

ICS

**FAX-2 Weather Facsimile
and Navtex System**

USER MANUAL

Version 1.0



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Introduction

The FAX-2 has been designed to provide up to date weather and navigation warning information on small vessels at sea. It is designed for simplicity of operation. Once programmed, it should provide reliable printed information day after day.

Installation is straightforward. Connect it to a 12 or 24 volt DC supply, plug it into the extension loudspeaker socket of an SSB receiver (tuned to the right frequency), switch it on, and it will start printing weather maps without further manual intervention. If the optional external Navtex receiver is connected, Navtex messages will also be printed automatically. If they are received while a map is printing, they will be printed at the end of the map.

Left in this state, the FAX-2 will quickly overwhelm you with information. It can therefore be programmed to print only those maps and Navtex messages which you want to receive. It is also convenient to program the main facsimile channels into the memory of your receiver for future use.

Permanent installation of the FAX-2 can be made with the 'U' bracket provided. Alternatively, an optional panel flush mount kit may be purchased.

The optional Navtex receiver is best mounted on the pushpit of a yacht or on any convenient rail where the antenna will remain in the clear and out of danger. It is best mounted on a metal object, to which it should be electrically connected.

Besides reading this manual, you will find the following books to be of interest:-

- "Admiralty List of Radio Signals, Volume 3"
- "Guide to Facsimile Stations", Klingenfuss
- "Reading the Weather", Alan Watts

The first of these is the standard reference work for marine weather facsimile services. It is regularly updated.

Specification

Reception Modes	Facsimile Navtex RTTY FEC British Telecom Marine Page
Facsimile Modes	Auto, 60, 90, 120, 240 RPM Auto, 576, 288 IOC
Navtex Reception	Conforms to CCIR 540-1 <i>Tune receiver to 516.1 kHz (USB) or use optional Navtex receiver</i>
Printing Modes	Normal size map Double size (two halves) Double size (left half) Double size (right half) Double size (centre portion) 40 or 80 column text
Timer	Six programmable on periods per day with external receiver frequency control
Options	518 kHz Navtex receiver 441 kHz Marine Page receiver FAX-2 flush mounting kit
Front Panel	Two line back lit LCD display Membrane key pad
Rear Connections	Audio in Power in Receiver frequency control Navtex in Marine Page in Printer in

Receiver Interface	Extension speaker connection. RS-232 frequency control of Icom R-72 and ham radio transceivers
Temperature Range	0 to 40 degrees Centigrade
Mounting	Shelf mount standard Panel mount option
Weight	3.0 Kg
Power	8 - 34 volts DC < 0.01 watts in standby (OFF) < 2.5 watts in standby (ON) 1A average, 4A peak while printing

Specifications may be changed without notice.

Choice of Radio Receiver

Weather facsimile reception is not particularly demanding of receiver performance, other than in terms of frequency stability. Any good quality communications receiver which is capable of receiving SSB (Single Sideband) transmissions will prove suitable. Ease of use is more important than overall performance, and the following features should be looked for:-

- Multiple memories, capable of being programmed to within 100 Hz. This means that you can pre-set all the most useful fax station frequencies in advance.
- An external loudspeaker connector. Preferably with a switch to turn the internal loudspeaker on and off. Most receivers automatically switch off their internal loudspeaker when an external speaker is connected.
- Frequency coverage from 100 kHz to 30 MHz. There are also some useful facsimile transmissions below 150 kHz.

Most facsimile stations transmit the same information on several frequencies simultaneously. It is important that you have all frequencies for each station programmed into memory, so that you can switch quickly between them to determine which is giving you the best signal at the time. At first sight, low cost portable receivers may seem suitable, but most of them can only be programmed to within 1 kHz, with tricky fine tuning being necessary in order to find the correct frequency. These work reasonably well with strong signals, but are frankly inconvenient to use. Some other aspects of the receiver performance also leave a lot to be desired.

There is no doubt that a good quality receiver from Lowe, Kenwood, Icom or Yaesu will give the best results obtainable. Any marine HF transceiver will also work very well indeed.

Using an Icom receiver will give you the added advantage that you can set up the timer within the FAX-2 to automatically tune to the correct frequency for each reception period.

Antennas

A number of 'Active' antennas are on the market. These are compact and work well enough. If you purchase one, make sure that it covers the full frequency range which you require. If you are ever likely to upgrade to an HF transceiver on your boat for long range communication, note that an active antenna cannot be used for transmitting.

A better solution is to use an insulated backstay on a yacht or a long whip antenna on a power boat. In either case, a good electrical ground is advisable, to reduce the possibility of interference from other equipment on board. You can use the keelbolts on a yacht if the keel is not encapsulated. A better idea is to use a metal earthing plate. These are porous plates, which are made by various manufacturers, and which have a contact area with the water which is far greater than their small physical size suggests.

Electrical Noise

Once you have the receiver and antenna connected up, listen on a quiet frequency which is close to one of the facsimile broadcast frequencies.

Turn equipment on and off around the boat and make sure that there is no big increase in back ground noise from the receiver. Problem areas are likely to be the engine alternator, flourescent lights and water pumps. If you have a problem, you may have to decide whether to fit suppressors, or to simply specify that your crew do not switch on the offending item while a weather map is printing.

Installation

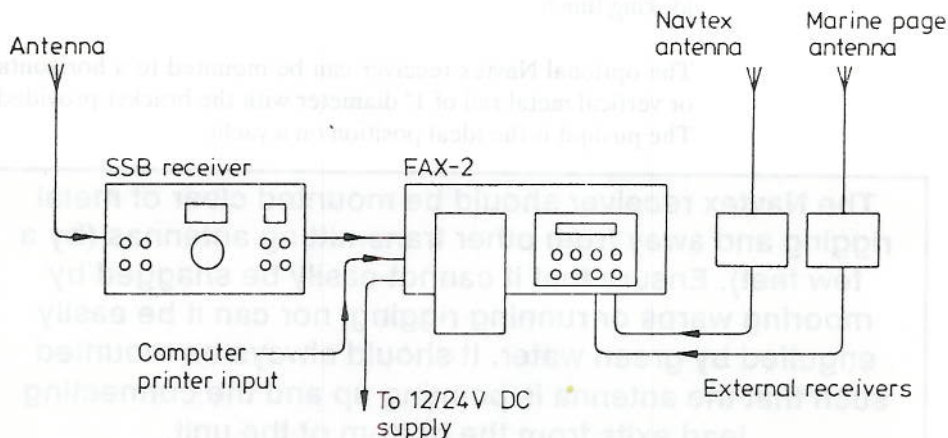
Installation of the FAX-2 is straightforward, and can be carried out by almost anyone with simple 'D.I.Y.' skills. For simple installations, only a drill and screwdriver are needed.

The FAX-2 should not be mounted in a position where driving spray can reach it in a rough sea, or where it can be in direct sunlight.

It may be worth checking that the FAX-2 is operating correctly before making final mechanical mounting of the unit, or even taking it to the vessel. For this reason, we are showing the electrical connections first. You may like to become familiar with it at home before taking it to your vessel. Be aware, however, that maps printed at sea are generally of better quality than those printed on land or in a marina, due to lower background electrical noise levels.

Electrical Connections

An overview of the FAX-2 system connections follows:-



See the later chapter, "Interface Connections" for precise details of the connections to the rear of the FAX-2 unit.

Most of the wiring is supplied as a ready made harness connected to the main FAX-2 interface connector. The power connection must be made to a 12 or 24 volt DC supply via a circuit breaker capable of supplying at least 5 amps.

The audio lead plugs directly into the output of the receiver. If this cuts off the internal loudspeaker of the radio, you may like to connect an external loudspeaker with a switch. Always use cable ties to restrain the wiring from any vibration which might weaken it over a prolonged period. If you doubt your abilities, you should employ a qualified marine electrician.

Connections from the optional Navtex receiver are made directly to the screw connections on the FAX-2 mating connector. If the connections are correct, the FAX-2 should indicate this on switch on with a suitable message on the LCD display.

Mechanical Mounting

The 'U' bracket supplied can be used to mount the FAX-2 above or below a horizontal (or near horizontal) surface. If you are contemplating mounting the unit through a flat panel, it is strongly advised that you purchase the ICS panel mount kit. This will make your job much easier and will give a better looking finish.

