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NASA
MARINE INSTRUMENTS

A GUIDE TO SHORT-WAVE LISTENING USING THE TARGET HF3 RECEIVER

RoHS ✔
2002/95/EC

BY
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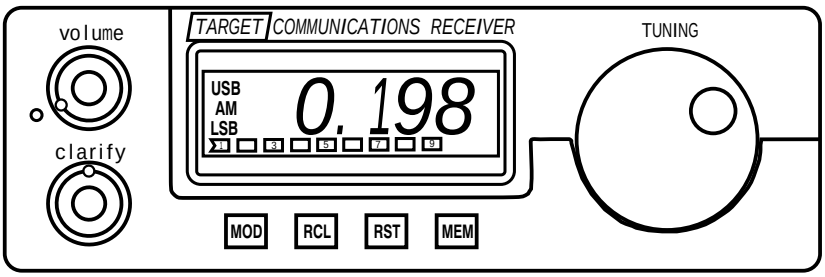
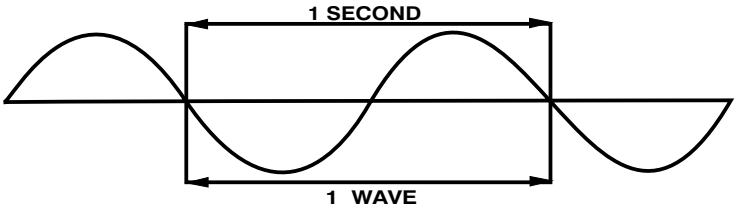


The **TARGET HF3** receiver covers the entire spectrum from 30 kHz to 30 MHz.

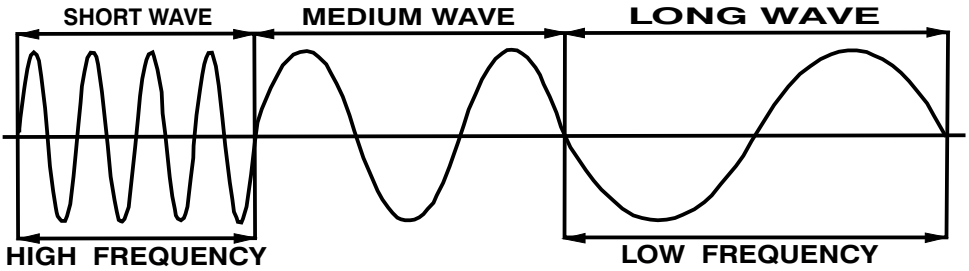
For the beginner, what does this mean???

The symbol Hz (pronounced Hertz, and named after a famous radio pioneer) represents one complete electromagnetic wave in a second. A kilohertz (kHz) is one thousand waves per second, and a Megahertz (MHz), a million waves in a second. The number of waves per second is called the Frequency.

1 WAVE IN 1 SECOND = 1 HERTZ



Often a reference is made to a stations wavelength rather than it's frequency. High frequency signals have short wavelengths and low frequency signals have long wavelengths. The frequency of a signal in kHz is given by dividing 300,000 by the wavelength in metres.



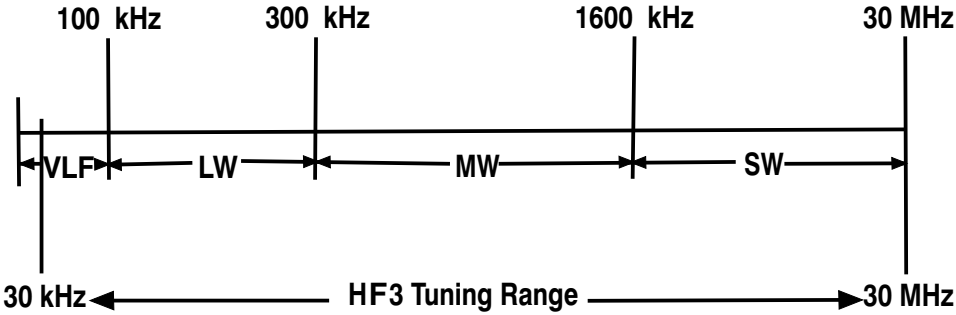
Why are high frequency waves shorter than low frequency ???

