FURUNO

OPERATOR'S MANUAL

FAX/NAVTEX (OPTION)
DUAL FUNCTION
FACSIMILE RCEIVER

MODEL   FAX-208 MARK-2

This manual contains only operating information.
For other information, please refer to the following
manuals:

- Installation · · · · · · · Installation Manual
- Servicing · · · · · · · · Service Manual

FURUNO ELECTRIC CO., LTD.
NISHINOMIYA, JAPAN

·Your Local Agent/Dealer

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00080461000

⚠ SAFETY INSTRUCTIONS

"DANGER", "WARNING" and "CAUTION" notices appear throughout this manual. It is the responsibility of the operator of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.

⚠ **DANGER**	This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

⚠ **WARNING**	This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**	This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

⚠ WARNING

Avoid opening cover of equipment except to replace paper, fuse or printing head.

This equipment uses high voltage electricity which can shock.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

Immediately turn off the power at the ship's mains switch board if water or foreign object falls into the equipment or the equipment is emitting smoke or fire.

Continued use of the equipment can cause fire, electrical shock or serious injury.

⚠ CAUTION

Do not place liquid-filled containers on the top of the equipment.

Fire or electrical shock can result if a liquid spills into the equipment.

Do not place heater the equipment.

Heat can melt the power cord, which can result in fire or electrical shock.

Do not operate the unit with wet hands.

Electrical shock can result.

Use the correct fuse.

Use of a wrong fuse can cause fire or equipment damage.

Observe the compass safe distances to prevent deviation of a magnetic compass.

Unit	Standard compass	Steering compass
FAX-208 MARK-2	1.00 m	0.55 m

WARNING Label attached

⚠ **WARNING** ⚠

To avoid electrical shock, do not remove cover. No user-serviceable parts inside.

⚠   ▬ ▬   ⚠

Name : Warning Label (1)
Type : 86-003-1011-0
Code No. : 100-236-230

FEATURES

The FAX-208 MARK-2 Facsimile Receiver has a wide variety of functions, all contained in a rugged plastic case that is compact to fit almost any class of vessel.

All keys respond immediately to the operator's command and each time a control key is pressed an audible "beep" sounds to confirm that the command has been accepted by the unit.

Some of its prominent features are as follows.

* Parallel thermal head recording enables very quiet operation. Odors, fumes, carbon dust, electric noise, etc. are eliminated.

* Thermal paper provides a clear-cut, high-quality picture in eight tones. Cloud analysis picture in the FM mode is presented clearly.

* Programmed with all existing facsimile stations and frequencies, which may be updated by the user. 310 private frequency spaces are reserved additionally for the user.

* Fully automatic reception by the built-in on/off/sleep schedule timer, auto speed/IOC selection, auto phase alignment and intelligent optimum frequency selection facility.

* Menu-driven/dialogue-guided operation enables sophisticated function with simple key sequences ... the highest user-friendliness.

* Battery back-up for real-time clock, schedule, channel/frequencies and all user presets.

* Various self-tests available for easy service and maintenance.

* Optional preamp unit available for vessels with limited antenna mounting space, providing stable signal on LF and HF bands with minimum onboard noise.