The optional Navtex receiver can be mounted to a horizontal or vertical metal rail of 1" diameter with the bracket provided. The pushpit is the ideal position on a yacht.

The Navtex receiver should be mounted clear of metal rigging and away from other transmitting antennas (by a few feet). Ensure that it cannot easily be snagged by mooring warps or running rigging, nor can it be easily engulfed by green water. It should always be mounted such that the antenna is pointing up and the connecting lead exits from the bottom of the unit.

Initial Operation

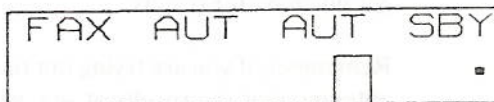
Having connected everything up, you are not far away from printing out your first map.

- ⇒ **Switch on the FAX-2 by pressing P (for POWER).**

The LCD display should light up.

- ⇒ **If you have the external Navtex receiver installed, this should be acknowledged. If you now do nothing else, every Navtex message from transmitters within range should be printed.**

The front panel data display on the FAX-2 should look like this:-



Check with the 'Admiralty List of Radio Signals, Volume 3' for the frequency of a nearby weather facsimile transmitter. Some stations transmit more frequently than others, so choose one that is likely to be transmitting at the time. Bracknell and Offenbach put out maps much more frequently than our favourite facsimile station for use in UK waters, which is Northwood.

- ⇒ **Turn your receiver on and switch to USB mode. Tune it to 1.9 kHz lower than the frequency listed for the station you are looking for. Adjust the audio volume to a comfortable listening volume.**

Either the station will be pausing between maps (in which case, you will hear a steady tone and a black square will appear in the right hand half of the tuning display), or a map will be in progress (indicated by a rhythmic crunching noise). If you hear this, just press **S** (START/ STOP) and the map will be printed

at the time when the crunching noise stops. The map might not be synchronised correctly, as you started it part way through.

⇒ **The next map transmitted should be printed after it has been received into memory.**

If all you can hear is a steady tone, just leave the system running for a while. It will automatically print the next map to be transmitted. This time, it should be correctly synchronised.

If you have the Navtex option fitted, any Navtex messages coming in while a map is printing should be printed out at the end of the map.

If the maps which you printed were not very good (a smudged appearance, or a lot of background noise) don't be disappointed. You just chose the wrong frequency for the time of day. Try another frequency for the same station and you should get much better results.

Remember, if you are trying out the system on land with a poor antenna, that the results at sea, with an excellent ground and very little man made electrical noise, will normally be superior.

Paper Loading

The FAX-2 should come with one roll of paper fitted. When this paper roll is completely used up, the FAX-2 will sound an alarm and printing will stop. Early warning that the paper is about to run out will be given by red stripes on the paper.

If the paper runs out in the middle of a map, don't worry. You won't lose any information.

- ⇒ **Simply remove the existing paper by opening the paper load door on the front of the unit and by lifting the lever which is then exposed on the left of the roll holder.**
- ⇒ **Remove the old paper roll spindle and load a new paper roll. The paper should exit from the top of the paper roll towards you.**
- ⇒ **Turn the paper through 180 degrees and insert it into the slot above, as far as it will go.**

It is important that the edge of the paper is straight and undamaged.

- ⇒ **Push the paper load lever down, and your map (or other information) should start printing where it left off.**

You can also advance the paper (if the unit is not printing) by using the **F** button on the front panel.

New supplies of paper can be ordered directly from ICS or our dealers. In an emergency, a roll of office facsimile machine paper can be cut up and used.

Front Panel Display and Controls

Overviews of the front panel data display and push button controls are shown below:-

LCD Data Display (Operation Modes)

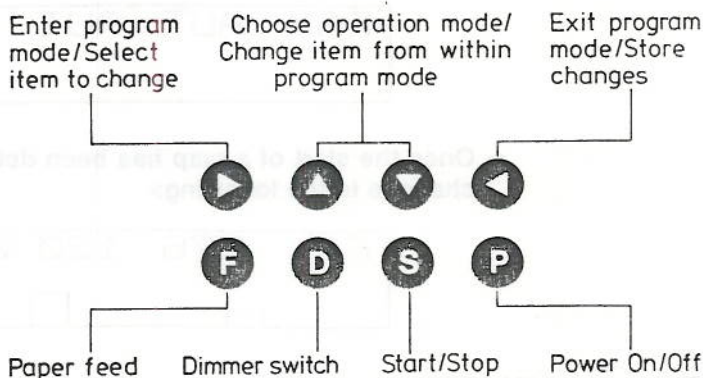
FAX AUT AUT SBY :	FACSIMILE
NAVTEX LAST MSG LE25 27MAY 14:51	NAVTEX
RTTY REV 45 SBY □ :	RTTY
FEC SBY □ :	FEC
TIMER1: FAX 03:13 024 MIN	TIMER
11:45:30 06 JUN 1991	TIME AND DATE
11:46:30 PRINTER MODE	PRINTER
MARINE PAGE USE EXT RECEIVER	MARINE PAGE

You can move between these modes by using the ↑ and ↓ buttons.

You can select between each of these operation modes by using the \uparrow and \downarrow buttons on the front panel. Precise operation is described in later sections of this manual. In Facsimile, RTTY, FEC and Timer modes, the bottom half of the display is used as a histogram type tuning indicator. The signal frequency is represented in the horizontal direction, with amplitude represented in the vertical direction.

Front Panel Controls

The main operation of the front panel controls is shown in the following diagram:-



Detailed operation is described in the following chapters.

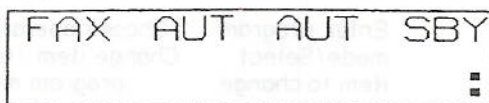
In addition, the front panel controls can be used to activate a printing self-test mode (keep **F** depressed when turning the power on with the **P** button).

They can also be used to reset the factory default configuration of the unit (keep \leftarrow depressed when turning the power on with the **P** button).

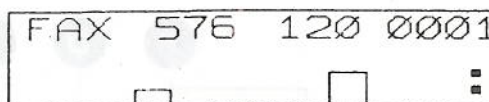
Facsimile Operation

As explained in the 'Initial Operation' section of this manual, weather facsimile reception is possible by simply connecting the FAX-2 to a suitable receiver tuned to the correct frequency, and switching it on. It is, however, possible to select between a number of features within the facsimile mode in order to optimise the printed output to your needs.

- ⇒ On entering the facsimile mode by using the ↑ and ↓ buttons, the following LCD display screen should appear:-

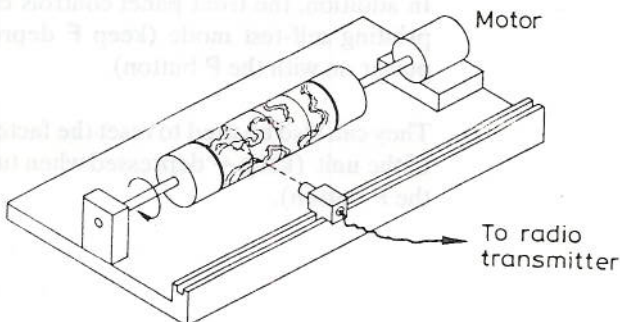


- ⇒ Once the start of a map has been detected, the display changes to the following:-



Theory of Weather Facsimile

To get the very best from your weather facsimile system, you should at least try to understand the basics of how maps are transmitted. A diagram of a transmitting station follows:-



A weather map is transmitted by taping the original to a revolving drum and by then moving a photodetector along the axis of the drum. A transmitted tone is varied in frequency, depending on the intensity of light received by the photodetector.

The map is thus transmitted as a successive series of helical strips across the map, rather like a television picture. The receiving station re-assembles the information to form a facsimile of the original map.

One transmitted tone represents a black area of the image, another represents white. Both frequencies can be seen on the tuning display of the FAX-2 whilst a map is being received.

At the beginning of a map, the transmitting station sends out some special tones which the receiving station needs to understand. These represent:-

IOC (Index of Co-operation).

This indicates the scanning line density i.e. is proportional to the speed at which the photo detector moves along the drum.

