

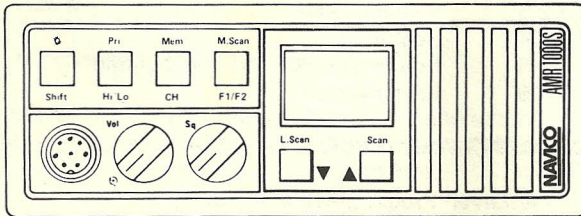
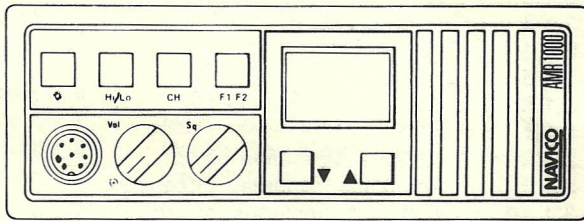
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AMR 1000 / 1000S
OWNERS MANUAL

NAVICO

2m FM Transceiver

Model AMR 1000 & 1000S



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1. INTRODUCTION.

Thank you for choosing a **Navico** transceiver.

This transceiver has been designed and manufactured in our own purpose built factory in Britain to the same high standard as our marine radio products that are respected the world over.

Applying our extensive experience to the amateur radio market has produced a transceiver that is ergonomically designed and simple to operate.

Both the **AMR1000** and **AMR1000S** feature a well illuminated, easy to read display and large, well spaced push buttons making operation simple, and with **safety when mobile** a design priority.

Full use of the latest microprocessor techniques with a proven transceiver design has produced the **AMR** range that is set to lead the field in terms of features, technical performance and ease of operation.

This manual has been written for both the **AMR1000** and the **AMR1000S**. If you have purchased an **AMR1000S** please follow the instructions for the **AMR1000** first, as basic operation and main controls are the same for both models, with the exception of the illumination controls.

Please read this manual carefully before connecting up or using the radio. The few minutes it takes to do this will ensure that you are familiar with operating procedures and greatly enhance the pleasure you will get from using the transceiver.

1.2. Unpacking and Inspection

Contents

- 1 **AMR1000** or **AMR1000S** Transceiver with Standard Mounting Bracket.
- 1 FTM3 Fist Mike with Up/Down Controls
- 1 DC Power Lead with Inline Fuse
- 1 Spare 7.5A Fuse
- 1 Microphone Mount
- 1 Owners Manual
- 1 Pack QSL Cards

Immediately after unpacking, record the Serial Number which may be needed in case of subsequent query or theft. Stolen equipment is often detected when returned for service, provided the Serial Number has been made available. The Serial Number is indicated on a label on the underside of the equipment and also engraved on the battery cover.

Note: Neither the **AMR1000** nor the **AMR1000S** requires a battery to be placed in the battery compartment.

1.3 Licencing

To operate this radio you must hold an appropriate amateur radio

licence. It is an offence to install and operate this equipment if you do not have a licence and this could result in heavy fines and confiscation of equipment.

Details of how to obtain an amateur radio licence in the UK can be provided by the following organisations.

The Department of Trade and Industry
Radio Communications Division
Amateur Radio Licensing Section
Room 613
Waterloo Bridge House
Waterloo Road
London SE1 8UA.
Telephone 01 215 2316

Radio Amateur Licensing Unit
Post Office Counters Ltd
Chetwynd House
Chesterfield
Derbyshire S49 1PF
Telephone 0246 217555

Radio Society of Great Britain
Lambda House
Cranborne Road
Potters Bar
Hertfordshire EN6 3JE
Telephone 0707 59015

City and Guilds of London Institute
Division 23
46 Britannia Street
London WC1X 9RG.
Telephone 01 278 2468

1.4 Accessories Available from your Navico Dealer

	Navico Part Number
Extension Loudspeaker	LS100
Extension Loudspeaker (weatherproof)	LS200
Dash mounting Bracket	DMB6500
Flush mounting Kit	FMB6500
Mains Power Supply Unit	PSU1208
24v / 12v converter	SMR1208
Telephone Handset	THS 3

2. INSTALLATION

2.1 General

The **AMR1000/S** has been designed to allow mounting in many different situations. The front panel can be reversed to ensure that the controls and display will always face the user.

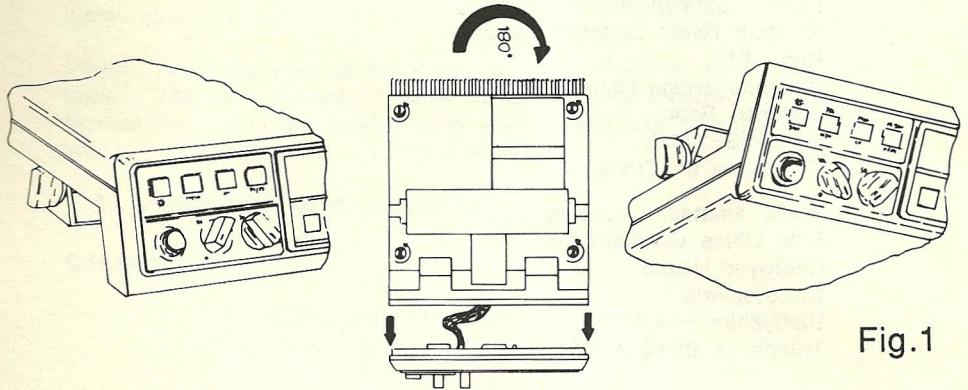


Fig.1

To do this (see Fig 1) loosen the four screws (by about 1.5 turns) which hold together the top and bottom of the case. Partly separate the two halves just sufficiently to ease out the front panel. Invert the front panel and replace it carefully, paying particular attention not to trap or strain the connecting ribbon cable. Retighten the screws.

Inexpensive optional mounting brackets will enable installation just about anywhere.

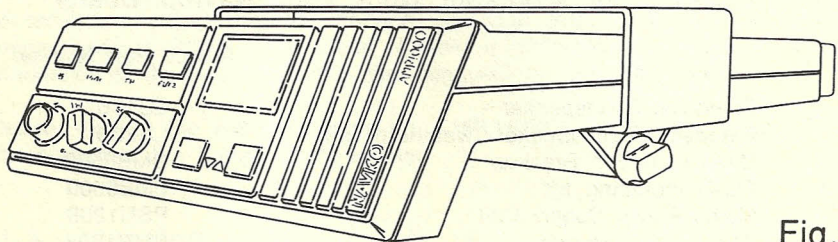


Fig.2

These include a Dash mount bracket (**DMB6500**) (See Fig.2), and a flush

mount bracket (**FMB6500**) allowing a particularly neat installation in a console (see Fig 3).

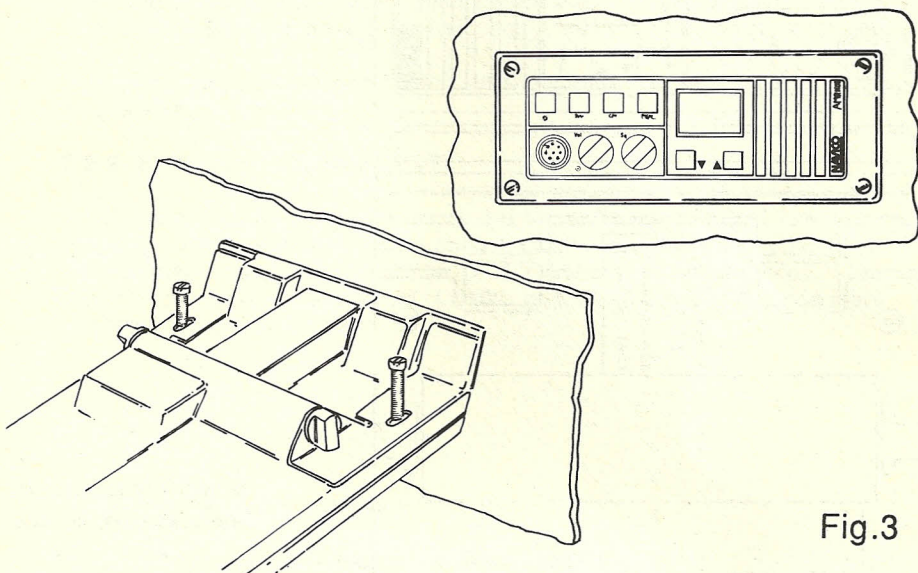


Fig.3

When installing the **AMR1000/S** in a vehicle use the power lead supplied, connecting it directly to the battery - red to positive, black to negative. Although the **AMR1000/S** is designed to eliminate much of the electrical noise produced by alternators, spark plugs, etc, try and route the power lead away from any source of interference. To prevent a voltage drop keep the power leads as short as possible. If it is found necessary to increase the length of the power lead, use wire that is at least 2.5mm^2 cross sectional area to minimise any voltage loss.