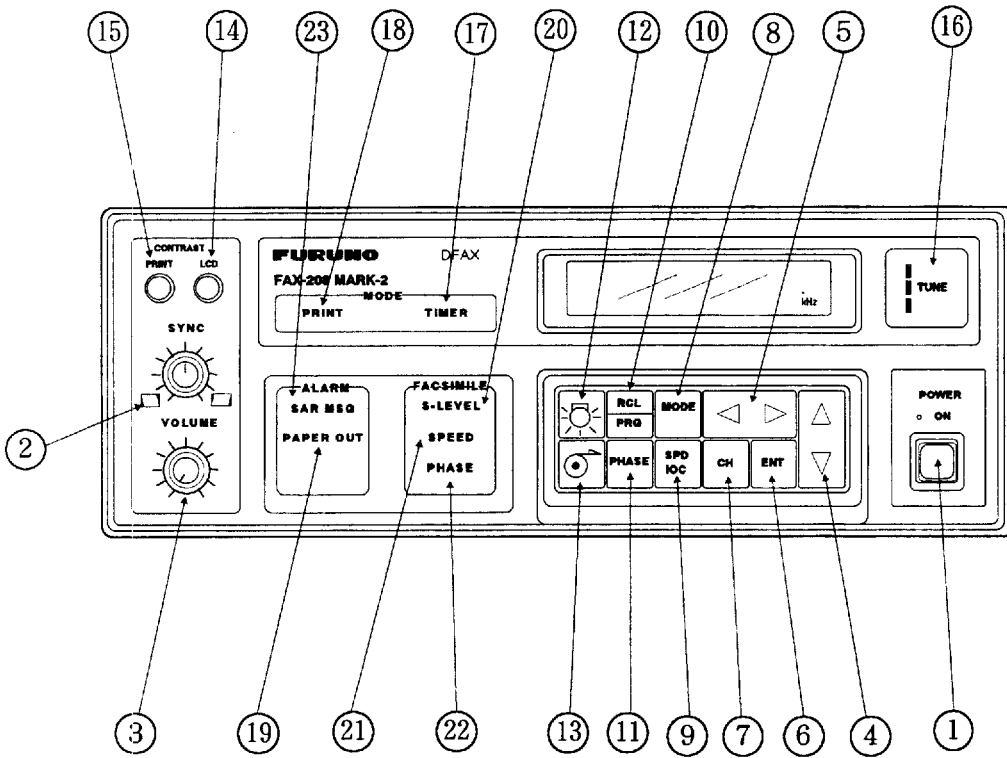* Universal power supply from 10V to 40VDC, drawing only 30W maximum.

Table of Contents

1. CONTROLS

1.1 Control Description

FAX-208 MARK-2 FRONT PANEL CONTROL & LED

No.	CONTROLS AND KEYS		No.	ANNOUNCIATOR LEDs	
①	POWER o ON	Turns on and off the unit.	⑯	TUNE	The tuning bar runs upward or downward when the programmed frequency differs from the actual receiving frequency.
②	SYNC	Fine tunes picture synchronization.	⑰	TIMER	Lights when timer recording is on.
③	VOLUME	Adjusts audio level of the monitor speaker.	⑱	PRINT	Lights when printing.
④	▲ ▼	Change menu and setting data.			
⑤	◄ ►	Shift the cursor leftward and rightward	⑲	PAPER OUT	Lights when there is no recording paper.
⑥	ENT	Registers data.	⑳	S-LEVEL	Lights when signal level is low.
⑦	C H	Selects receiving channel.			
⑧	MODE	Used to start/stop manual reception and turn the timer/ sleep on.	㉑	SPEED	Lights when the scanning speed is incorrectly set.
⑨	SPD IOC	Adjusts scanning speed an IOC to match those of transmitter.	㉒	PHASE	Lights when picture is out of phase.
⑩	RCL PRG	Displays data; programs the unit.			
⑪	PHASE	Adjusts picture phase.	㉓	SAR MSG	Lights when the search and rescue message of NAVTEX signal is received.
⑫	☼	Turns on/off illumination.			
⑬	☞	Feeds paper.			
⑭	LCD O	Adjusts LCD contrast.			
⑮	PRINT O	Adjusts recording intensity.			

1.2 [MODE] and [RCL/PRG] Keys

Function

The [MODE] key is used to operating of the printer in the manual recording mode, or to activate the timer/sleep modes. And the [RCL/PRG] key displays or changes time and various data.

NOTE: *If you accidentally press the [MODE] key or the [RCL/PRG] key, you can return to the normal display by pressing [▲] and [▼] keys to display "Escape?" and then press the [ENT] key.*

The [MODE] key

The [MODE] key and the [▲] and [▼] keys perform the functions shown in the figure which follows.