RPM (Revolutions per Minute)

This is the scanning line rate i.e. the speed at which the drum rotates.

Start

This indicates the start of the map.

All of these tones can be detected automatically by the FAX-2, or can be selected manually.

If signals are very poor, manual selection of START may be the only way to receive the map. This is achieved by pressing S.

At the end of a map, a STOP tone is sent. This is automatically detected by the FAX-2. It may also be forced manually by pressing **S**.

Facsimile Program Mode

Original default settings within the facsimile mode are as follows:-

Receiver: NOR (Upper Sideband)
IOC: Automatic Detection (default = 576)
RPM: Automatic Detection (default = 120)

In the facsimile program mode, you can change the default settings.

- ⇒ **First select Facsimile Operation Mode with the ↑ or ↓ buttons.**
- ⇒ **Press the → button to enter Program Mode, then move between parameters by pressing this same button again. The selected parameter will flash on and off.**
- ⇒ **Use the ↑ or ↓ buttons to change individual parameter settings.**
- ⇒ **Press the ← button to store the new settings.**

Normal and Reverse Tones

The first parameter can be set to NOR or REV (normal or reversed tones). Use NOR if your receiver is switched to upper sideband and REV if you want to use lower sideband.

Map Size

The next parameter permits selection of the map size as follows:-

SETTING	EXPLANATION
X1	Prints map the width of the paper. Receives it first into memory, then prints at the end of transmission with correct orientation.
DIR	As above, but prints the map line by line as it is received. The resulting map is upside down.
X2	Receives the map into memory and prints it at the end of transmission with twice the normal paper width. The image is printed in two strips, one after the other. These can be glued together to produce a double width image.
X2R	As for X2, but prints the right hand half of the map only.
X2L	As for X2, but prints the left hand half of the map only.
X2C	As for X2, but prints the centre of the map only.

IOC and RPM

IOC can be selected as AUT (automatic detection), 288 or 576.

RPM can be selected as AUT (automatic detection), 60, 90, 120 or 240.

Printed schedules for most weather facsimile stations usually also indicate the IOC and RPM setting for each map.

For most purposes, IOC and RPM can be set to AUTomatic. If the selection tone is incorrectly received, the FAX-2 will default to IOC: 576, RPM: 120. These settings are used by most weather facsimile signals.

Effects of Radio Propagation

The quality of the HF radio signals which you receive depends on:-

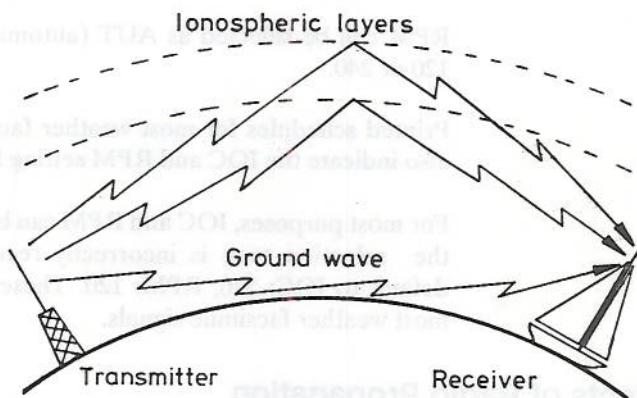
- The frequency of transmission
- Your distance from the transmitter
- The time of day
- The season
- The sun's level of magnetic activity.

For these reasons, most weather facsimile transmissions are made concurrently on several frequencies. It is worth programming all of each station's frequencies into your receiver's memory and switching between them to determine which is giving the best results.

During pauses between maps, a single solid black square should be seen in the right hand half of the tuning indicator. You will also notice that a good facsimile signal sounds like a clean rasping sound - without interference or fading.

It is not only the received signal strength which matters. The worst enemy of clear reception is multi-path propagation.

If signals are received via reflections at several heights in the ionosphere at once, or directly by ground wave and indirectly via the ionosphere at the same time, a poorly defined or 'smudged' map will result. Sometimes, a clear double image can even appear.



Examples of multi-path propagation.

You will need to experiment to discover which frequencies give best reception at a given time of day. In general, you will find that higher frequencies are best for longer distances and lower frequencies are better at night.

Navtex Operation

Navtex is a method of transmitting navigational warnings and weather forecasts from designated coast radio stations. All transmissions are made on 518 kHz and each station is allocated several time 'slots' during the day, when it is permitted to transmit. The only exceptions to this are gale warnings and search and rescue messages, which can be transmitted at any time.

Reception of Navtex is limited to an area of 200 - 300 miles radius around each transmitting station, although considerably greater ranges are possible at night.

Routine messages are repeated several times per day. Once a message has been printed correctly, the FAX-2 will not print it again. The FAX-2 permits pre-selection of both message types and transmitting stations in order to avoid printing large quantities of irrelevant information.

There are two ways of using the FAX-2 for Navtex reception:-

If you do not have the optional Navtex receiver fitted

- ⇒ In this case, you must use the ↑ and ↓ front panel buttons until the following display appears:-

NAVTEX	LAST MSG
LE25	27MAY 14:51

- ⇒ If you then tune your HF receiver to 516.1 kHz (upper sideband), Navtex messages should be printed.

You must leave your receiver powered on and tuned to this frequency at all times. If you change to a different frequency to receive weather maps, you may miss important Navtex messages.

If you have the optional Navtex receiver fitted

In this case, Navtex messages will always be received, even if you are using other modes and operating frequencies on your system. If, for example, you are receiving a weather map, then any Navtex messages received will be printed at the end of the map.

Navtex Programming

As explained above, it is possible to restrict Navtex message categories and transmitting stations to those which you wish to receive.

- ⇒ **First select the Navtex operation mode display with the ↑ or ↓ buttons.**
- ⇒ **Enter the Navtex program mode by pressing the → button.**

This brings up the transmitting station selection display.

- ⇒ **By pressing → followed by either the ↑ or the ↓ buttons, you can select or de-select stations. De-selected stations are indicated by a dash (-).**

Each Navtex transmitting station has its own identifying letter. For a complete list of these, see the Navtex Station Designations section at the end of this manual.

If you are not sure which stations serve your area best, just leave them all selected. You will soon see which stations are relevant to you.

At the top of each Navtex message, there is a serial number e.g.

Station (Cullercoats)	Message Type	Serial No.
	GA59	

This identifies which station has transmitted the message.

- ⇒ Once you have completed your selection, press ← to bring up the message category selection screen.

In general, you will probably wish to leave all message categories active for the stations which you have selected. If you wish to program message categories, they are again identified by a single letter, as below:-

A	. . . . .	.Coastal navigation warning
B	. . . . .	.Gale warning
C	. . . . .	.Ice report
D	. . . . .	.Initial distress information
E	. . . . .	.Weather message
F	. . . . .	.Pilot service message
G	. . . . .	.Electronic navigation information
L	. . . . .	.Navarea warning

- ⇒ Select the required message categories in the same way that you selected the transmitting stations.

You will find that message categories A, B and D cannot be de-selected. If you have Decca, Loran or satellite navigation equipment on board, do not de-select category G!

- ⇒ Press ← to store your message category selection.

If you do not have the optional Navtex receiver fitted, an additional display appears at this point. This allows you to enable or disable background Navtex operation. Background operation means that if you have an ICOM receiver with remote frequency control and you are using the timer function, then the receiver will revert to the 516.1 kHz Navtex frequency between maps. Make your selection and press ← to return to the operation mode.

The information provided by Navtex is extremely useful and the service is far easier to use if you purchase the optional external Navtex receiver.

In UK waters, you will find the Radio 4 shipping forecast printed twice per day. Cullercoats radio regularly transmits a list of rig positions for the North Sea.

Some parts of the world are less well served by Navtex than others, but its use is spreading. All Navtex transmissions are in English, with some additional translation into local languages being provided.

A Coastal navigation warning
 B Gale warning
 C Ice report
 D Initial distress information
 E Weather message
 F Pilot service message
 G Electronic navigation information
 L Navtex warning

→ Select the required message categories in the same way that you selected the transmitting stations.

You will find that message categories A, B and C cannot be selected. If you have Forecast, Current or similar navigation equipment on board, do not select category C.