Likewise, the antenna lead should be routed to avoid sources of interference and should be as short as possible.

Irrespective of where the transceiver is mounted adequate allowance for ventilation around the heatsink fins must be made to provide sufficient cooling - otherwise operation may be impaired.

2.2 Connections

There are four connection points on the transceiver (See Fig.4).

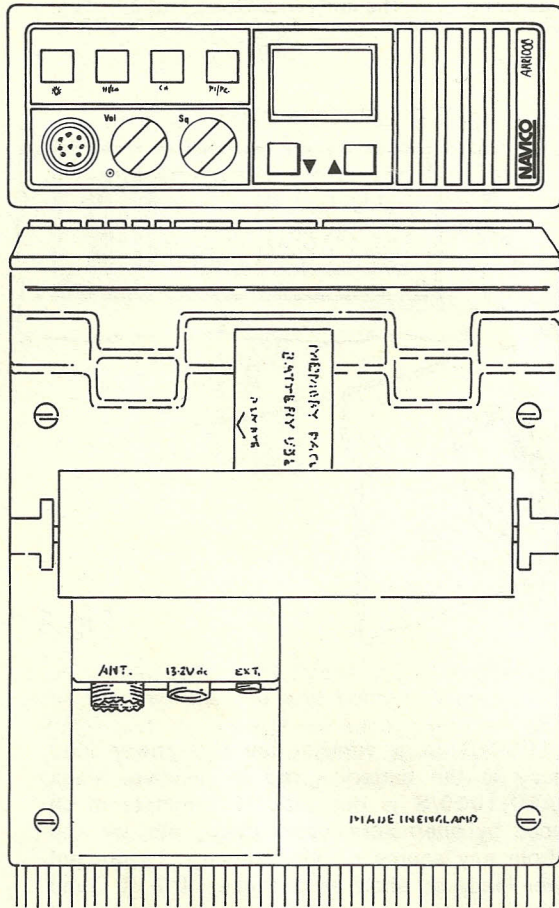


Fig. 4

D.C. INPUT VIEWED LOOKING INTO CONNECTOR ON BASE

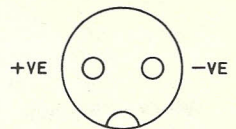
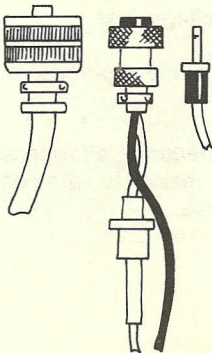


Fig. 5



2.1.1 Microphone

The microphone connects into the chassis mounted plug on the front panel. The plug has a location pip to provide correct alignment to the

socket. Please take care to position this correctly and avoid overtightening the lock nut.

The **Navico THS 3** Telephone Handset can be used in place of the fist microphone allowing private reception in a noisy environment.

The remaining connection points are located on the base of the transceiver.

2.2.2 Extension Speaker (EXT)

An extension speaker may be connected via a 3.5mm standard jack plug. Plugging in an extension speaker will disconnect the built-in speaker. The extension speaker should be of 4 OR 8 Ohms impedance. We recommend using the **Navico LS100** or **LS200** extension speakers available from your dealer.

2.2.3 Power Inlet (Marked 13.2v)

This accepts the pre wired power lead supplied.

This is wired as in Fig.5.

The **AMR** range has been designed to operate with a nominal 12v. It will however work satisfactorily between 10.8v and 15v. This will accommodate low battery voltage and the higher charging voltages found in most vehicles.

If being used on a vehicle with 24volt supply we recommend using a **Navico SMR1208**. This provides 12.6v at up to 8 amps from a supply voltage of 15v DC to 32v DC. Efficient conversion of voltage is achieved by using switch mode techniques.

If used as a base station, the transceiver will require a mains power supply unit. We recommend using the **Navico PSU1208**. This is designed to provide 12.6v at 8 amps, continuous. Using a power supply of higher voltage (eg: 13.8v) will not result in higher output power as the output power is well regulated. It will however result in the transceiver having to dissipate more heat.

2.2.4 Antenna (ANT)

The antenna socket requires a standard PL259 plug to connect to the antenna. The antenna should be of 50 Ohms impedance and of low VSWR.

Although the RF output device can withstand open or short circuit

conditions for short periods of time you should take great care to avoid this occurring. The following guidelines should be followed.

- 1 Follow the antenna manufacturers instructions
- 2 Check and adjust if necessary for minimum VSWR.
- 3 Use high quality feeders and connectors.
- 4 Regularly inspect the antenna, the feeder and connectors.

Fig.6

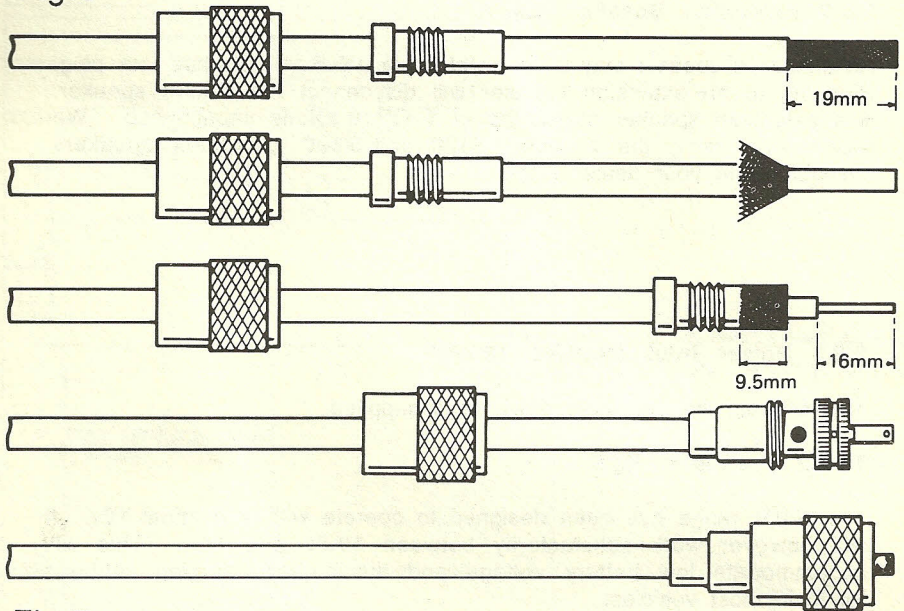
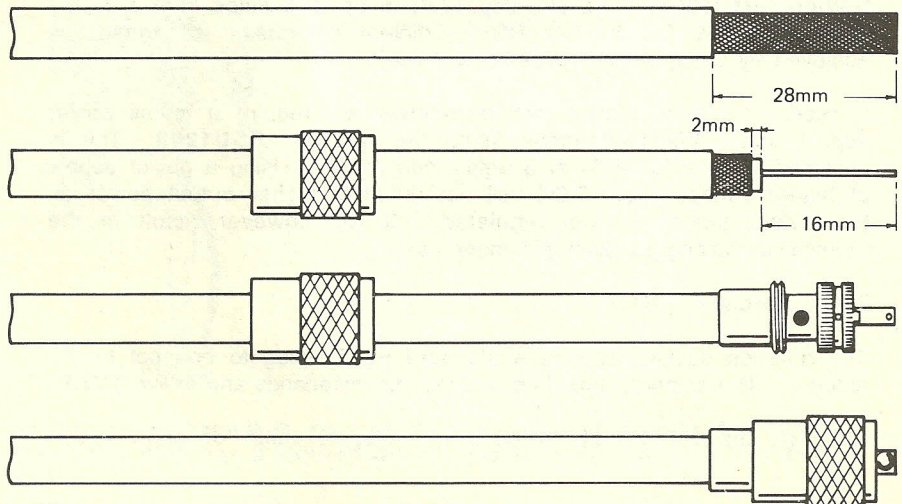


Fig.7



Any radio system is totally dependent on its antenna system so choose very carefully the type of antenna which best suits you. Mount the antenna as high as possible and as clear of any obstructions as is practicable.