One pressing of [MODE] key

```
                           │
 [▲]                       ↓
   ┌──────────────────────────────────────┐
   │  Manual   START      ?               │
   └──────────────────────────────────────┘
                    or
   ┌──────────────────────────────────────┐
   │  Manual   STOP       ?               │
   └──────────────────────────────────────┘
       [▲] ↑                 ↓ [▼]
   ┌──────────────────────────────────────┐
   │  MODE ;   Escape     ?               │
   └──────────────────────────────────────┘
       [▲] ↑                 ↓ [▼]
   ┌──────────────────────────────────────┐
   │  SLEEP   ON          ?               │
   └──────────────────────────────────────┘
       [▲] ↑                 ↓ [▼]
   ┌──────────────────────────────────────┐
   │  TIMER   ON          ?               │
   └──────────────────────────────────────┘
              [▼]
```
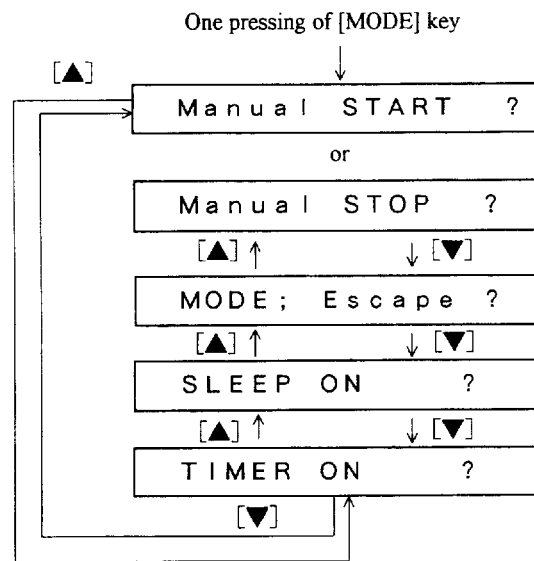
Ex. To select the function "TIMER ON" in the mode menu.
1. Press the [MODE] key.
2. Then press either the [▲] or [▼] key until message "TIMER ON " appears on the LCD display.
3. Press the [ENT] key.

Single pressing of the [RCL/PRG] key

A single pressing of the [RCL/PRG] key enables confirmation of time and timer programs. You may select the item to confirm by operating the [▲] and [▼] keys. Then press the [ENT] key.

Single pressing of [RCL/PRG] key

[▲]
↓

| T I M E   1 2 : 3 4 |

[▲] ↑   ↓ [▼]

| R C L ; E s c a p e ? |

[▲] ↑   ↓ [▼]

| R e c a l l C H F R E Q ? |

[▲] ↑   ↓ [▼]

| R e c a l l S c h e d u l e ? |

[▲] ↑   ↓ [▼]

| R e c a l l N A V T E X ? | (*1)

[▼] ↑
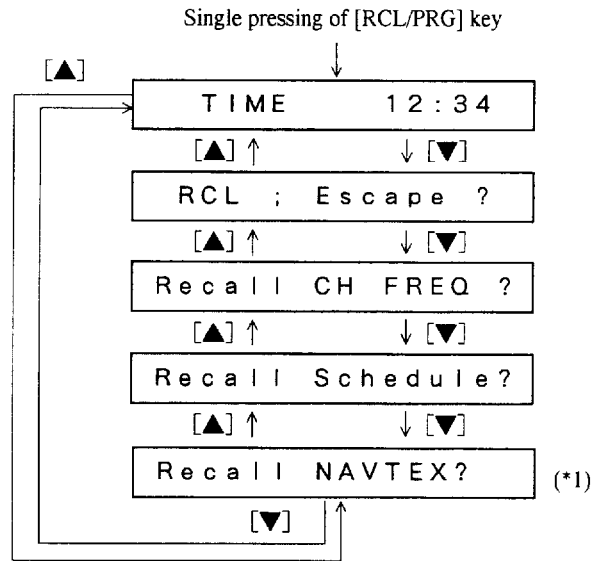
Two pressings of the [RCL/PRG] key

Two pressings of the [RCL/PRG] key enable change of time and timer programs. You can select what to change by operating the [▲] and [▼] keys. Then press the [ENT] key.