Imagine that you could see a wave travelling past you at the speed of light. The wavelength would be the distance between two adjacent waves. If you increase the frequency of the waves then you would get more waves in the same space so the wavelength would be shorter.

Radio waves, light, X rays, are all electromagnetic waves. The only thing that differentiates them is their frequency.

For convenience the range of frequencies used for radio communications is split into bands. Frequencies below 100 kHz are called Very Low Frequencies (VLF). The Long Wave (LW) covers frequencies between 100 kHz and 300 kHz, whilst the Medium Wave (MW) covers the frequencies between 300 kHz and 1.6 MHz (1600 kHz).

All frequencies between 1.6 MHz and 30 MHz are referred to as Short Waves (S W).



The **HF3** covers all of these bands in one continuous sweep with steps of 1 kHz. Numbers to the left of the decimal point are in MHz whilst those to the right are in kHz.

e.g. 0.198 is expressed as 198 kHz or 0.198 MHz

14.386 is expressed as 14386 kHz or 14.386 MHz

Turning the tuning knob slowly advances the tuning in 1 kHz steps, turning a little faster the steps change to 10 kHz, faster still the steps become 100 kHz, and a really fast spin will make the steps 1 MHz. This makes it quick and simple to hop from one end of the spectrum to the other.

GETTING STARTED

The **HF3** is supplied with a simple long wire antenna connected to a phono plug. The wire length is 10 metres and is a good compromise for general coverage. A shorter wire will be less sensitive and, whilst a longer wire may pick up more of the desired signal, it may also pick up much more undesirable signals in the form of interference. The antenna wire should be strung up as high as possible and as far away from mains wiring, striplights, televisions, or any other source of interference (see Page 7). The shorter black wire from the phono plug is the ground terminal. Connect this to something that is well grounded. A cold water pipe or *mains earth is usually adequate. Do not connect to anything you are not certain is earthed.

***Do not** attempt to connect directly to any Mains Supply without the aid of a qualified Electrician.*

Plug the 12 Volt line from the power supply into the receiver, plug in the antenna and set the switch on the rear of the receiver to normal position if you are using a long wire antenna or active if using the optional active antenna. You are now ready to go.

Switch on the receiver by rotating the volume control clockwise. The display will show the frequency and the mode. Set the mode to AM. To select mode USB, AM and LSB press **MOD**. This rosters through the modes. Set the Clarify control to it's central position. Adjust the volume to a convenient level and use the tuning knob to move up and down the spectrum and listen to the AM stations.

To Store a Frequency in memory

Tune to the desired frequency and press **MEM**. The *S* meter then becomes the memory location pointer. Select the memory location using the tuning knob. When the desired location is selected press **MEM**, the desired frequency is stored in that location and the receiver returned to normal operation.

To Recall a Frequency from memory

Press **RCL**. The *S* meter then becomes the memory location pointer. Select the desired memory location using the tuning knob. When the desired location is selected press **RCL**. The desired frequency is recalled and the receiver returned to normal operation.

The **RST** key resets the microprocessor and reverts to memory position 1.

Tune to 100 kHz and you will hear a fast ticking noise. These are the pulses of LORAN C, this is a long range navigation system in use all over the world.
Encrypted data is transmitted to military submarines at VLF.
This covers very great distances. Speech is not transmitted.

The Medium and Long waves are crowded with domestic and foreign broadcast stations. When tuning a station rotate the tuning knob to obtain the highest number on the **Signal Strength Meter.**

Tune between 300 and 400 kHz for marine and aeronautical beacons. These are used by shipping and aircraft to get bearings. Each beacon transmits a Morse code ident of it's name. The Morse is very slow and continually repeats, so if you don't read Morse, you have plenty of time to look it up. The ident letters are often a syllable of the airport or towns name.

Domestic portable telephones operate at the high frequency end of the medium wave at about 1.6 MHz. At 1.8 MHz the short wave frequencies start. A quick flip round and you'll find it's very different than the medium wave band.