→ Press → to store your message category selection.

If you do not have the optional MFD receiver fitted, an additional display appears at this point. This allows you to enable or disable background Navtex operation. Background operation means that if you have an ICOM receiver with remote frequency control and you are using the timer function, then the receiver will revert to the 518 kHz Navtex frequency between maps. Make your selection and press → to return to the operation mode.

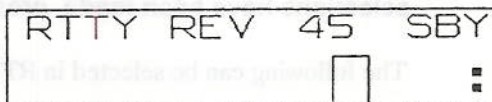
The information provided by Navtex is extremely useful and the service is far easier to use if you purchase the optional external MFD receiver.

In UK waters, you will find the Radio 4 shipping forecast printed twice per day. Continuous radio-telephone transmissions of the shipping forecast for the North Sea.

RTTY Operation

Some weather broadcasts are made in RTTY (radio teletype) mode. This produces inferior results to FEC with poor signals, and requires rather more manual intervention. As well as the frequency and time of transmission, you need to know the Baud rate and polarity of the transmission. They are listed in the relevant publications.

- ⇒ To enter RTTY mode, press the ↑ and ↓ buttons until the RTTY display appears. It will resemble the following:-



- ⇒ Assuming that the settings are correct (normal rather than reverse polarity and 50 Bauds), simply tune the receiver (in USB mode) to the required frequency (-1.9 kHz).

An RTTY signal sounds like an intermittent warbling tone. Black bars of varying height should appear at the centre of the tuning indicator and the two dots (one above the other) at the bottom right corner of the display should appear alternately. If this is not the case, fine tune the receiver.

- ⇒ Once you are satisfied that the tuning is correct and that the transmission has started (there will be a steady tone between transmissions, with only one dot shown on the display), press S to start reception. SBY (standby) will change to ACT (active) on the display and the tuning indicator will change to scrolling text. The message should then be printed.
- ⇒ Press S to stop reception and return to standby mode.

RTTY Programming

⇒ If the default Baud rate and signal polarity are not correct, you must enter program mode from the RTTY operation display by pressing →. This will bring up a display like:-

RTTY	BAUD	USOS
NOR	50	OFF

⇒ Move from one field to the next by pressing → and select from available choices with ↑ and ↓. Once your selections have been made, press ← to store them.

The following can be selected in RTTY program mode:-

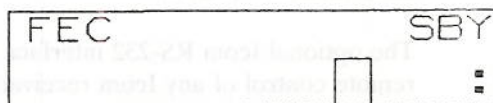
Signal Polarity Normal or Reverse
 Baud Rate 45, 50, 75 or 100 Bauds
 Unshift on Space On or Off

Unshift on space is useful when receiving poor signals and should be turned ON in those circumstances. Its use means that every space between words forces a letters shift, thus preventing a string of text becoming unreadable due to spurious figures shift characters having been received in error.

FEC Operation

Some weather broadcasts are made in FEC (forward error correction) mode. This is a robust method of sending text, which works well with poor signals. At present, Portishead Radio in the UK is putting out its North Atlantic weather forecasts in FEC mode.

- ⇒ To receive FEC messages, simply tune your receiver (in USB mode) to the listed frequency for the station, minus 1.9 kHz.
- ⇒ Select FEC operation mode with the ↑ and ↓ buttons:-



- ⇒ When information is received, it will be printed automatically. The SBY (standby) designation will change to ACT (active) and the tuning indicator will change into scrolling text.

When tuning in an FEC signal, the received signal should show in the centre of the tuning indicator and the two dots in the bottom right corner of the display should both be on. If this does not occur when you hear an FEC signal (a continuous warbling tone), fine tune your receiver until they both appear.

Timer Operation

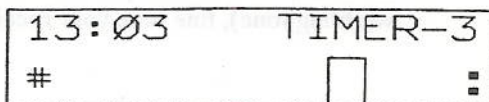
Once you have become familiar with the FAX-2 and determined which stations provide the best weather information for your purposes, you need to start becoming selective. If you were to print out all the weather maps available to you, you would eventually drown in paper!

For this reason, the FAX-2 can be programmed to receive maps during six pre-set periods each day. If you have an Icom receiver or transceiver with external frequency control, the FAX-2 can automatically tune to a different frequency during each timer ON period.

The optional Icom RS-232 interface box is a pre-requisite for remote control of any Icom receiver or transceiver. The connections to the FAX-2 are:-

FAX-2 Pin	Description
6	Transmit Data
9	Common

To activate the timer, move to the timer operational display by pressing the ↑ and ↓ buttons. The display will look similar to this:-



The # sign in the lower left hand corner will only show if the timer ON period has started and the system is waiting for a map (or other text information) to start. If you have not previously changed the timer settings, the programmed system defaults are:-

FAX-2 TIMER SCHEDULE

NO	TYPE	HH:MM	MIN	RFC	FREQ	MODE	SCALE	IOC	RPM	BAUD	USOS
1:	FAX	06:30	24	OFF	00,000.1kHz	USB	x2R	AUT	AUT	----	----
2:	FAX	07:35	20	OFF	00,000.1kHz	USB	x2	AUT	AUT	----	----
3:	FAX	13:03	24	OFF	00,000.1kHz	USB	x2	AUT	AUT	----	----
4:	FAX	13:20	25	OFF	00,000.1kHz	USB	x2R	AUT	AUT	----	----
5:	FAX	14:50	25	OFF	00,000.1kHz	USB	x2R	AUT	AUT	----	----
6:	FAX	17:33	25	OFF	00,000.1kHz	USB	x2R	AUT	AUT	----	----

You can print out this summary of the programmed timer settings at any time, simply by pressing **S** within the timer operation mode. The default settings which you see above will produce a useful series of maps if you tune your receiver to an available channel for Northwood when within a reasonable distance of the UK. Northwood's frequencies are contained in the "Weather Facsimile Frequencies" section at the end of this manual.

If you wish to change any of the timer settings (mode, start time, period or frequency), proceed as follows:-

- ⇒ From the timer operational screen, press → to enter program mode. You should now see a display similar to this:-

TIMER1:	FAX
03:13	024 MIN

If you don't want to change this timer, but only one of the later ones, press ←.

- ⇒ Once you have reached the timer you wish to change, press → to select the parameter(s) you want to change and ↑ or ↓ to implement those changes. Once you have finished, press ← to take you to the next timer and eventually back to operation mode.
- ⇒ If, after programming the timer details, you wish to change the programmed frequency of the receiver, continue pressing → to take you first to the frequency selection display:-

FREQ 00, 000.1 KHZ
OFF MODE USB

⇒ Press → to continue to the program mode display:-

TIMER1:	FAX
03: 13 024	MIN

- ⇒ As soon as you are satisfied with the programmed information, press ← to move to the next display.
- ⇒ Once you have finished programming and have returned to the timer operation screen, press S to print out a summary of the new settings. Check that you have made no mistakes.

Note:

Some weather facsimile stations are not very precise in the timing of their transmissions. Be aware that most weather maps take about 15 minutes to transmit, but allow as much latitude as possible as to when each can start and finish - commensurate with not accidentally receiving the preceeding or following chart. If the desired weather map is not transmitted on time, then it will be late. It will never be early!

Setting the Time and Date

The FAX-2 can keep track of the date and time of day. This information is used:-

- If you decide to use the inbuilt timer to receive weather maps.
- To time and date stamp received information.

The times of most transmissions are listed in GMT (UTC), so you may find it more convenient to use this time system than local time.

- ⇒ **Select the time and date display, using the ↑ and ↓ buttons.**

You should now see a display similar to the following:-

11:45:30
06 JUN 1991

- ⇒ **Press the → button to enter the Time and Date programming mode, then use the ↑ and ↓ buttons to change the area of the display which is flashing.**
- ⇒ **Press → to progress to the next and subsequent information fields which you wish to change.**
- ⇒ **When you are satisfied that the time and date have been programmed correctly, press ← to return to the operation mode display.**

Printer Operation

Note: This section covers selection of 40 column (large) or 80 column (small) printout for all text modes offered by the FAX-2. Read this section, even if you don't intend using the FAX-2 as a computer printer.