Two pressings of [RCL/PRG] key

[▲]
↓

| S e t C L O C K ? |

[▲] ↑   ↓ [▼]

| P R G ; E s c a p e ? |

[▲] ↑   ↓ [▼]

| E r a s e S c h e d u l e ? |

[▲] ↑   ↓ [▼]

| U p d a t e C H F R E Q ? |

[▲] ↑   ↓ [▼]

| S e t S c h e d u l e ? |

[▲] ↑   ↓ [▼]

| S e t N A V T E X ? | (*1)

[▼] ↑
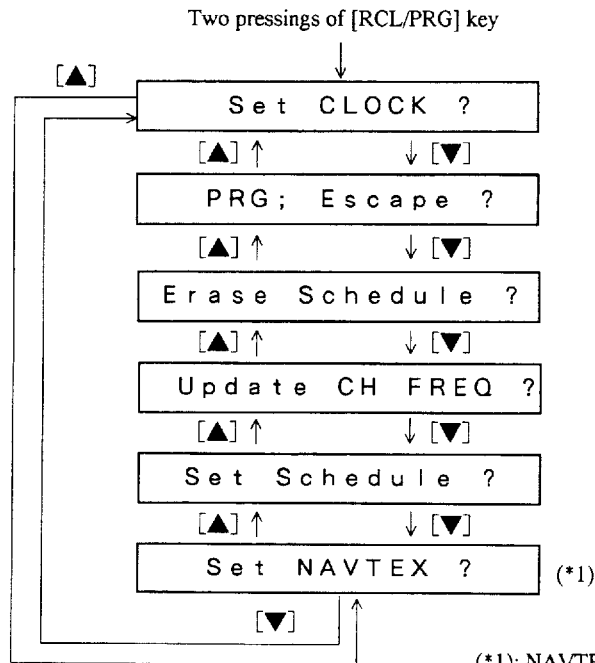
(*1): NAVTEX version only

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2. AUTOMATIC RECORDING

2.1 Automatic Recording

General

Once you set the facsimile station from which to receive, the unit goes into stand-by, ready to receive facsimile broadcast automatically upon reception of remote signal from the facsimile station. The procedure which follows shows how to ready the unit for automatic reception. You may also receive facsimile broadcasts automatically by the timer program feature. The instructions for how to do this are in "2.3 Timer Recording."

Getting into stand-by

1. Press the POWER switch to turn on the power. The display changes in the sequence shown below (your display makes look a little different), taking about five seconds to complete the sequence. The last-used station and frequency appear on the display.

```
FURUNO      < DFAX >
```
↓
```
TIME          12 : 34
```
↓
```
100N   JMH      3622.5
```
(Normal Display)
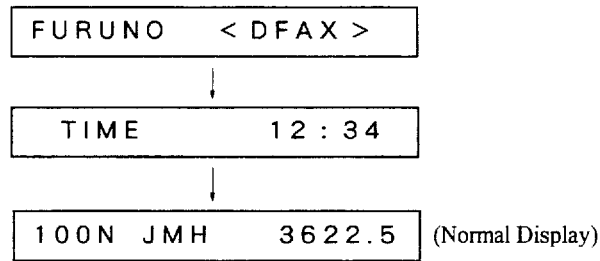
2. Adjust LCD contrast and illumination by the CONTRAST-LCD control and the [☼].

Selecting station

3. Referring to the facsimile station list at the end of this manual, select zone number and station no., and set them as follows. In the example shown below, station JMJ (Tokyo, Japan) zone 1, station 1 and channel no. 2 are temporarily set.

1) Press the [CH] key. The (blinking) cursor should be under channel number.

Channel No. ········┐ ┌······· Picture Format
Station No. ······┐ │ │   ("R" is reverse picture. See page 5-3.)
Zone No. ····┐ │ │ │
          ↓ ↓ ↓ ↓
```
100N   JMH      3622.5
```
└── Call Sign   └── Frequency
└── Cursor
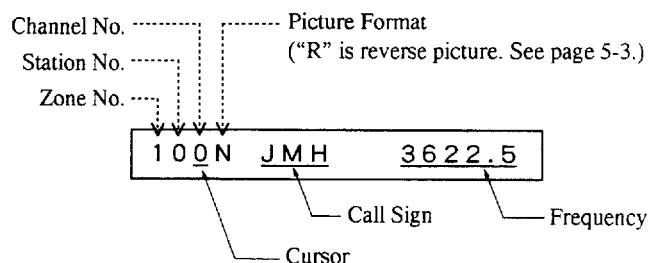
2) Press the [◄] key to set the cursor under zone number. Set zone by operating the [▲] and [▼] keys.