For mobile use RG58 or UR43 cable will be the most practical choice. This will require a PL259 plug (which may need a reducer). Connection details are shown in Fig 6.

For base station use or where long runs of cable are used, RG213 or UR67 cable should be used as they have lower losses. Fig.7 shows how they should be terminated.

3. OPERATION

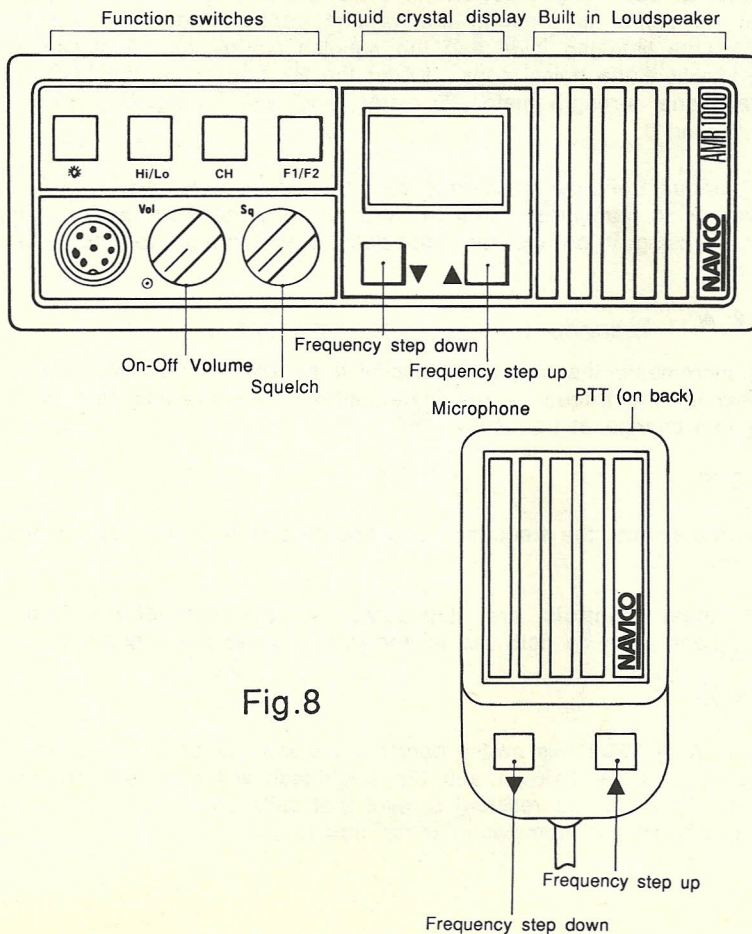
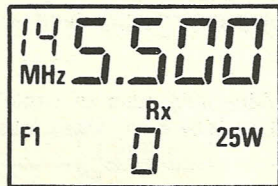


Fig.8

3.1 AMR1000

The front panel controls are shown in Fig.8. When the transceiver is first switched on, the display will show as follows:



This indicates that the frequency is set at 145.500MHz, F1 (VFO setting) is selected, the set is in receive mode (RX) and is ready to transmit at 25W output power. If there is noise from the loudspeaker, when no signal is present, the volume control should be set for a comfortable listening level and the squelch control turned clockwise to a point where the noise stops. Under the RX Legend on the LCD is the digital signal strength meter (S meter) and with no signal present this should read 0.

The various front panel controls can now be experimented with. It is advisable to familiarise yourself with all the controls and functions prior to using it on the air, especially if you intend to use it whilst mobile.

3.1.2 ▲

This increments the frequency displayed by 25kHz when pressed once. If held in, the frequency will increment at an increasing rate enabling very fast change of frequency.

3.1.3 ▼

This decrements the frequency and operates in a similar way to the ▲ control.

Both these controls are duplicated on the microphone and the instructions apply to both the microphone and the panel controls.

3.1.4 ☀

On the **AMR1000** this switch operates the illumination of the LCD. The switch should be held in and the brightness will increase through six levels. When it has reached a level that suits you, release the switch. To switch off the illumination press again.

The illumination of the LCD on the **AMR1000S** is enabled in a different manner, see Section 3.2.6.

3.1.5 Hi/Lo

This selects the output power. At switch-on 25w is selected and when the *Hi/Lo* switch is pressed this will change to 5W and the display will change accordingly. A second press will return to 25w, etc.

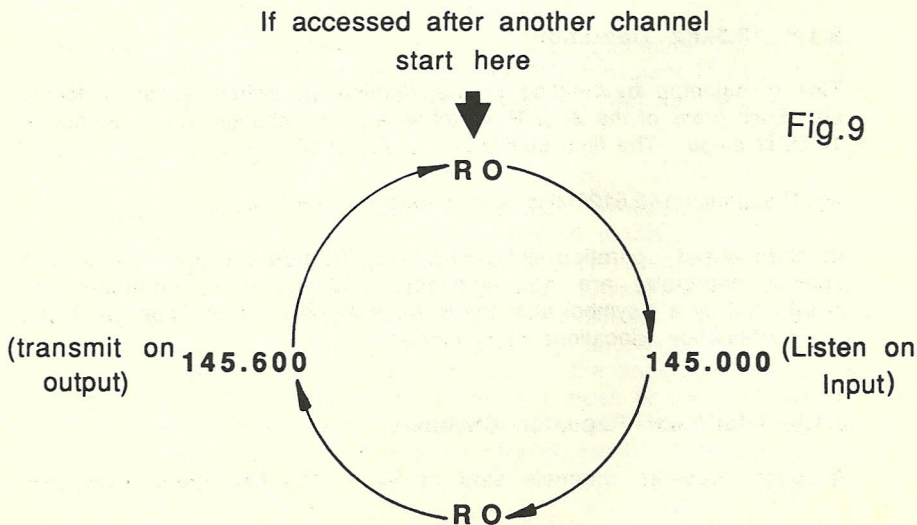
3.1.6 CH

This switch will change the frequency display to channel numbers in accordance with the IARU band plan. Thus 145.500 will be displayed as S20, 145.525 as S21, etc. In channelised mode, only the channelised FM portion of the band is operative, enabling rapid channel selection, by missing out the satellite sub band and 144 to 145MHz.

To change back to frequency operation press the *CH* switch again.

When operating in the channelised mode and a repeater channel has been selected, then the 600KHz repeater offset is automatically implemented and intelligent toneburst enabled.

As a repeater channel has two frequencies (one for receive and one for transmit) associated with it, it can be cross referenced from two frequencies. The sequence of changing repeater channel to frequency is indicated in Fig.9.



ie: If RO has just been selected then the first press of *CH* will result in the display showing 145.000MHz. This will act as a simplex frequency, but allow a listen on input (of repeater) facility.

The next press of *CH* will revert to correct repeater operation. On a further press of *CH* the display will show 145.600. This will act as a simplex frequency, but allow a transmit on output (of repeater) facility. A further press of *CH* will again revert operation to RO.

If the repeater channel is changed then the loop (as shown in Fig.9.) will always be entered at the top.

With careful use of the *CH* control in conjunction with the *PTT*, reverse duplex operation can be achieved although this practice is not recommended as it can cause interference and annoyance to other users.