The FAX-2 can act as a computer printer, when connected to external equipment. A serial RS-232 data interface is provided.

The data rate is 1200 Bauds and the data format is one start, eight data and one stop bits. There is no parity. Flow control is provided by an XON/XOFF protocol.

The necessary two wire connections are as follows:-

Computer	FAX-2 Pin
Transmit Data	8
Common	9

⇒ In order to use the FAX-2 as a printer, you must first select the printer display as follows:-

```
11:46:30
PRINTER MODE
```

⇒ If you wish to change from 40 column (large) to 80 column (small) printout or vice versa, enter the program mode by pressing →.

```
SETUP
PRINTER WIDTH 40
```

⇒ Use the ↑ and ↓ buttons to make your change, then press ← to store your selection.

Any changes which you have made will apply henceforth to all data printout from the FAX-2, irrespective of mode.

In order to use Marine Page - an experimental service from British Telecom transmitting paging messages to be sent automatically to any vessel calling in UK waters - you require an optional external static channel receiver/antenna. This is connected as follows:

Marine Page Receiver	FAX-2 Pin
Sensor	5
Data Output	12
Power	3
Common	1 and 13

Once this connection has been made, Marine Page will operate in background mode. Whenever mode you are in, a paging message will always be printed as soon as the current operation has ended. The only set up required for Marine Page is to input the select (selective calling code) which is given to you by the paging service provider.

→ Move to the Marine page operation display with the ↑ and ↓ buttons:-

MARINE PAGE
USE EXT RECEIVER

→ Change to program mode by pressing →:

SETUP
SELECT: 12345

→ Use the ↑ and ↓ buttons to change each figure, pressing the → button to advance along the row of numbers.
→ Press → to store the chosen select.

Marine Page Operation

In order to use Marine Page - an experimental service from British Telecom permitting paging messages to be sent automatically to any vessel sailing in UK waters - you require an optional external single channel receiver/antenna. This is connected as follows:-

Marine Page Receiver	FAX-2 Pin
Sensor	5
Data Output	12
Power	2
Common	1 and 13

Once this connection has been made, Marine Page will operate in background mode. Whatever mode you are in, a paging message will always be printed as soon as the current operation has ended. The only set up required for Marine Page is to input the selcal (selective calling code) which is given to you by the paging service provider.

⇒ Move to the Marine page operation display with the ↑ and ↓ buttons:-

MARINE PAGE
USE EXT RECEIVER

⇒ Change to program mode by pressing →.

SETUP
SELCAL: 12345

⇒ Use the ↑ and ↓ buttons to change each figure, pressing the → button to advance along the row of numbers.

⇒ Press ← to store the chosen selcal.

System Alarms

The alarm signal within the FAX-2 will sound under the following circumstances:-

- Incorrect key pressed
- Paper Out
- Printer Off (paper loading lever is up)
- Printer Fault (print head is too hot)
- Low Battery (Supply is < 8 volts)
- Urgent Navtex message

The alarm will be cleared by rectifying the problem leading to the alarm sounding.

Interface Connections

The FAX-2 rear panel interface connections are as follows:-

Pin	Function
1	Ground (Power In)
2	+ ve (Power In)
3	Auxiliary Contact
4	Auxiliary Contact
5	Navtex/ MP sense
6	RS-232 Data to Icom Receiver
7	Not Used (RS-232 CTS)
8	RS-232 Input (Printer Mode)
9	RS-232 Common Return
10	Navtex Data Input
11	Navtex Data Return
12	Marine Page Data Input
13	Marine Page Data return
14	Audio In/ Out
15	Audio Ground.

Notes:

- Pin 1 is located closest to the edge of the FAX-2 case.
- The auxiliary contact is capable of switching up to 24 volts DC at up to one amp and is volt free. It can be used to switch external equipment (such as a receiver, but not a transceiver) on and off under the influence of the timer. The contact is closed during any active timer on period.
- Polarity of the receiver audio input is unimportant. It is DC isolated.
- If the external Navtex receiver is powered by connecting to pins 1 and 2 of the FAX-2, then connect pin 11 to pin 1. If the Navtex receiver takes its power from elsewhere, then connect pin 11 to the negative side of this circuit. Similarly, with the external Marine Page receiver and pin 13.
- If fitting both Navtex and Marine Page receivers, connect both the sense wires to pin 5.

Weather Facsimile Frequencies

Alaska	Kodiak	4298.0
		8459.0
Argentina	Buenos Aires	5185.0
		10720.0
		18093.0
Australia	Canberra	2628.0
		5100.0
		11030.0
		13920.0
		20469.0
	Darwin	5755.0
		7535.0
		10555.0
		15615.0
		18060.0
Bulgaria	Sofia	5092.5
Canada	Halifax	122.5
		4271.0
		6330.0
		10536.0
		13510.0
	Vancouver	4268.0
		6456.0
		12753.0
	Iqaluit	3253.0
		7710.0
Chile	Santiago	4766.0
		6418.0
		8594.0
		13525.0
		22071.0
	Valparaiso	4228.0
		8677.0
		17144.4
China	Beijing	5527.0
		8122.0
		10117.0
		14367.0

		16025.0
		18237.0
Czechoslovakia	Prague	111.8
Denmark	Copenhagen	5850
		9360.0
		13855.0
		17510.0
Diego Garcia		7582.0
		12806.0
		20302.0
Egypt	Cairo	4526.0
		10123.0
Germany	Grenge	2342.5
		2822.0
		3318.0
		4570.5
	Hamburg	3855.0
		7880.0
		13882.5
	Offenbach	117.4
		134.2
Guam	Apra	5258.0
		10253.0
		19858.0
		20525.0
		5262.0
		10257.0
		19862.0
		23010.0
Hawaii	Honolulu	9982.5
		11090.0
		16135.0
		23331.5
	Pearl Harbour	4855.0
		9398.0
		21839.0
India	Delhi	4993.5
		7403.0
		14842.0
		18225.0
Italy	Rome	4777.5
		8146.6

		13597.4
	Vicenza	5237.0
		7625.0
	Catania	9050.0
		17040.5
Japan	Tokyo	3365.0
		5405.0
		9438.0
		14692.0
		18441.2
		3622.5
		7305.0
		9970.0
		13597.0
		18220.0
		23522.9
	Yokosuka	4963.0
		12777.0
		22322.5
Kenya	Nairobi	7464.5
		9045.0
		12317.0
		15527.0
		16317.0
		17367.0
		22869.0
Korea	Soul	5857.5
New Zealand	Auckland	5807.0
		9459.0
		13550.0
		16340.1
Philippines	Subic Bay	10964.0
		15923.0
Reunion	St Denis	8176.0
		16335.0
Saudi Arabia	Jeddah	3560.0
		5452.0
		10296.0
Senegal	Dakar	13669.5
		19751.5
South Africa	Pretoria	4014.0
		7508.0

		13538.0
		18238.0
Spain	Madrid	3650.0
		6918.5
		10250.0
	Rota	4704.0
		5785.0
		8975.5
		9382.5
		9875.0
		12315.0
		16905.0
		17585.0
		19624.0
Thailand	Bangkok	7394.0
		17519.0
Turkey	Ankara	3377.0
		6790.0
USSR	Khabarovsk	4516.7
		7475.0
		9230.0
		14737.0
		19275.0
	Kiyev	3360.0
		6950.0
	Moscow	53.6
		5150.0
		6880.0
		7670.0
		10230.0
		11525.0
		13470.0
		2815.0
		3875.0
		5355.0
		7750.0
		10710.0
		10980.0
		15950.0
		18710.0
		144.5
		4202.5

		12165.0
	Murmansk	10130.0
		10520.0
	Novosibirsk	3635.0
		4475.0
		5335.0
		9060.0
		12230.0
		5765.0
		9220.0
		12320.0
	Rostov	3610.0
		7630.0
		9100.0
	Tashkent	3280.0
		5285.0
		8083.0
		9150.0
		13947.0
		3690.0
		4365.0
		5890.0
		7570.0
		9340.0
		14982.5
	Tbilisi	3745.0
		7495.0
UK	Bracknell	2618.5
		4782.0
		9203.0
		14436.0
		18261.0
		3289.5
		4610.0
		8040.0
		11086.5
		14582.5
	Northwood	4307.0
		6446.0
		8342.5
		2374.0
		3652.0

		12844.5
		17635.0
USA	Mobile	6852.0
		9157.5
	Boston	3242.0
		7530.0
	San Francisco	4346.0
		8682.0
		12730.0
		17151.2
		22527.0
		6453.0
		9090.0
	Norfolk	3357.0
		8080.0
		10865.0
		16410.0
		20015.0

Notes:-

- You will need to tune your receiver to 1.9 kHz lower than the frequencies listed above, using USB (upper sideband).
- For detailed transmission schedules and current frequencies, refer to the "Admiralty List of Radio Signals, Volume 3" or the "Guide to Facsimile Stations" from Klingenfuss.