3) Press the [►] key once to place the cursor under station number. Set station number by operating the [▲] and [▼] keys.

4) Press the [►] key once to place the cursor under channel number. Set channel number by operating the [▲] and [▼] keys.

```
1 1 2 N   J M J       9 4 3 8 . 0
```

5) Press the [ENT] key. Station call sign, channel frequency and other information set in steps 2, 3 and 4 appear on the display.

```
1 1 2 N   J M J       9 4 3 8 . 0
```

Receiving and printing

The unit is now ready to receive. When it receives the start signal from the facsimile station, it automatically adjusts itself to match speed, IOC and phase of the transmitter and then saves picture information to the memory. ("PRINT" LED lights.) When a certain amount of picture information is accumulated, printing starts. Upon completion of the broadcast, the facsimile station sends the stop signal.

Stopping printing manually

Press the [MODE] key and the display will indicate the message "MANUAL STOP ?" for verification. Press the [ENT] key. **DO NOT STOP PRINTING BY TURNING OFF THE POWER, TO PREVENT DAMAGE TO THE PRINTING HEAD.**

2.2 Stopping Printing

General

In the "timer sleep" mode, the printer stops printing at the time preset by the operator.

Setting stop time

1. Press the [MODE] key, then scroll the menu with the [▲] or [▼] key to display the message "SLEEP ON ?."

```
  SLEEP  ON      ?
```

2. Press the [ENT] key.

```
  OFF  at     _      :
```

3. Press the [▲] key to change the display alternately as shown below.

```
OFF  at       0 : 00  ⟷   OFF  at       *    :
                      [ ▲ ]
```

Entering stop time

4. Select the display "OFF at _0:00," then press the [▶] key to move the cursor on the stop time column.

```
  OFF  at      0 : 00
```

5. Enter the desired stop time by the arrow keys.

```
  OFF  at     1 2 : 3 4
```

6. Press the [ENT] key.

```
  OFF  at     1 2 : 3 4
```

Stop printing by "stop signal"

4. Select the display "OFF at * " in step 3 above.

```
  OFF  at       *    :
```

5. Press the [ENT].

```
  OFF  Facsimle
```

Stop printing in sleep mode

1. Press the [Mode] key. Operate the [▼] or [▲] keys to display the following message.

```
SLEEP   ON         ?
```

2. Press the [ENT] key.

```
OFF  at  _        :
```

3. Press the [ENT] key.

```
OFF  Facsimile
```

Reprinting

1. Press the [MODE] key

```
OFF  Facsimile
```

↓

```
100N  JMH   3622.5
```
(Normal display)

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2.3 Timer Recording

General   Most LF/HF facsimile stations transmit facsimiles in accordance with a schedule issued by relative meteorological observatory. (You can find facsimile schedules in the publication "Meteorological Facsimile Broadcasts," available through meteorological observatory bodies.) If you wish to receive a certain facsimile broadcast on a daily basis, therefore, the timer recording mode will virtually allow you "hands-off" automatic operation. You may preset 16 timer programs.

Preparation   Before you start entering program times into the unit, you should prepare a list of stations and start/stop times. (A log for such is provided at the end of this manual.)

Adjusting   If the picture looks strange, you can adjust (while printing)
recording   the frequency, speed, IOC and phase to correct it.

Procedure   1. Press the [RCL/PRG] key twice. Operate the [▲] and [▼] keys to display the following message.

```
┌─────────────────────────┐
│ Set   Schedule   ?      │
└─────────────────────────┘
```

2. Press the [ENT] key. The following display appears.

```
┌───────────────────────┐
│ 0 0 0 N  P R V  * *  0 : 0 0 │
└───────────────────────┘
```
Cursor   └── Zone, Station, Channel   └── Broadcast Start Time

In the procedure which follows you are shown how to set Tokyo, Japan station JMH, zone number 1, station number 0, and broadcast start and stop times of 15:29 and 15:47.