The BBC broadcasts it's World Service on several short-wave frequencies. In times of crisis the BBC World Service has been the source of unbiased news the world over. Most countries have their own overseas broadcasts. Some follow in the traditions of the BBC, others simply use the airwaves for blatant propaganda.

Many overseas broadcast stations welcome contact with listeners. This helps them to establish their listener profile and assess their coverage. The station will usually repay the listener with give-away goodies and a QSL card (from the international Q code meaning “acknowledge receipt”). Many people make a hobby of collecting QSL cards from all over the world.

Some transmissions will not contain speech or music, they will just consist of warbling tones. These contain some form of data. It may be a weather chart broadcast to shipping, or a fax or telex to a news agency. Without a special decoder it cannot be read.

Another form of transmission found on short-wave is single side band (SSB).

To understand what this means it helps to see how it developed. In a conventional signal a carrier is transmitted. The amplitude (height of the wave) of the carrier is modulated with speech, hence the name “amplitude modulation” (AM). If the signal is studied carefully then the result of the modulation produces a carrier, an upper sideband of frequencies and a lower sideband of frequencies.

All this takes up space on the radio spectrum. Now, since the upper and lower sidebands are mirror images of each other it’s not necessary to transmit both, so one is filtered out in the transmitter. As no information is provided by the carrier that also can be filtered out leaving only one of the sidebands. This takes up less space in the spectrum and, because only wanted information is transmitted, makes better use of the power available.

This is single sideband or SSB. The downside of this is, firstly, the quality of reproduction is not usually as good as AM. For this reason it is only used for communications and not for broadcast. Secondly, it is more difficult to recover the original speech than in AM.

When recovering an SSB signal, the listener must know which sideband is being transmitted. Fortunately there is a convention. Frequencies below 10 MHz transmit the lower sideband (LSB), and those above 10 MHz use the upper sideband (USB). (There are exceptions to this convention, e.g. VOLMET is always on USB.

Tuning the Amateur band from 3500 to 3800 kHz you will always find SSB signals. With the receiver in the AM Mode the speech sounds severely distorted and, as there is no carrier the tuning meter rises and falls with the voice peaks. Switch to LSB, set the clarify control to it's centre position (pointer uppermost). Tune the receiver until the speech becomes as clear as possible, finally turn the clarify control until the speech seems as near normal as possible. Only a small adjustment of the clarify control will change the voice characteristic from high to low pitch. With a little patience, tuning in SSB stations becomes quite natural. Most people find it easier with the volume set at a low level.

When using the tuning knob to tune through a band of frequencies, place a finger in the dimple and turn the knob as if stirring a cup of tea. This will move gently in 1 kHz steps. Holding the knob and twisting may accelerate it too fast and cause larger increment steps.

When is the best time to listen ???

Early evening is usually a good time to listen with ever distant stations being received as the night progresses. Daylight conditions are less favourable. During a period of exceptional activity ("a lift"), the spectrum is crowded both day and night. Conditions can swing to the other extreme with only the more local stations available.

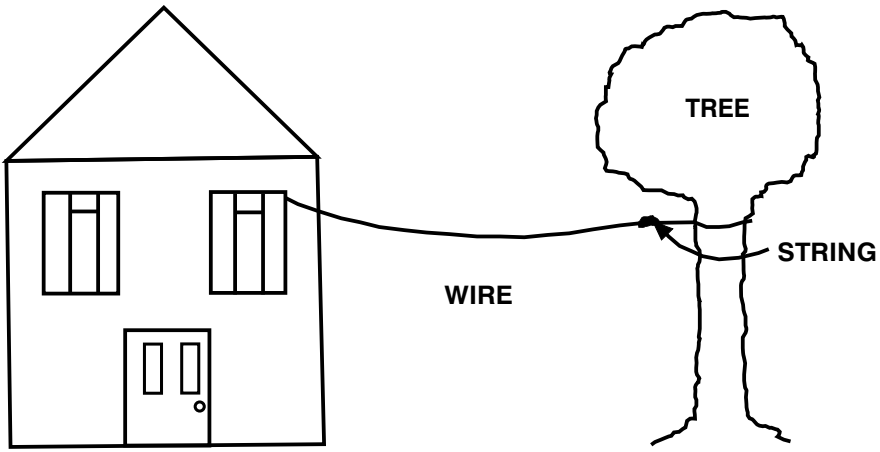
Over short distances, signals follow the contour of the earth (ground waves), however, long distance propagation relies on the signal bouncing off the ionosphere (sky waves). Often the skywave from a distant station is stronger than the groundwave from a local station. With experience the listener will soon learn the best time and conditions to receive the stations he wants.

