger than the holes to be cut into the hull for their installation. Unfortunately, this apparent advantage turns out to be their biggest drawback, because after about six months of sailing algae and shells will have started to colonise the pellets, so they need cleaning or replacement to do their job properly. The solution to this problem is an electrical trick also used with metal-vessels: a capacitor does the 'grounding-job'. Installing a copper or aluminium-based foil of about 3m² in the bilge would make up for one half of the capacitor, the second half is the seawater – the two conductors are separated by the GRP-hull. Still, foil is not recommended for a long-term installation as it is easily breakable. The best solution is to use SSB-ground-paint, a silver-plated copper coating to be applied inside the vessel below the waterline near the antenna-tuner. As with foil, a surface of about 3m² should be painted for good results. This installation has three major advantages: Firstly, the antenna-



tuner can be located close to the ground-plane. Secondly, we can couple a rather large area to seawater (capacitive coupling), and thirdly, the painted area is not susceptible for environmental effects that would lead to corrosion, thus it is maintenance free. Over coating with conventional spar varnish for conservation is advisable. The antenna-tuner can be connected to the ground plane with the help of a broad embedded copper strap.

Contact problems turned out to be another major problem area. Any loose connection, any surface too small for transporting HF-power from one piece of equipment to the other can become a bottleneck in the system. Let's take a look at the most critical points of contact: The transceiver and the antenna tuner should be connected using coax cable; the PL-plugs must be soldered thoroughly, avoiding contact between conductor and ground / shielding on the one hand and making sure there is sufficient contact surface for the conductor on the other. Another crucial contact point is the clamp connecting the feeder with the antenna (insulated backstay). This Backstay-clamp should meet three requirements: 1. It should be made of stainless steel or brass; 2. It should insulate the area of contact; and 3. It should realize an adequate contact surface to the insulated backstay. Yachtfunk.com offers special clamps for this purpose. All in all, we can say, that when installing SSB-equipment one needs to consider contact surface, possible short circuits and – especially for electrical contacts outside the vessel – possible corrosion.

When installing equipment capable of transmitting HF frequencies, one needs to carefully think about where HF is radiated, thus one needs to decide where certain distances need to be kept short in order to avoid loss of power or interference. Connecting the tuner to the antenna, it is necessary to emphasize that the feeder is already part of the antenna – system. Therefore, the tuner will try electrically to adjust the length of the antenna - including the length of the feeder - to the used frequency. At last year's ARC, we were surprised to see that many so called "experts" working for shipyards had installed coax cable between the tuner and the antenna. That is one of the major problems that keeps the tuner from adjusting the antenna system. A lot of the power emitted on the way to the insulated backstay will be reflected inside the coax, back to the tuner and will finally be diverted to ground. The tuner will never be able to properly adjust the system unless appropriate cable is installed. Yachtfunk.com recommends GTO-15, a high-voltage cable to connect tuner and antenna. The GTO-15 will then have to be kept at a distance to the un-insulated part of the backstay with the help of standoffs. A feeder directly connected to the un-insulated backstay would lead to a loss of power and can cause interferences with other electrical systems onboard. Basically we can say that whatever kind of antenna is used onboard, it should be mounted as far away from any metal objects on the vessel as possible for the best performance possible.

Distance also plays an important role with regard to the installation of the tuner – it

should be placed as close as possible to the ground-plane.

If you follow the Yachtfunk.com's installation guide, you should have a well performing SSB transceiver that is worth the investment. If you still have concerns with regard to the installation and operation of the equipment, we will be happy to assist you - before or at the coming ARC in Las Palmas.



Recommended Reading

Marine SSB Radio for "Idi-Yachts" and HF Radio Email for "Idi-Yachts".

Highly recommended for anyone new to radio, or as an onboard companion and aide-memoir. Available from WCC - £20 each or £36 for both.

Yachtfunk.com

Yachtfunk.com are specialists in modern marine radio technology, combining traditional SSB-radio with newest digital data communication technologies offered for HF radio via Pactor equipment.

In addition to SSB-radios, capable of sending and receiving emails - including downloads of weather forecast and GRIB files, Yachtfunk.com provide a worldwide installation and advisory service to make sure your equipment is ready for your voyage and operating at maximum effectiveness.

In order to meet sailors' high expectations, Yachtfunk.com have carefully chosen quality components including SSB-ground-paint to replace costly sea-ground-plates, standoffs & waterproof backstay-clamps, halyard SSB-antennas, high-power WiFi-adaptors, online-logs and individualized websites. Yachtfunk.com can also provide advice and assistance with registration, set-up and operation of HF radio email via networks such as Sailmail.

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