Navtex Station Designations

Navarea I

Belgium	Oostende	T
Iceland	Reykjavik	R
Netherlands	Ijmuiden	P
Norway	Bodo	B
	Rogaland	L
	Vardoe	V
Sweden	Haernoessand	H
	Stockholm	J
UK	Cullercoats	G
	Niton	S
	Portpatrick	O
USSR	Murmansk	C
	Arkhangelsk	F
	Tallin	U

Navarea II

<i>Cameroon</i>	<i>Douala</i>	-
France	Le Conquet	A
Portugal	Lisbon (Monsanto)	R
	Azores (Horta)	F
<i>Spain</i>	<i>Finisterre</i>	D
	<i>Canary Islands</i>	I

Navarea III

Bulgaria	Varna	J
Cyprus	Troodos	M
Egypt	Alexandria	N
	Ismailia (Serapeum)	-
Malta		O
France	Toulon	-
Greece	Limnos	L
	Iraklion	H

	Kerkyra	K
<i>Isreal</i>	<i>Haifa</i>	-
<i>Italy</i>	<i>Ancona</i>	-
	<i>Augusta</i>	-
	<i>Cagliari</i>	-
	<i>Roma</i>	-
<i>Spain</i>	<i>Tarifa</i>	G
	<i>Cabo La Nao</i>	Z
<i>Turkey</i>	<i>Izmir</i>	I
	<i>Samsun</i>	E
	<i>Istambul</i>	D
	<i>Antalva</i>	F
<i>USSR</i>	<i>Odessa</i>	C
	<i>Marinpol</i>	B
	<i>Novorossiysk</i>	A
<i>Yugoslavia</i>	<i>Split</i>	Q

Navarea IV

<i>Bermuda</i>	<i>St Georges</i>	B
<i>Canada</i>	<i>Sydney, Nova Scotia</i>	K
<i>USA</i>	<i>Boston</i>	F
	<i>New Orleans</i>	G
	<i>Portsmouth</i>	N
	<i>Miami</i>	A
	<i>San Juan, Puerto Rico</i>	R

Navarea V

<i>Uruguay</i>	<i>Colombia</i>	-
	<i>Laguna del Sauce</i>	-
	<i>La Paloma</i>	-
	<i>Montivideo</i>	-
	<i>Punta del Este</i>	-
	<i>Salto</i>	-

Navarea VI

<i>Argentina</i>	<i>Bahia Blanca</i>	D
	<i>Buenos Aires</i>	F

<i>Comodoro Rivadavia</i>	<i>C</i>
<i>Mar del Plata</i>	<i>E</i>
<i>Rio Gallegos</i>	<i>B</i>
<i>Rosario</i>	<i>G</i>
<i>Ushuaia</i>	<i>A</i>

Navarea VII

Navarea VIII

<i>India</i>	<i>Madras</i>	<i>P</i>
	<i>Bombay</i>	<i>G</i>

Note: These transmissions are planned for 4209.5 kHz.

Navarea IX

<i>Bahrain</i>	<i>Hamala</i>	<i>-</i>
<i>Egypt</i>	<i>Ismailia (Serapeum)</i>	<i>X</i>
<i>Saudi Arabia</i>	<i>Dammam</i>	<i>G</i>
	<i>Jeddah</i>	<i>H</i>

Navarea X

Navarea XI

<i>China</i>	<i>Zhanjiang</i>	<i>M</i>
	<i>Guangzhou</i>	<i>N</i>
	<i>Fuzhou</i>	<i>O</i>
	<i>Shanghai</i>	<i>Q</i>
	<i>Dalian</i>	<i>R</i>
	<i>Tianjin</i>	<i>S</i>
<i>Hong Kong</i>		<i>L</i>
<i>Japan</i>	<i>Otaru</i>	<i>J</i>
	<i>Kushiro</i>	<i>K</i>
	<i>Yokohama</i>	<i>I</i>
	<i>Moji</i>	<i>H</i>
	<i>Naha</i>	<i>G</i>
<i>Singapore</i>	<i>Jurong</i>	<i>C</i>

Korea
USA

Guam

-
V

Navarea XII

USA

San Francisco
Astoria
Long Beach
Kodiak
Honolulu
Adak

C
W
Q
J
O
X

Navarea XIII

USSR

Vladivostok
Kholmsk
Petropavlovsk
Magadan
Beringovskiy
Providenya

A
B
C
D
E
F

Navarea XIV

Navarea XV

Chile

Valparaiso
Antofagasta
Talcahuano
Puerto Montt
Punta Arenas

B

Navarea XVI

Peru

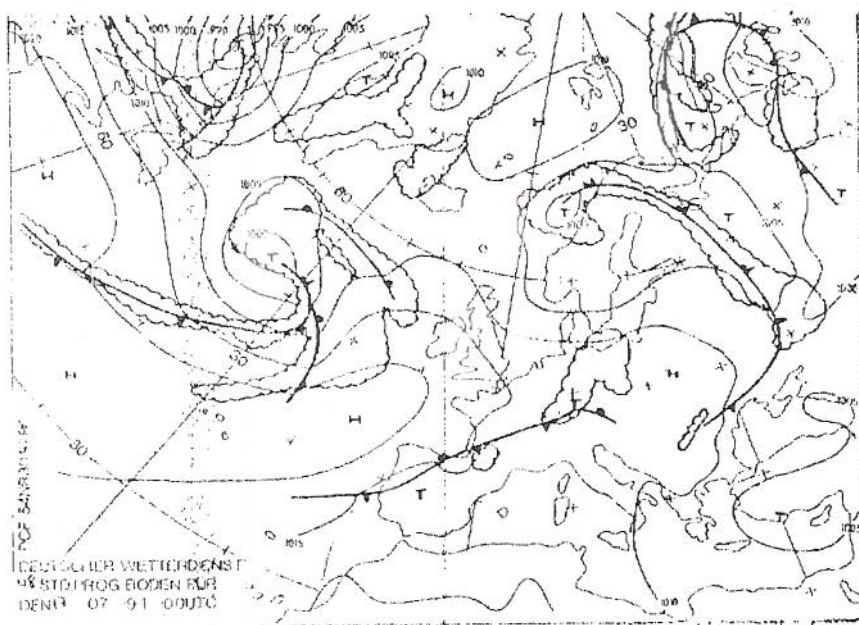
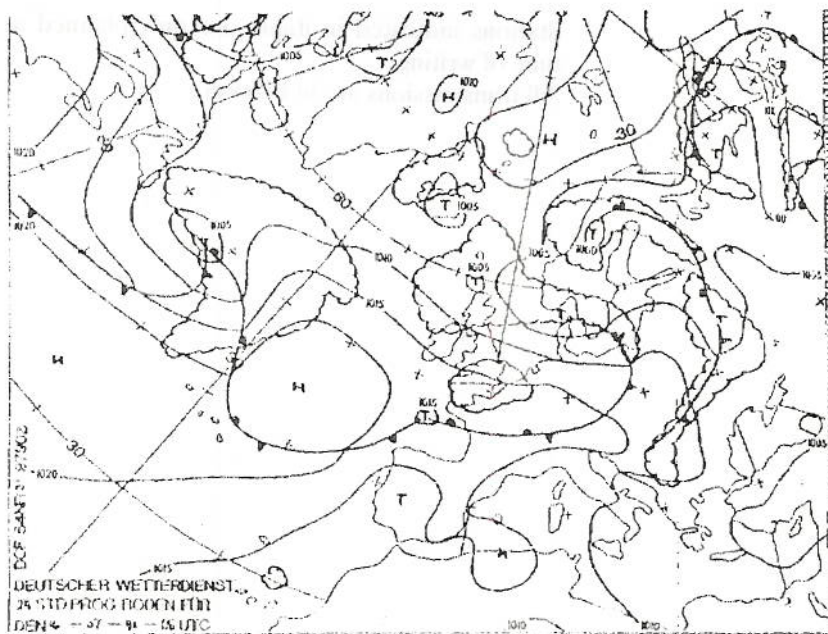
Paita
Calleo
Mollendo