Note

It is good practice to unplug the antenna when not in use. This will protect the receiver from damage during Electrical Storms.

It is also good practice to switch off the unit and unplug the power supply from the mains when the Receiver is not in use.

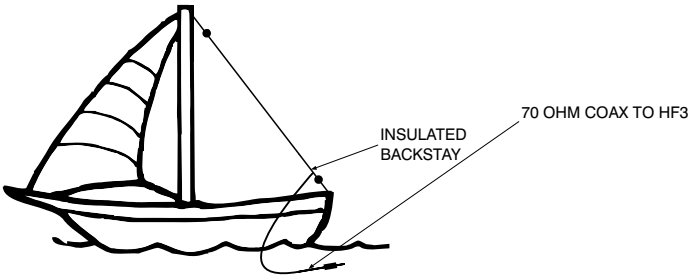
ANTENNA



Tie the end of the antenna wire to a piece of string which in turn is tied to a tall object.

IDEAL ANTENNA POSITION

If the antenna is to be some distance from the receiver, then use 70 ohm co-ax (TV Aerial cable) between the receiver and the antenna. If an outside antenna is not practical, then the antenna can be fitted as high as possible in the loft. Reasonable results can be obtained with an indoor antenna, though interference from other electrical equipment may cause problems. For serious listening a good antenna is worth the effort. Alternatively an active antenna is available from www.nasamarine.com. When using an active antenna the switch at the rear of the receiver should be set to **ACTIVE**. Otherwise it should be set to **NORMAL**.



Troubleshooting

- **UNIT WON'T TURN ON**

  Check the Power lead (DC) is plugged into the receiver and the receiver is switched on.

- **DISPLAY IS ON BUT UNIT WILL NOT RECEIVE**

  Check antenna and ground connections.

- **THERE IS A HUM OR BUZZ PARTICULARLY ON STRONG LOCAL STATIONS**

  Check ground connection. If necessary, try connecting to an alternative ground.

- **CAN RECEIVE LOCAL STATIONS BUT CANNOT RECEIVE DISTANT STATIONS**

  Atmospheric conditions may be poor, wait until conditions improve. Check the antenna wire, re site the antenna if necessary.

- **HIGH LEVELS OF INTERFERENCE ARE EXPERIENCED**

  Locate the source of interference if possible. Turn off all other items, especially TV's, computers etc. sequentially, until the offending item is found. Try to site the antenna as far from the source of interference as possible. Turn off items that cause problems.

- **FREQUENCY MOVES IN GREATER THAN 1 kHz STEPS WHEN FINE TUNING**

  Tuning knob is being turned too fast. Use the finger dimple in the tuning knob when fine tuning.

- **CANNOT PROPERLY RESOLVE SSB SIGNALS**

  Check that correct sideband is selected. Adjust the clarifier control for best sound. If there is insufficient adjustment on the clarifier control, return the clarifier to the central position and retune the main tuning knob.

- **SOME SIGNALS PARTICULARLY AROUND 27 MHz ARE DIFFICULT TO HEAR**

  That is because they are frequently modulated (FM). The receiver does not have an FM facility, however, tuning off the centre of the signal will allow these signals to be heard. This is commonly called “slope detection”.