Set station
3. Set "1," "0" and "*" as zone number, station number and channel by operating the [▲] and [▼] keys to shift cursor and the [▲] and [▼] keys to set data.

```
┌───────────────────────┐
│ 1 0 *  J M H  * *  0 : 0 0 │
└───────────────────────┘
```

Zone No. ────────────┘ │
Station No. ─────────────┘
Frequency Scanning ──────────────┘
(* means automatic selection of best frequency.)

└─ Speed
/ *: Remote Signal
(a: 60 rpm
(b: 90 rpm
(c: 120 rpn
\ d: 240 rpm

─────────── Start Signal
/ *: Automatic (Remote) Start \
(s: Timer Start (IOC=576) slow)
\ f: Timer Start (IOC=288) fast /

Select speed and start signal

4. Set "*," "*"as the speed and start signal by the arrow keys.

Set recording start and stop times

5. Press the [▶] key to set the cursor on the hour in the starting time column. Press the [▲] and [▼] keys to set starting time, using 24-hour notation. (In the example the starting time hour is 15.) You may press and hold down on those keys to speed up the rate of change. Similarly set the starting minute. Enter a time at least two minutes earlier than actual start time to allow for detection of the start signal.

```
10 * N  JMH    * *  15 : 27
```

6. Press the [▶] key to set the cursor on the stop recording time column.

```
* * 1 5 : 2 7   →   0 : 0 0 Y
```
```
      \ Start Time      \ Stop Time
```

7. Set stop time by operating the arrow keys. Enter a time at least two minutes later than actual stop time to allow for detection of stop signal.

```
* * 1 5 : 2 7   →   1 5 : 5 0 Y
```

Setting timer program ON/OFF

You can turn on or off the timer programs: "Y"(Yes) for on, "N" for off.

8. After selecting "Y" or "N" by the arrow keys, press the [ENT] key. This concludes the procedure for entering timer program.

To enter another timer program, repeat the procedure.

NOTE: *If, when you open the timer program menu, 16 timer programs already exist, the message "Schedule full" momentarily appears and then control is returned to the normal display. You cannot write over existing programs, however you can erase them individually or collectively. More on this later.*

```
Schedule Full !
```
↓
```
100N JMH  3622.5
```
(Normal Display)

You can confirm timer programs by printing the timer program list. For further details, see page 2-10.

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Starting timer operation

Press the [MODE] key. Select the message "TIMER ON," then press the [ENT] key. ("TIMER" LED lights.) If no timer programs are programmed, the message "No Schedule!" will be displayed.

Canceling timer operation

Press the [MODE] key. ("TIMER" LED goes off.)

Remarks on timer recording

- If you set two programs which overlap each other in time, the program having the later starting time is not recorded. For example, program A's start and stop times are 2:00 and 2:30 and program B's, 2:15 and 2:40. In this instance program B will not be recorded.
- When the start signal detection method is "automatic start," the receiver scans a facsimile station's transmit frequencies to find the most suitable one. If there is no signal or a suitable frequency cannot be found, the picture is not printed.
- You may change receive frequency during printing, when picture quality is not satisfactory.
- Use of the scanning function is not recommended when phasing or other factor varies greatly by signal strength. Instead, set the channel (frequency) you feel is most suitable.
- For the automatic start mode, the start and stop times should be set at least one minute earlier and later than scheduled times to allow for complete acquisition of the start and stop signals.

Two methods of timer recording

There are two methods by which timer recording can be started: automatic start and timer start.

In automatic start, the unit is in stand-by at the program start time, and records the picture when it receives the "start signal" from a facsimile station. The IOC number is automatically chosen by the unit.

In the timer start mode, the unit operates by programmed timer schedule regardless of the presence or absence of a facsimile signal. However, the proper IOC (576 or 288) must be chosen by the operator.

Because of the inconvenience of having to choose IOC, it is recommended to select automatic start rather timer start to ensure reception of the entire picture.

Changing timer programs

Follow the procedure below to change timer programs.