3.1.7 F1/F2

This switch selects the VFO setting to be used. Although the **AMR1000** has no memories one of the VFO settings can be used to store a favourite frequency, which is remembered whilst the radio remains on.

Select the desired frequency or channel, using \blacktriangle , \blacktriangledown and *CH*. Press *F1/F2* switch to store this in memory. If F1 had been showing then the required frequency has now been allocated to the F1 memory and the display will now show F2. Conversely if F2 had been showing then the required frequency will now have been allocated to the F2 memory and display will now show F1.

3.1.8 12.5kHz Operation

This is selected by holding in the illumination switch whilst switching on. Each press of the \blacktriangle or \blacktriangledown switches will now change the frequency in 12.5kHz steps. The final 500Hz is not displayed.

eg: Frequency 145.5125MHz is displayed as 145.512.

In channelised operation extra channels (located between the 25KHz spaced channels) are now available. These extra channels are designated by a ° symbol after the channel number. (See Appendix 3 and 4 for frequency allocations of channels).

3.1.9 Additional Repeater Channels

Although repeater channels stop at R7 in the UK, many European

countries have also designated R8 and R9. France has also designated specific channels Fr8b, Fr9b, and Fr10 to 14. (See Appendix 3)

The **AMR1000** can enable these channels as options and insert the correct repeater offset. As many of them fall into parts of the band plan reserved for other uses eg: ATV calling channel (Fr9b input) ssb (Fr9b output) we would recommend only selecting these options in an area where their use will not upset local working conditions.

R8 is enabled by holding in *Hi/Lo* whilst switching on.

R9 is enabled by holding in *CH* whilst switching on

Fr8-14 are enabled by holding in *F1/F2* whilst switching on.

All of these additional channels and 12.5kHz operation can be enabled simultaneously by holding all four switches in together and switching on, or alternatively any combination can be set. Once the radio is switched on these switches will return to their normal functions.

3.1.10 Transmitting

The radio can only transmit when the press to talk (*PTT*) switch is depressed on the microphone.

Whilst transmitting all normal operation of switches, with the exception of illumination, is inhibited. However a toneburst (1750 Hz) can be sent by one of two methods.

Manual Toneburst.

When transmitting if either the **▲** or **▼** switch (on either the radio or the first microphone) is pressed then a 1750Hz toneburst is sent for as long as the switch is held in, subject to a minimum of 400mS.

Intelligent Toneburst.

If a repeater channel has been selected then the intelligent toneburst facility is automatically enabled. **Navico** have introduced this unique feature to provide the simplest possible use of repeaters. The first time that transmit is selected (on a particular repeater channel) then a toneburst (1750Hz for 400mS duration) is transmitted. Provided that when in receive the squelch remains open then another toneburst is not sent when reverting to transmit. However, if the squelch closes for a period of over 10 seconds then on the next press of the *PTT* switch another toneburst will be sent. Should the channel be changed then the intelligent toneburst controller automatically resets and the above sequence is repeated.

3.2 AMR1000S

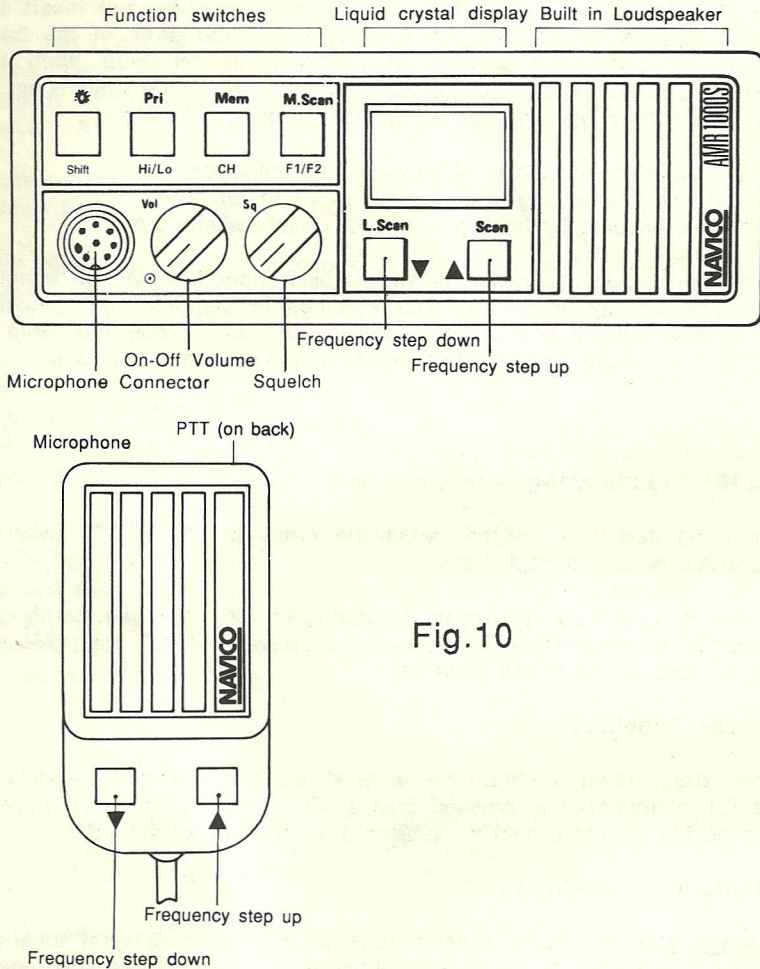


Fig.10

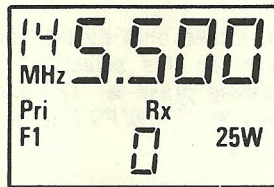
3.2.1 General

The **AMR1000S** operates in a similar way to the **AMR1000** but each control now has two functions. The second function is obtained by using the *Shift* switch in combination with one of the other switches. After *Shift* has been pressed the other switch must be pressed within 2 seconds.

If the second switch is pressed after a period of more than two seconds from pressing the *Shift* switch then the first function of this (second) switch will be enabled, and not the second function.

3.2.2 Priority Watch

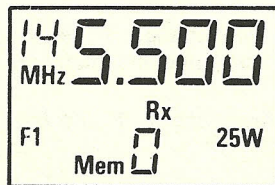
This is selected by pressing *Shift* then *Pri*, and confirmed by the LCD indicating *Pri*. The Priority Watch Channel will then be scanned once every second. This function can be cancelled by again pressing *Shift* then *Pri*.



The purpose of priority watch is to allow constant monitoring of one channel (eg: calling channel, a local net channel or Raynet frequency), at the same time as listening on any other channel. Should a signal open the squelch on the priority channel then this frequency will be locked until the squelch again closes.

3.2.3 Memory Channels.

Pressing *Shift* then *Mem* gives access to up to ten memory channels. The LCD will show *Mem*, and the S Meter section will show the memory channel number. The \blacktriangle and \blacktriangledown switches are used to select the required memory channel. Five seconds after the last press of either \blacktriangle or \blacktriangledown the S Meter function will return to normal operation and the radio will remain on the chosen frequency or channel. Further use of \blacktriangle or \blacktriangledown will change the frequency or channel as normal and not to the next memory channel. To select another memory channel you must press *Shift* and *Mem* again.



3.2.4 Scanning

There are three basic modes of scanning; M.Scan (scanning of memory channels), L.Scan (scanning of channels between two limits), and Scan All.

Scanning can be enabled to look for either a busy or a vacant channel. Each scanning mode can also be enabled in conjunction with priority watch. Thus a total of 16 combinations for scanning can be implemented.

For all scanning modes the following rules apply.

Scan for busy channel: the 2nd function switch is pressed and released. The **Scan** legend displays.

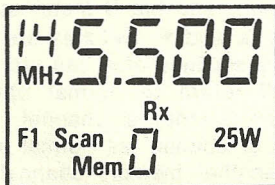
Scan for vacant channel: the 2nd function switch is held in for approximately 2 seconds until the **Scan** legend flashes.