S
U
W

Notes:

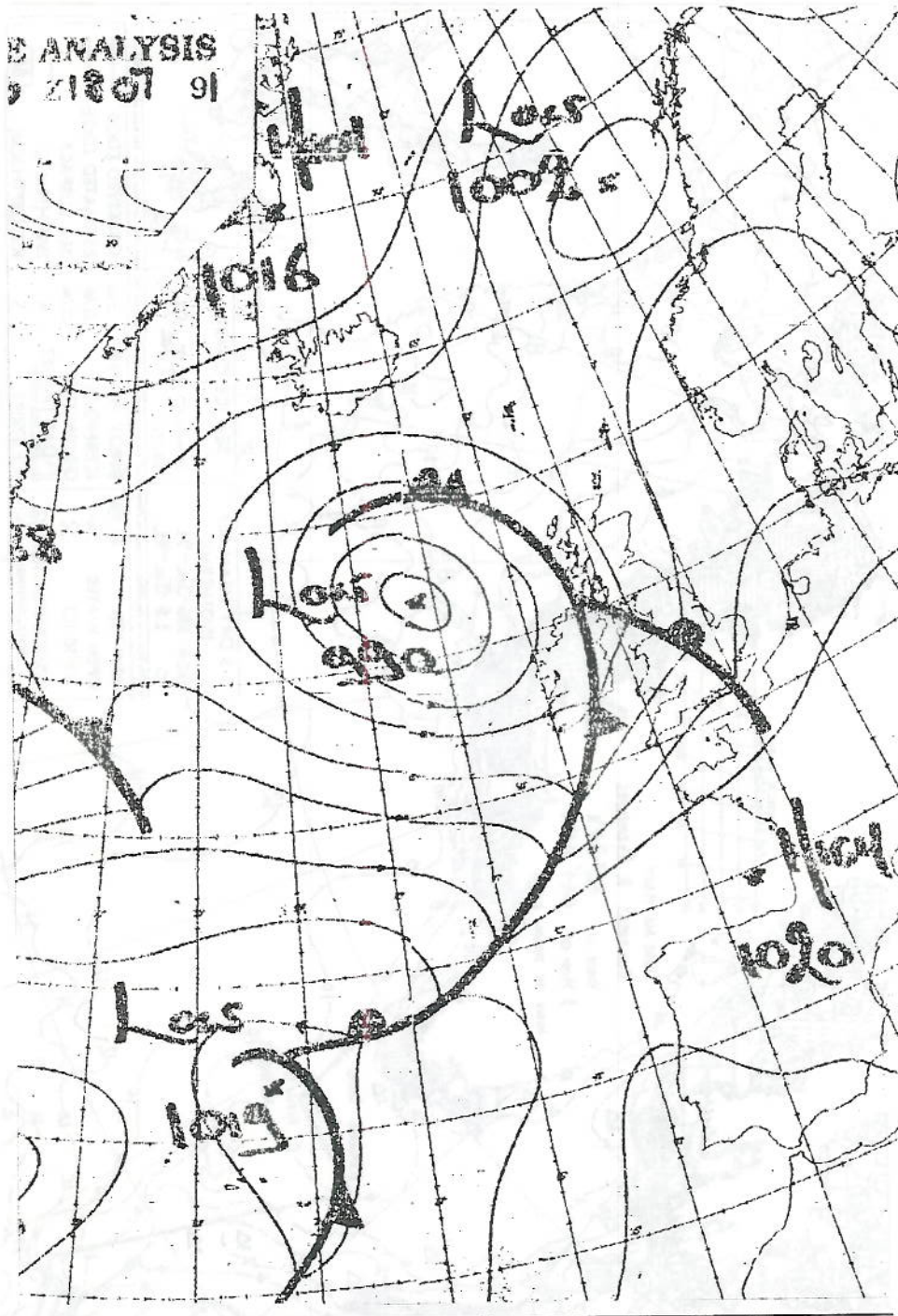
- Stations indicated in italics are only planned at the time of writing.
- All transmissions are in English.

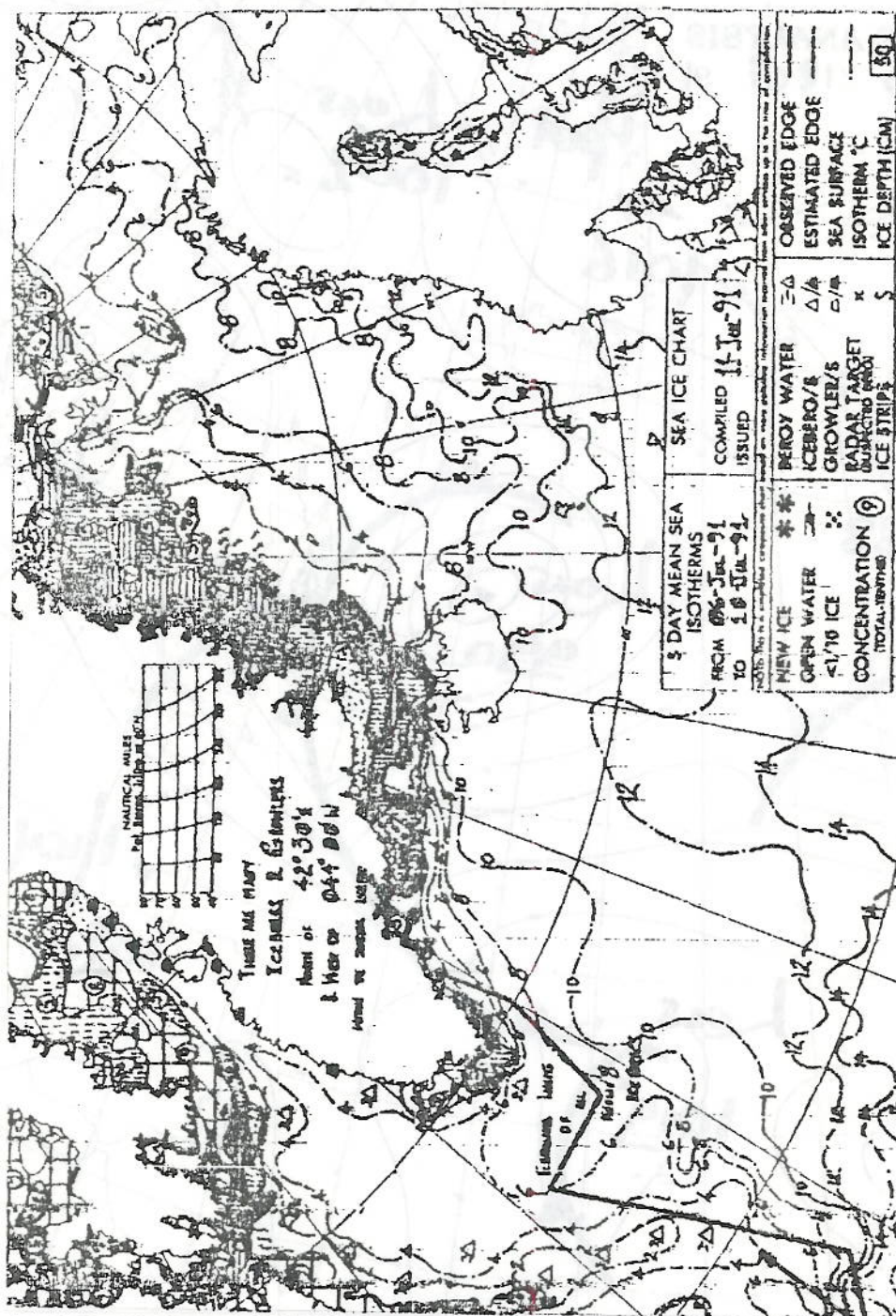
Typical Facsimile Printouts



E ANALYSIS

21807 91





Typical Navtex Printouts

NAVTEX MESSAGE ----- GE71 RECEIVED 13 Jul 20:50

CULLERCOATS RADIO
SHIPPING FORECAST

2040 ON SATURDAY 13 JULY 1991

THE GENERAL SYNOPSIS AT MIDDY
LOW FAEROES 993 EXPECTED SOUTH NORWAY 996 BY MIDDY TOMORROW.
DEVELOPING ATLANTIC LOW MOVING RAPIDLY NORTHEAST EXPECTED SOUTHWEST
ROCKALL 990 BY SAME TIME