1. Press the [RCL/PRG] key once. Press the [▲] and [▼] keys to display the following.

```
Recall  Schedule?
```

2. Press the [ENT] key. The start time nearest to current time appears. Press the [▲] and [▼] keys to display the program you want to change; [▲] for earlier program, [▼] for later one.

```
52*  KWAF  **17:26
```
(Timer Program)

3. Press the [RCL/PRG] key again to get into the timer program mode. Change program times as necessary by pressing the arrow keys.

```
52*  KWAF  ** 17:26
```

4. Press the [ENT] key. The normal display appears.

```
       S  E  T
```
↓
```
100N  JMH    3622. 5
```
(Normal Display)

Erasing timer programs

You may erase all or specific timer programs as follows.

Specific programs
1. Follow steps 1 through 3 in "Changing timer programs" to display the timer program you want to erase.

```
52*  KWAF  **17:26
```

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2. Press the [▶] key to set the cursor on the starting time column. Change the starting time to same time as stop time by the arrow keys.
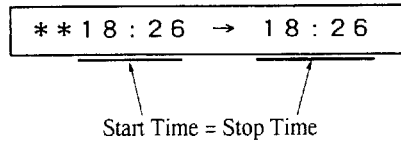
```
┌─────────────────────────────┐
│ ＊＊18：26  →  18：26        │
└─────────────────────────────┘
```

Start Time = Stop Time

3. Press the [ENT] key. The display changes in the following sequence.

```
┌─────────────────────────────┐
│            E r a s e         │
└─────────────────────────────┘
              ↓
┌─────────────────────────────┐
│ 1 0 0 N   J M H     3 6 2 2. 5 │   (Normal Display)
└─────────────────────────────┘
```

All programs

1. Press the [RCL/PRG] key twice. Press the [▲] and [▼] keys to show the following display.

```
┌─────────────────────────────┐
│ E r a s e   S c h e d u l e   ? │
└─────────────────────────────┘
```

2. Press the [ENT] key. The following display appears.

```
┌─────────────────────────────┐
│ E r a s e   O K   ?  (Y╱N)   │
└─────────────────────────────┘
```
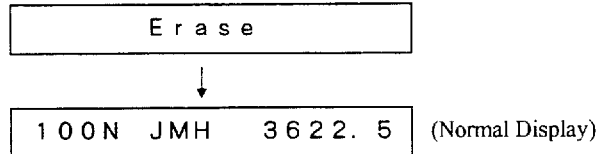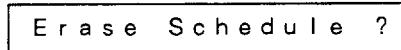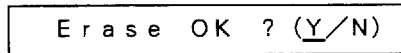
3. Press the [ENT] key to erase all programs, or escape by selecting "N" (NO) followed by the [ENT] key.

```
┌─────────────────────────────┐
│            E r a s e         │
└─────────────────────────────┘
              │  (After several seconds)
              ↓
┌─────────────────────────────┐
│ 1 0 0 N   J M H     3 6 2 2. 5 │   (Normal Display)
└─────────────────────────────┘
```

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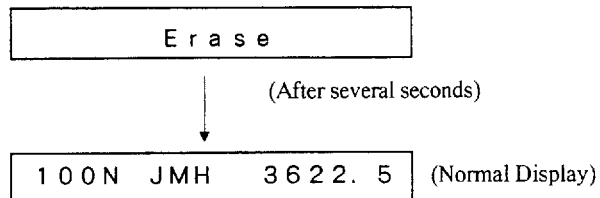
Printing timer program list

The timer program list contains all timer programs, arranged in chronological order. You can print a hard copy of it for reference.

1. Turn off the power. While pressing and holding down the [RCL/PRG] key, turn on the power. Release the [RCL/PRG] key when a display appears.

```
Print  Schedule  ?
```

2. Press the [ENT] key to print the timer program list.

```
Print  Schedule
```

The figure below shows a sample timer program list. Check your list for correctness.

| Picture Format | Frequency | Start Time | Stop Time |

```
                  * * *    Schedule    * * *
  111N  JMJ       54050     cS   7 : 28    —    7 : 42Y
  103N  JMH       99700     aS   8 : 01    —    8 : 12N
  100N  JMH       36225     bF   8 : 20    —    8 : 30Y
  100N  JMH       36225    * *  9 : 15    —    9 : 36N
  11 *  JMJ        ⬭        bS  11 : 13    —   11 : 30Y
```

Frequency is not printed when scannig mode is selected.