Once a channel has been locked onto by the scan routine the radio may pause or stop permanently on this selection. To step onto the next channel and continue scanning press **▲**. To cancel the scan and lock the set onto the channel press **▼**. If the **PTT** is pressed this automatically cancels the scanning routine.

If the Scan stops on a repeater channel then the intelligent toneburst and repeater offset work automatically. If you then go into a simplex channel, operation returns to simplex (ie: without toneburst),..... **all without touching another control!**

Memory Scan

This is selected by pressing *Shift* then *M.Scan*.

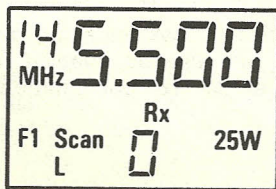


The displayed frequency will then change in sequence according to the frequency or channels programmed into the memory.

Memory scan can be stopped by pressing **▼**, the **PTT** switch or *Shift* then *M.Scan*.

Limit Scan

This is a scan between two pre-set limits set by F1 and F2. Press *Shift* then *L.Scan* to enable limit scan. The display will show **Scan** plus **L**. The scan can be stopped by pressing **▼**, the **PTT** switch or *Shift* then *L.Scan*.



Important Note: For correct operation of this mode it is essential to have a frequency stored against both VFO settings F1 and F2.

Scan All Frequency Mode

With the radio in frequency display mode, pressing *Shift* then *Scan* will start a Scan of the whole band.

Scan - all can be halted by pressing ▼, the *PTT* or *Shift* then *Scan*.

To avoid the scan lock up on beacon frequencies etc, it is possible to delete up to 48 frequencies from this mode.

Scan All Channel Mode

This feature comprehensively provides the facility that most memory channels in other transceivers are traditionally used for. This frees memory channels for other uses. R8, R9 and the French repeater channels can also be incorporated. Only the repeater output channels and simplex channels are scanned, allowing a very rapid scan of the main section of the band.

The functions are obtained and controlled in exactly the same way as for Scan - all, but select *CH* first to go into channel mode.

3.2.5 Scanning from Fist Microphone

Memory Scan and Scan All can also be initiated from the fist microphone; scanning for either a busy or vacant channel. This requires a little dexterity but with practice it is possible to do this with your thumb.

M.Scan:

Hold down ▲ and press ▼. This will initiate scanning for a busy memory channel. If ▼ is held in for about 2 seconds scanning for a vacant memory channel will be initiated.

Scan All:

Hold down ▼ and press ▲. This will initiate scanning for a busy channel. If ▲ is held in for about 2 seconds scanning for a vacant channel will be initiated, confirmed by a flashing scan legend.

3.2.6 Illumination

On the **AMR1000S** the illumination becomes a second function.

Press *Shift* then press *Shift* again and hold in. The illumination will now increase through six levels. Release the switch when you have reached the desired level.

To switch off the illumination, press *Shift* then *Shift* again.

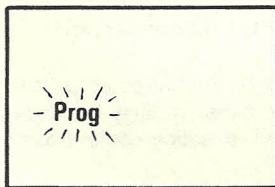
4. PROGRAMMING (AMR1000S ONLY)

Warning. To initiate programme mode really needs the use of two hands. **Navico** do not recommend trying to change any of the programmable options whilst mobile.

4.1 First Level Programmable Functions

Programme mode can only be selected at switch on and is enabled by holding in both ▲ and ▼ switches whilst switching on.

The LCD illumination will come on at full brightness and the **Prog** legend on the LCD will flash to confirm.



If channelised operation is selected in programme mode then R8, R9 and Fr8b - 14 are automatically available in frequency order. 12.5kHz steps are also automatically selected to allow for easier programming

4.1.1 Priority Channel

Press *Shift* then *Pri*.

Display will show

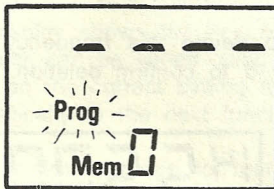


The frequency shown can then be altered using the ▲ and ▼ switches. Once the frequency is selected, it can be written to memory by pressing *Shift* then *Pri* once more. This is confirmed by the display clearing and only flashing "Prog".

4.1.2 Memory Channels.

There are ten memory channels designated 0 - 9. Pressing *Shift* then *Mem* enables frequencies or channels to be entered into memory.

The display will show



The memory number is 0 and a frequency is waiting to be entered. Press ▲ or ▼ to select the frequency or press *CH* if a channel is required. Note a combination of frequency and channels can be stored in different memory channels.

Once the frequency or channel has been selected, press *Shift* then ▲. This selects the next memory location.

The above sequence is then repeated. When memory 9 has been stored by pressing *Shift* then ▲, the display will return to *Mem 0* and the frequency already stored in this memory will be displayed. Pressing *Shift* then ▼ allows you to go back through the memory channels to check or change frequencies.

If you switch off at this point memory data will be lost.

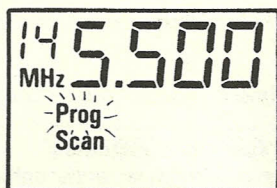
The memory frequencies or channels are only written to memory when you exit this mode by pressing *Shift* then *Mem*. You do not need to allocate a frequency or channel against all memories.

Note: when selecting the required frequency or channel (using ▲ and ▼ switches) the display - - - - corresponds to no data. Set to this display if this memory channel is not required.

4.1.3 Delete From Scan All.

This is a facility which allows up to 48 channels to be skipped during the scan all routine.

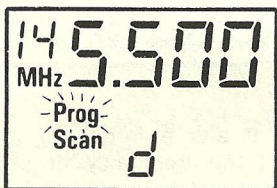
To enter this mode press *Shift* then *M.Scan* the display will show:



Select the desired frequency or channel using the ▲ and ▼ switches.

Press *Shift* then ▼ to delete this frequency. The display (S Meter section) will then show *d* to confirm deletion.

Example:



If you wish to reinstate a frequency or channel that you have previously deleted then select that particular channel or frequency and press *Shift* then ▲. The *d* will then be removed from the display.

When all the available space for deleted channels has been used up the symbol = will appear instead of *d*.



If you wish to skip any more frequencies you will first have to reinstate some.

To write the channel deletions to memory press *Shift* then *M.Scan*. The LCD now prompts with only a flashing "Prog".

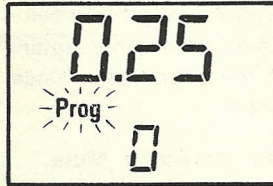
If you only wish to carry out one or two changes to first level programming you can get out of programme mode by switching off then back on again. Alternatively carry on to second level programming.

4.2 Second Level Programming

This allows some of the operating parameters to be changed to suit your preferences. There is a fixed sequence to go through so please read these instructions carefully.

Press *Shift* then *Shift* again.

Display will show



The bottom line of the display shows the Function Number and the top line shows the setting which can be varied using the ▲ and ▼ switches. When you have decided on the correct setting for you, press *Shift* then *Shift* again to go automatically to the next function.

To write all of these function settings to memory it is important to sequence through all functions (0-7). Failure to do this will result in function settings not being memorised.

It is possible to skip through some functions by repeatedly pressing *Shift* until the function number you require is reached. Likewise, this method can be used to exit the routine if only one or two changes need to be made.

4.2.2 Function 0: Scan Rate

The default setting is 250mS but can be set from between 100mS to 2 seconds in steps of 50mS.

When you have set the required scan rate for your needs press *Shift* then *Shift* to go onto the next function.

4.2.3 Function 1: Scan Hold Time

This determines the length of time the scanning function stays locked onto a channel before continuing the scan. The default setting is 5 secs but can be varied from 4 to 20 seconds. If you press ▲ when 20 is showing the display will show ∞. This can be interpreted as infinity, and means the radio will stay on the found frequency until Scan is restarted manually.

Press *Shift* then *Shift* again to store this value and go on to next function.

4.2.4 Function 2: Toneburst Length

The default setting is 400mS but can be varied from 100mS to 1 S in

50mS steps. Use the ▲ and ▼ switches to select the value which suits you and then press *Shift* then *Shift* to go on to the next function.