- **DISPLAY SHOWS RANDOM CHARACTERS**

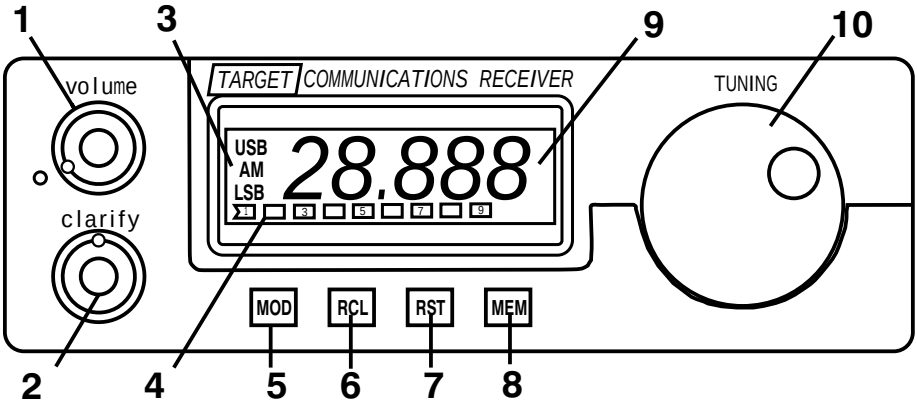
  A supply transient could upset the internal processor. If turning the tuning knob does not clear the problem then press RST. This performs a reset then returns to stored frequency display.

NB. The **HF3** receiver is optimised for speech communications. When listening to music, the audio response will be restricted.

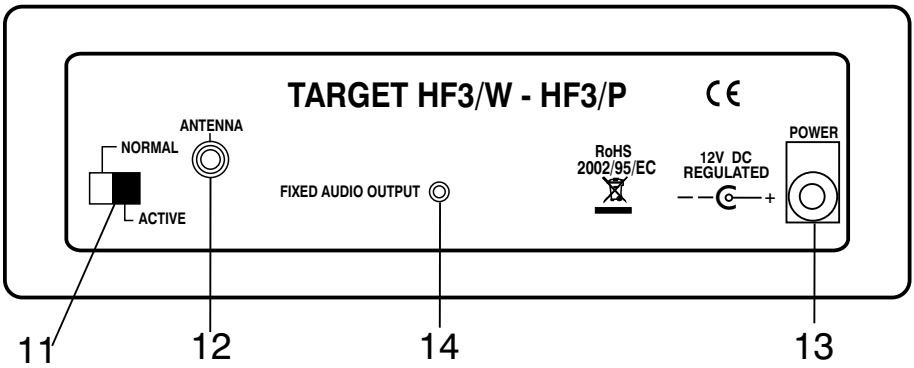
The **HF3** receiver has no facility for external Speakers.

THIS UNIT IS PACKED WITH A 12 VOLT D.C.POWER CABLE INCORPORATING A 1 AMP FUSE. CONNECT RED LEAD TO POSITIVE AND THE LEAD WITH THE BLACK STRIPE TO NEGATIVE (SUPPLY REVERSAL WILL BLOW THE FUSE). CONNECT TO A 12 VOLT BATTERY OR A REGULATED D.C POWER SUPPLY . DO NOT EXCEED 13.8 VOLTS.

FUNCTIONS



1	On/Off & Volume Control	Clockwise on. Continue for volume increase.
2	Clarify Control	Set at centre (red mark up) tune either side of centre.
3	Mode Display USB AM LSB	Displays selected Mode only.
4	Signal Strength Meter	Bar Graph increases with received Signal Strength.
5	Rosters through Modes	Rosters LSB AM USB.
6	Recall from Memory	Recalls Freq. in Memory.
7	Reset	Reset and return to Memory Position 1.
8	Install into Memory	Installs Freq. displayed into Memory.
9	Frequency Display	MHz to left of Point. kHz To right of Point.
10	Tuning Knob	Turn to alter Frequency.
11	Attenna Power Switch	Set to normal for long wire Antenna. Active for Nasa Active Antenna
12	Antenna Socket	Plug Aerial in here.
13	Power Socket	Plug 12v Dc Supply here.
14	Fixed Audio Output	Plug data lead for PC Here (HF3/W only)



RECEIVING WEATHER FAX USING THE TARGET HF3/W

MINIMUM REQUIREMENT OF PC

Pentium processor or better, minimum of 10 MB of RAM, 10 MB free on hard disk, VGA monitor and a sound card with mic input port.