THE AREA FORECASTS FOR THE NEXT 24 HOURS ISSUED BY THE
METEOROLOGICAL OFFICE AT 111700

VIKING NORTH UTISRE SOUTH UTISRE FORTIES
SOUTHWESTERLY 4 OR 5 VEERING NORTHWESTERLY 3 OR 4. OCCASIONAL
RAIN.
MODERATE OR GOOD

CROMARTY FORTH TYNE DOGGER FISHER GERMAN BIGHT
SOUTHWEST VEERING WEST 4 OR 5. SHOWERS. GOOD

HUMBER THAMES
SOUTHWESTERLY 4 OR 5 DECREASING 3 OR 4. RAIN AT TIMES. GOOD
BECOMING MODERATE WITH FOG PATCHES FOR A TIME

DOVER WIGHT
WEST OR SOUTHWEST 4 OR 5 OCCASIONALLY 6. RAIN AT TIMES. MODERATE
WITH FOG PATCHES BECOMING GOOD FOR A TIME

FAIR ISLE FAEROES
CYCLONIC 4 OR 5 BECOMING WESTERLY 3. RAIN AT TIMES. MODERATE
OR
GOOD

NAVTEX MESSAGE ----- 0A73 RECEIVED 13 Jul 17:50

NAVAREA ONE 186.
OMEGA. POLAR CAP DISTURBANCE IN PROGRESS. SIGNALS INVOLVING
POLAR
PATHS MAY HAVE ERRORS AS GREAT AS ONE HALF LANE OR MORE.

NAVTEX MESSAGE ----- 0A74 RECEIVED 13 Jul 17:49

NAVAREA ONE 187.
ADMIRALTY LIST RADIO SIGNALS VOLUME 3. LIST NO 0030.
NORTHWOOD FACSIMILE FREQUENCIES CHANGED TO:
2374.0, 3652.0, 4307.0, 6446.0, 8342.5, 12044.5 AND 17635.0

NAVTEX MESSAGE ----- G631 RECEIVED 13 Jul 17:04

NAVAREA ONE 222.

1. OMEGA STATION DELTA NORTH DAKOTA OFFAIR 081800Z TO 192100Z JUL.
2. A SOLAR ECLIPSE WILL OCCUR BETWEEN 111630Z AND 112130Z JUL AND MAY DEGRADE OMEGA SIGNAL ACCURACY
3. CANCEL THIS MESSAGE 192200Z JUL 91

NAVTEX MESSAGE ----- G600 RECEIVED 13 Jul 17:04

WZ 804.

RICHMOND, NORTH SEA.

'GLOMAR ARCTIC 3' AT 58-13.2N 08-17.4E.

CANCEL THIS MESSAGE 141025Z JUL 91.

NAVTEX MESSAGE ----- G635 RECEIVED 13 Jul 17:03

WZ 809.

ENGLAND EAST COAST. PIPELAYING OPERATIONS VICINITY 54-45N 00 50W.

ANCHORS AND CABLES TO 2000 METRES. WIDE BERTH REQUESTED.

CANCEL WZ 804 (G600)

NAVTEX MESSAGE ----- G636 RECEIVED 13 Jul 17:02

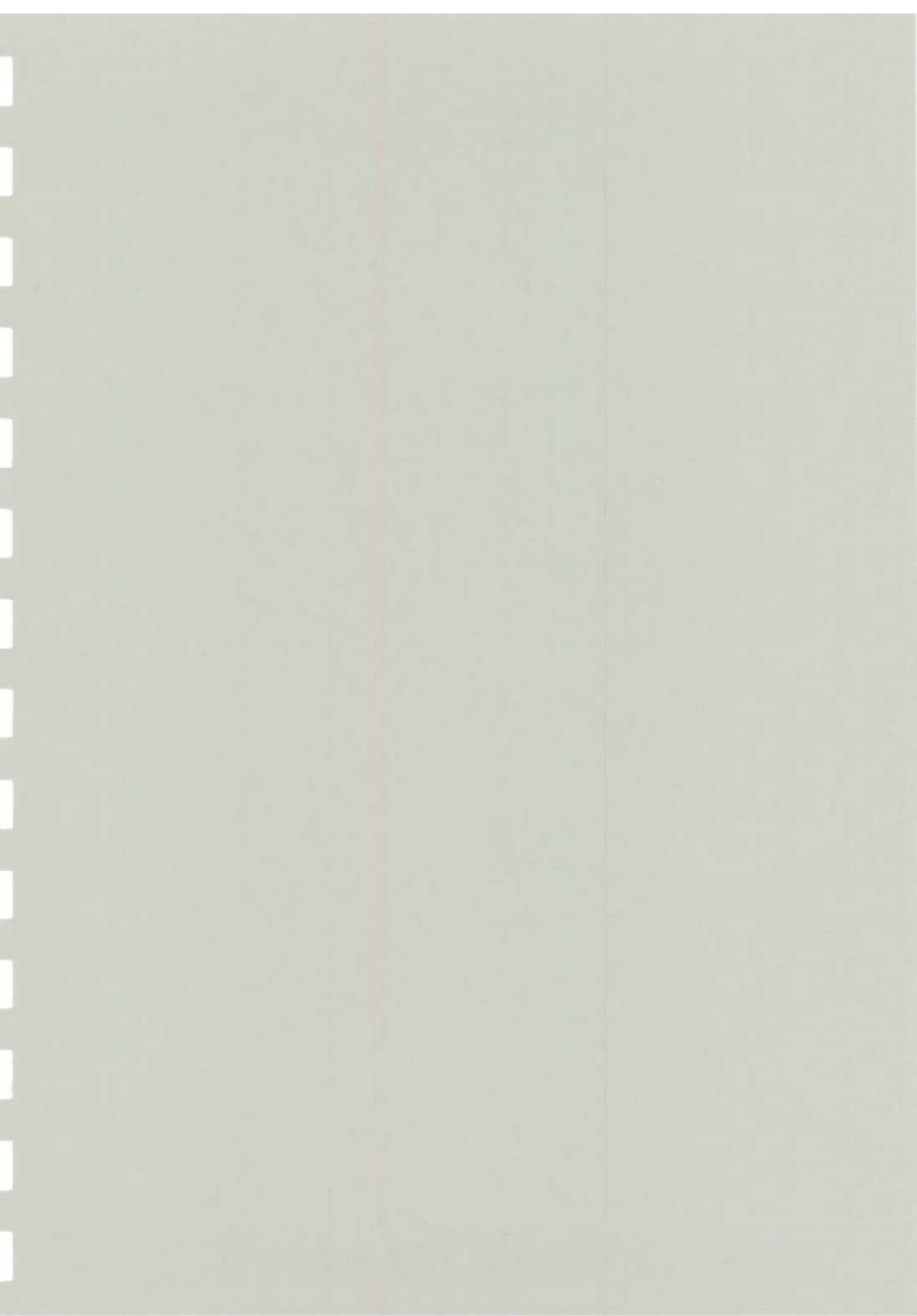
NAVAREA ONE 223.

SATNAV. GPS. SATELLITE PRNG UNUSABLE 0819Z TO 1320Z DAILY 06

JUL TO

19 AUG 91. CANCEL THIS MESSAGE 191430Z AUG 91.

CANCEL 220/91 (G628) (S639) (0615)



**ICS Electronics Ltd. Unit V, Rudford
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