4.2.5 Function 3: Intelligent Toneburst Time Out

This function decides how long the radio will wait before allowing another tone burst to be made automatically. The default setting is 5 seconds but can be varied between 4 and 20 seconds using the ▲ and ▼ switches. There is another setting after 20 which is - - . This turns the intelligent tone burst off. Once set, press *Shift* then *Shift* to go on to next function.

4.2.6 Function 4: Audio Mute.

On = Squelch operates on both speaker and audio output on microphone connector.

Off = Squelch only operates on speaker. Audio output given continuously on microphone connector.

Press *Shift* then *Shift* to go on to next function.

4.2.7 Function 5: Pre Set Illumination Level

There are six levels of illumination (as well as off!) which can be preset. This means that in normal operation when illumination is required, pressing *Shift* twice will bring the illumination to the preset level instantaneously, rather than holding in the *Shift* on the second press.

Use the ▲ and ▼ switches to select the desired level and press *Shift* then *Shift* to go to next function.

4.2.8 Function 6: Start Up Frequency.

Although the start up frequency is normally 145.500 this can be changed, to any other frequency (or channel) using ▲ and ▼ switches and CH Switch. When this has been selected, press *Shift Shift* to go on to next function.

4.2.9 Function 7: Start Up Options.

The display will show as follows:



The four 0000 represent the four function switches and the start-up options they control. The programming software allows one or more of these options to be preprogrammed on switch on.

The first 0 is flashing. If the ▼ is pressed this will change to a 1 flashing, indicating that 12.5kHz steps has been programmed. If the ▼ is pressed again it will revert to 0 and 25kHz steps will be selected. To move to the next selection press ▲ the second 0 will then flash. This can set R8. Press ▼ to select, the display will change to 1 and R8 is programmed. Press ▲ to go onto the next 0. This allows selection of R9 using the ▼ switch. Pressing ▲ moves onto the fourth 0 allowing selection of the French repeater channels.

Examples.

1 0 0 1 shows 12.5kHz steps and French channels selected.

0 1 1 0 shows 25kHz channel spacing with R8 and R9 selected.

1 0 0 0 shows 12.5kHz steps selected.

This selection will loop through with every press of ▲. To get out of this loop press *Shift* then *Shift* again. This will now return the radio to normal operation (ie: out of programme mode) and will write all parameters of second level programming to memory.

5.1 Technical Description AMR1000

The electronics is divided into two sections, the main Rx-Tx PCB and two smaller PCBs in the front panel, comprising the control circuitry. The block diagram shows the general arrangements (Fig 11).

A surface mounted microprocessor controls all the functions of the radio including the squelch and S Meter. The noise level and squelch control are read by an A/D converter for display and control of the muting functions.

The microprocessor reads the front panel controls, including those duplicated on the fist mike and updates the LCD display. The synthesizer data is calculated from the displayed frequency including any repeater offset. If PTT is being pressed then this data contains the transmit and power control instructions.

The receiver uses a dual gate MOSFET, as an RF amplifier following a two stage band pass filter. The output passes through a three stage bandpass filter into the J.FET Mixer to produce an output at 21.4MHz. This is filtered by a narrow band crystal filter before passing to a specialist integrated circuit IF amplifier and ceramic filter. The demodulated output passes through a de-emphasis network, and is then amplified to feed the loudspeaker and headphone outputs.

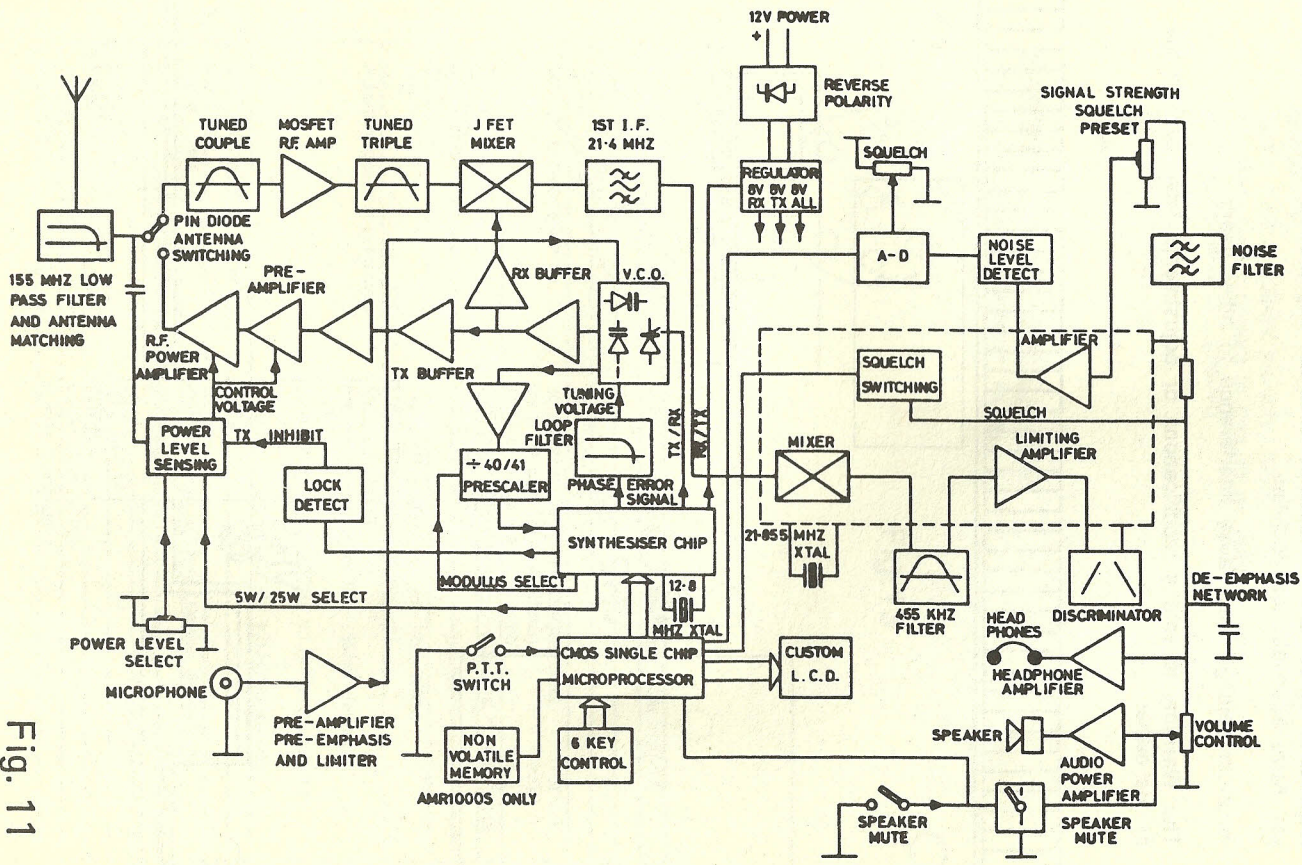
The local oscillator is a varicap tuned J.FET oscillator with PIN diode switching to the transmit frequency range. Its output is fed via a divide by 40/41 prescaler into the synthesizer IC which produces an error voltage which after filtering drives the varicap.

The output is also switched either to the mixer when in receive or to the transmit preamplifier.

The output power is amplified by a hybrid module and routed to the output filter via PIN diode switching of the Receive/Transmit paths. A small amount of power is picked off and fed into the power control circuitry which then regulates the voltage to the last driver transistor and the first stage of the module. The preset resistor VR2 controls the setting of the 5W output power.

The microphone signal is amplified with pre-emphasis. This output is passed through a variable limiter and then low pass filtered (above 3KHz). This output drives a second varicap in the oscillator to modulate the frequency. Preset VR3 determines the maximum deviation.

Fig. 11



5.2 Modulation Limiting and Power Control

Important Note: Do not attempt to adjust any preset controls unless you have adequate test facilities.

Incorrect settings may cause interference to other users.

The Warranty is void if modifications or adjustments have been made by the owner.