INSTALLING SOFTWARE ONTO HARD DISK

Insert the CD into your CD drive. If it doesn't self install double click the setup icon 'NASA HF3/w'.
Double click the setup icon to install the program onto your hard drive.
When you exit the installer the programme will boot up automatically.
On first use it will ask for the input of the 'PRODUCT KEY'. This is printed on the paperwork accompanying the CD and also on the underside of the HF3/W.

Refer to the comprehensive help file on the program to connect your receiver to your PC to operate the software.

A list of stations, frequencies and transmission can be found in the Admiralty list of radio signals and an excellent website -
-www.weather.mailsail.com

TUNING FOR WEATHERFAX

Set the receiver to the exact frequency shown, ignore any figures after the decimal point. (there is no need for an offset.) Select **USB** and set the clarify control with the pointer centred. When no picture is being transmitted a constant note will be heard. During picture transmission this note will change to a rhythmic chirp. To get good quality pictures a good interference free signal is necessary. Atmospheric interference will usually sound like the hiss of frying bacon superimposed on a signal. Other interference such as that from TV and computers will usually be more of a rasping noise. Each station has several frequencies, select the one which gives the best results. It will vary according to the time of day. Note: Not always the strongest station gives the best results. A weaker station may have less background noise and give a clearer picture.

Make sure you are satisfied with the quality of signal you're receiving on the computer. Ideally there should be no change in the quality of the signal being received. Many computers however (particularly models built before the introduction of regulations to limit emissions of radio interference) will emit radio interference which will degrade the signal.

To solve this problem it is necessary to locate the antenna as far from the computer as possible. Use a 70 ohm coaxial cable to connect the antenna to the receiver. It may also be helpful to locate the receiver some distance from the computer. If the interference is reduced by unplugging the data lead, the noise is being conducted along the shield of the cable.

IMPORTANT READ THIS BEFORE UNPACKING INSTRUMENT

Prior to unpacking this instrument read and fully understand the installation instructions. Only proceed with the installation if you are competent to do so. Nasa Marine Ltd. will not accept any responsibility for injury or damage caused by, during or as a result of the installation of this product. Any piece of equipment can fail due to a number of causes. Do not install this equipment if it is the only source of information and its failure could result in injury or death. Instead return the instrument to your retailer for full credit. Remember this equipment is an aid to navigation and not a substitute for proper seamanship. This instrument is used at your own risk, use it prudently and check its operation from time to time against other data. Inspect the installation from time to time and seek advice if any part thereof is not fully seaworthy.

LIMITED WARRANTY

Nasa Marine Ltd. warrants this instrument to be substantially free of defects in both materials and workmanship for a period of one year from the date of purchase. Nasa Marine Ltd. will at its discretion repair or replace any components which fail in normal use within the warranty period. Such repairs or replacements will be made at no charge to the customer for parts and labour. The customer is however responsible for transport costs. This warranty excludes failures resulting from abuse, misuse, accident or unauthorised modifications or repairs. In no event shall Nasa Marine Ltd. be liable for incidental, special, indirect or consequential damages, whether resulting from the use, misuse, the inability to correctly use the instrument or from defects in the instrument. If any of the above terms are unacceptable to you then return the instrument unopened and unused to your retailer for full credit.

Name _____

Address _____

_____

Dealer Name _____

Address _____

_____

Date of Purchase _____

Proof of purchase may be required for warranty claims.

Nasa Marine Ltd.
Boulton Road, Stevenage, Herts SG1 4QG England

Declaration of Conformity
NASA Marine Ltd declare this product is in compliance with the essential requirements of R&TTE directive 1995/5/EC.
The original Declaration of Conformity certificate can be requested at info@nasamarine.com
THIS PRODUCT IS INTENDED FOR USE ONLY ON NON SOLAS VESSELS

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