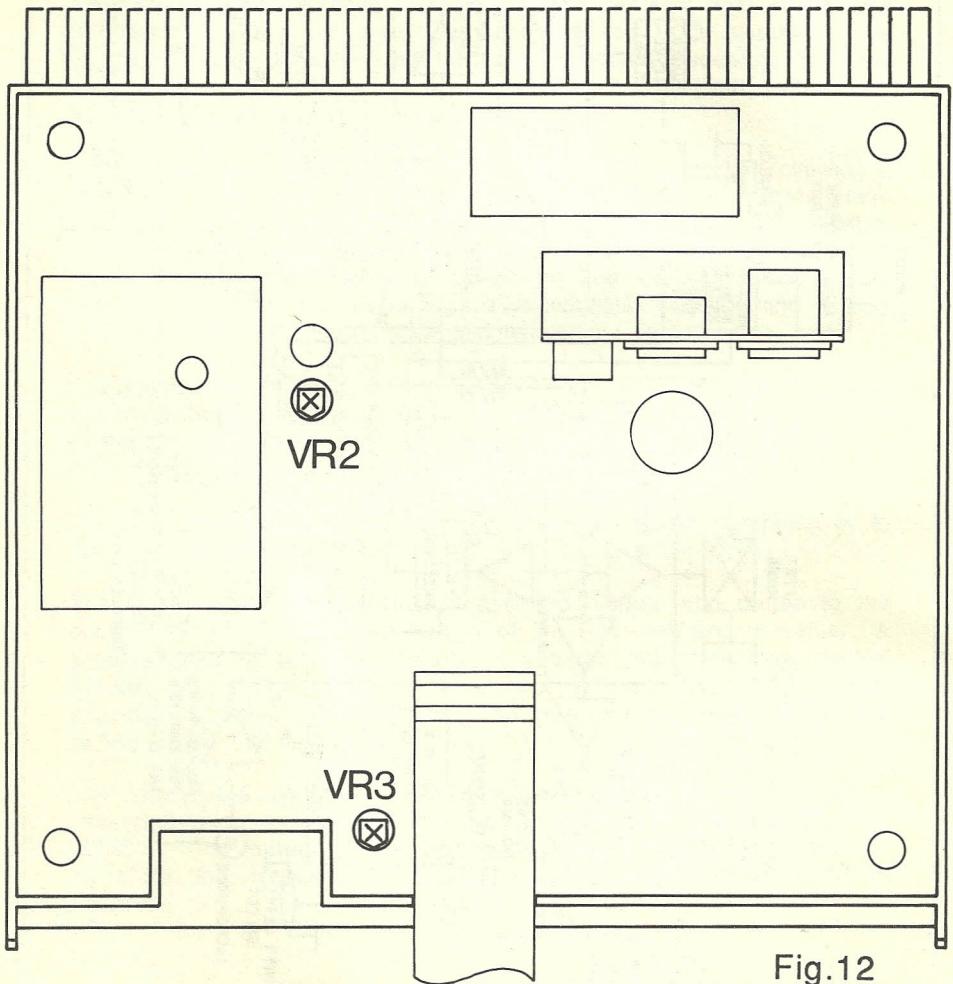


Fig.12

5.3 Microphone Pin Out.

1. Ground 0V
2. Audio output 500mVrms into 300R
3. Speaker mute (connect to ground to mute speaker)
4. PTT (Grounded to transmit)
5. Microphone
6. +12V @ 100mA
7. Up
8. Down

MICROPHONE PIN OUT VIEWED LOOKING
INTO CONNECTOR ON FRONT PANEL

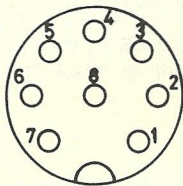


Fig.13

5.4 Specification

Technical specification -	typical figures	AMR1000, AMR1000S
General		
Frequency range	144 - 146MHz	
Supply voltage	12V +30% -10%	
Current consumption	standby (no illumination, squelched)	150mA
	transmit 5W (into 50 ohms)	2.5A
	transmit 25W (into 50ohms)	5.5A
Mode of operation	F3E (with 750 μ s pre-emphasis and de-emphasis)	
Temp range	-10°C to +50°C	
Receiver		
Sensitivity	-124dBm (.14 μ V PD) for 12db sinad (1kHz tone \pm 3kHz deviation)	
Adjacent channel selectivity	\pm 12.5kHz 50dB (interfering signal 400Hz \pm 3kHz deviation) \pm 12.5kHz 60dB (interfering signal 400Hz \pm 1.8kHz deviation) \pm 25kHz 70dB (interfering signal 400Hz \pm 3kHz deviation)	
Intermodulation rejection	70dB	
Blocking	90dB	
Audio output	max 4W (into external speaker 4 ohms)	
Co channel rejection ratio	-8dB	
Transmitter		
Output power	25W or 5W	
Harmonic radiation	75dBc	
Hum & noise level	better than -40dB	
Modulation	\pm 5kHz maximum	

6. USING YOUR AMR1000/S

To get the best use of your radio, and to ensure that you cause no undue interference to other users, please follow these few simple guidelines. This is however not intended to be a complete guide to operating technique. The best way to become a competent operator is to listen to other users and to follow the example set by the better operators. If you are new to the hobby you may wish to join a local amateur radio society to meet others who share similar interests. The Radio Society of Great Britain can put you in touch with a local society or group.

The space allocated to the 2m band is fixed and thus restricted. Careful use of the band available and consideration for other users will ensure everyone's enjoyment of communications. To this end, the RSGB via the International Amateur Radio Union have formulated a Band plan that ensures that the many modes of operation available can be used to good effect and with minimum interference.

Appendix 1.

IARU/UK Band Plan.

Frequency			
FROM	TO		SEE NOTE
144.000	144.150	CW ONLY	i
144.150	144.500	SSB & CW ONLY	i
144.500	144.845	ALL MODES. NON CHANNELISED	ii
144.845	144.990	BEACONS SUB BAND	iii
145.000	145.175	FM REPEATER INPUTS	iv
145.200	145.575	SIMPLEX CHANNELS	v
145.600	145.775	FM REPEATER OUTPUTS	iv
145.800	146.000	SATELLITE SERVICE	vi

Notes re Appendix 1

- i. The section from 144.00 to 144.500 is for use using cw and ssb only. Use of FM in this portion of the band will cause unnecessary interference to dozens of users at a time.
- ii. The section from 144.500 to 144.845 may be used in the FM mode but please take care to try and avoid spot frequencies used mainly for other modes; eg: Packet, ATV, etc. See Appendix 2.

- iii. The section from 144.845 to 144.990 is used by beacons in the UK. Again do not use FM in this part of the band. Many newcomers to the hobby think that it is a quiet part of the band and therefore okay to use. Not so! Beacons are maintained for the sole purpose of propagation studies and the idea is to listen to them. That's why it's quiet!
- iv. The section from 145.000 to 145.175 and 145.600 to 145.775 are used by repeaters. These are devices that can receive, and relay your transmission simultaneously over a wide area. They are useful for increasing the effective range of your transceiver and have been built mainly to offer this facility to mobile and pedestrian stations. To operate via a repeater, your transceiver needs to transmit a toneburst on the input frequency in order to switch the repeater on; this is called 'accessing'. Most repeaters will require at least 300ms toneburst followed by at least 5 secs of speech to access them. When you release the PTT, the receiver reverts back to the output frequency

If you have correctly accessed the repeater it will normally respond in Morse code with the letter K (- - - , Dah-di-Dah). It will then be open to receive another transmission. If it does not hear a reply it will stay open for about ten seconds then send its own callsign in Morse code and close down.

There are dozens of repeaters up and down the UK, all built and maintained by radio amateurs. If you use a local repeater regularly, you may like to consider joining your local repeater group and making a contribution to its upkeep.

Many repeaters have different operating conditions, impossible to list in this guide but a useful publication is The International VHF FM Guide. This book should be available from your local dealer or direct from the publisher;

Julian Baldwin G3UHK
41 Castle Drive
Maidenhead
Berks SL6 6DB
Telephone 0628 37837

This guide, as well as giving in depth details of all UK repeaters, also covers most of the European repeaters and details of licencing conditions for those who may wish to take their radios abroad. Repeater input and output frequencies are summarised in Appendix 3.

- v. The section from 145.200 to 145.575 is used for normal simplex communications, centred around 145.500MHz (or S20). This is used as a calling channel where CQ calls or calls for a specific station are made. Once contact has been established it is good practice to move to another channel, leaving the calling channel vacant.

Before moving to another frequency please try and ensure that it is not being used by anyone else. Only use as much power as is needed. If a local contact is made, check if communication can be established with the lower power setting, as this will enable stations outside of that range to use the same frequency. Try also to avoid spot frequencies used regularly for other modes eg: FAX, RTTY, etc.

- vi. The section from 145.800 to 146.000 is used by the Amateur Satellite Service. Again, this section should be left free.

Appendix 2: Spot Frequencies with Preferred Modes of Operation.

FREQUENCY	CHANNEL	MODE
144.500		SSTV CALLING
144.600		RTTY CALLING
144.650		PACKET RADIO
144.675		PACKET RADIO
144.700		FAX CALLING
144.750		ATV CALLING
144.775		RAYNET
144.800		RAYNET
144.825		RAYNET
145.200	S 8	RAYNET
145.225	S 9	RAYNET
145.250	S 10	SLOW MORSE,MODULATED TONE
145.300	S 12	RTTY - AFSK
145.500	S 20	CALLING CHANNEL
144.525	S 21	GB2RS NEWS
144.550	S 22	RALLY TALK-IN

Appendix 3: Repeater Frequencies

CHANNEL	INPUT FREQUENCY	OUTPUT FREQUENCY	AMR1000 DISPLAY
R0	145.000	145.600	R0
R0x	145.0125	145.6125	R0 ^o
R1	145.025	145.625	R1
R1x	145.0375	145.6375	R1 ^o
R2	145.050	145.650	R2
R2x	145.0625	145.6625	R2 ^o
R3	145.075	145.675	R3
R3x	145.0875	145.6875	R3 ^o
R4	145.100	145.700	R4
R4x	145.1125	145.7125	R4 ^o
R5	145.125	145.725	R5
R5x	145.1375	145.7375	R5 ^o
R6	145.150	145.750	R6
R6x	145.1625	145.7625	R6 ^o
R7	145.175	145.775	R7
R7x	145.1875	145.7875	R7 ^o

ADDITIONAL REPEATER CHANNELS

R8	145.200	145.800	R8
R9	145.225	145.825	R9
Fr8b	144.725	145.325	Fr8b
Fr9b	144.750	145.350	Fr9b
Fr10	144.775	145.375	Fr10
Fr11	144.800	145.400	Fr11
Fr12	144.825	145.425	Fr12
Fr13	144.850	145.450	Fr13
Fr14	144.875	145.475	Fr14

Appendix 4 : Simplex Channels.

CHANNEL	FREQUENCY	AMR1000 DISPLAY
S8	145.200	S8
S8x	145.2125	S8 ⁰
S9	145.225	S9
S9x	145.2375	S9 ⁰
S10	145.250	S10
S10x	145.2625	S10 ⁰
S11	145.275	S11
S11x	145.2875	S11 ⁰
S12	145.300	S12
S12x	145.3125	S12 ⁰
S13	145.325	S13
S13x	145.3375	S13 ⁰
S14	145.350	S14
S14x	145.3625	S14 ⁰
S15	145.375	S15
S15x	145.3875	S15 ⁰
S16	145.400	S16
S16x	145.4125	S16 ⁰
S17	145.425	S17
S17x	145.4375	S17 ⁰
S18	145.450	S18
S18x	145.4625	S18 ⁰
S19	145.475	S19
S19x	145.4875	S19 ⁰
S20	145.500	S20
S20x	145.5125	S20 ⁰
S21	145.525	S21
S21x	145.5375	S21 ⁰
S22	145.550	S22
S22x	145.5625	S22 ⁰
S23	145.575	S23
S23x	145.5875	S23 ⁰

Appendix 5.

MCW Operation

Modulated Carrier Wave operation has become more popular over the last few years as a means of using FM transceivers for morse code operation.

MCW techniques rely on having a continuous carrier, and a tone must be injected into the audio input. The PTT must be held closed whilst the audio tone is keyed on and off.

The AMR1000/S requires approximately 1mV of audio (into 600R) to give 3kHz deviation. Higher audio levels may cause distortion as the audio limiter circuitry takes effect.

A wide range of morse keys and electronic keying systems are available from Dewsbury Electronics of Stourbridge, England. As a manufacturer of specialist morse equipment, they are an excellent source of information and products. Their Star Masterkey product range is compatible with the AMR1000/S.

Appendix 6.

Mobile Operation

For safe mobile operation it is preferable not to use a fist mic whilst driving. A number of alternatives already exist on the marketplace.

The microphone supplied will give optimum results as the audio circuitry is tailored to the insert used. Many accessory microphones have too wide a frequency range for effective communications use, especially at the low frequency end. This contributes to distortion of the transmitted audio. You must therefore bear in mind that using another microphone will change the quality of your audio signal.

Most "boom" microphones will be compatible and we have tested the Adonis FX1 model. The gain settings of these units (if they incorporate a pre-amp) must be set as low as possible to avoid distortion.

Many of these microphones can be modified to be powered from the AMR1000/S microphone connector, simplifying installation. If you choose a model with up/down scanning switches, these facilities will also be available to you. There is no need to provide a toneburst from an accessory microphone as this is generated in the transceiver.

Appendix 7.

Packet Operation

Although designed with clear speech communication in mind, the Navico AMR1000/S series of two metre transceivers are fully compatible with all commercially available packet radio equipment in the UK.

TNCs and multimodes tested include:

PACCOMM: Tiny 2, Micropower 2, TNC200, TNC220, TNC 320 and Handipacket

KANTRONICS: KAM, KPC4, KPC2 and KPC2400

AEA: PK80, PK88 and PK232

The AMR1000/S series needs no internal modification such as additional capacitors or resistors. All connections to the TNC can be made via the microphone connector on the front panel. Some connection details are as follows:

	AMR1000/S 8 pin Mic	Paccomm 5 pin din	KANTRONICS 9 way D	PK88 8 pin Mic	PK232 5 pin molex
Ground	1	2	6	1	4
RX Audio	2	4	5	8	1
PTT	4	3	3	3	5
Mic Audio	5	1	1	2	2

Both receive and transmit audio levels at the mic connector function independently of the set's main volume control, so the only adjustment needed will be to the squelch control which should be set to approx 11 o'clock position, ie: closed. If you do not wish to monitor activity on the loudspeaker, plug a pair of headphones or a suitable audio load into the EXT socket of the AMR1000/S.

We are indebted to Siskin Electronics Ltd of Southampton for their help with testing TNCs, and for providing the connection details. As the leading importer and retailer of packet radio equipment in the UK they have a wealth of experience in this field and are a good source of advice and information on this subject.

SERVICE WARRANTY UK

Your AMR1000/S needs no regular servicing. It is guaranteed for 12 months from the date of retail sale. In the event of a failure, contact the retailer from whom the transceiver was purchased who will carry out the necessary repairs. Alternatively return it direct to Navico at Margate CARRIAGE PAID. Please make sure the transceiver is well packed, preferably in original packaging and you must enclose a copy of proof of purchase documentation, or a charge may be made for service.

If a fault occurs outside the country of purchase, return the unit to the official Navico agent in the country of use. The appointed agent will rectify the fault and make a charge for labour and return carriage and packing. Any component that has failed under the terms of the Warranty may be replaced free of charge.

If your Navico instrument is purchased outside the country of your permanent residence, the agent is at liberty to charge for the repair, parts and labour at local rates. Reimbursement will not be made.

A list of official international Navico distributors and service centres is available upon request.