This shows automatic start. cS means speed of 120rpm and IOC of 576.

Timer program isn't carried out.

3. After the list is completely printed, turn the power off.

```
                    END
```

3. MANUAL RECORDING

3.1 How to Record Manually

Preparation

To receive a facsimile signal manually, you will first need to set zone number, station number and channel number. These are listed in the facsimile station list in Appendix 2. The list does not show frequencies (since they are usually not necessary for operation). You may, however, print a hard copy of all frequencies (including ones you entered) stored in this unit. For further details, see page 5-4.

NOTE: *Do not turn off the power while printing, to prevent damage to the printing head.*

The procedure which follows includes how to manually receive automatic recording broadcast which has already started and how to receive from a facsimile station which does not use start and stop signals.

Procedure

Turning on the power
1. Press the POWER switch. The display changes in the sequence shown below, the entire sequence taking about five seconds. The last-used station and frequency appear.

```
┌─────────────────────────┐
│ F U R U N O    < D F A X > │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│ T I M E        1 2 : 3 4 │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│ 1 0 0 N  J M H      3 6 2 2 . 5 │   (Normal Display)
└─────────────────────────┘
```

— Call Sign   — Frequency

———— Picture Format ⎧ N: Normal
—— Channel No.   ⎨ R: Reverse picture.
— Station No.   ⎩ (See page 5-3.)
—— Zone No.
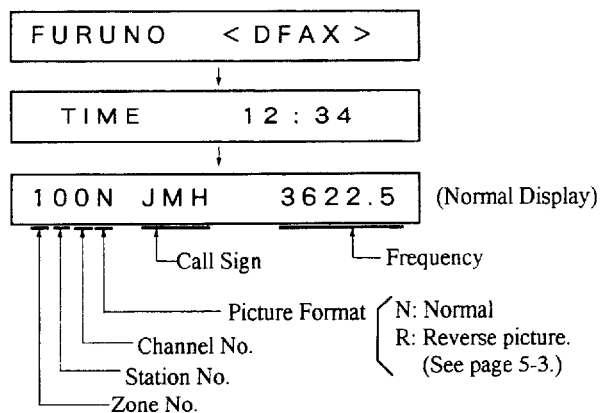
Adjusting illumination

2. Press the [☼] key to adjust LCD and LED illumination to "bright," "dim" or "off." Then, adjust LCD contrast by the CONTRAST-LCD control.

Selecting station 3. Select facsimile station (zone and station) as follows.

1) Press the [CH] key. The cursor should be under channel number.

```
1 0 0 N   J M H        3 6 2 2 . 5
```
Cursor

2) Press the [◀] key to place the cursor on zone number (far left side digit). Operate the [▲] and [▼] keys to set zone number.

3) Press the [▶] key once to place the cursor under station number. Operate the [▲] and [▼] keys to set station number.

4) Press the [▶] key to place the cursor under channel number. Press the [▲] key to display the asterisk (*), to get automatic frequency scanning. This is the preferred (and easiest) method of frequency selection, however you may wish to designate specific channel number.

```
1 0 * N   J M H
```

5) Press the [ENT] key. The unit scans the frequencies of the facsimile station selected.

```
1 0 * N   J M H   S C A N
```

6) The frequency found through scanning appears on the display.

```
1 0 * N   J M H        7 3 0 5 . 0
```

```
"S-LEVEL" LED lights when signal
level is low.
If you cannnot receive by scanning,
select a suitable frequency.
```

4. You can monitor the facsimile signal through the speaker. Adjust the volume of the speaker by pressing the VOLUME control, if necessary.

3-2

Changing SPD/IOC

5. You may have to change the SPD (speed) and IOC (Index of Cooperation) depending on the facsimile station. SPD and IOC of the receiver must match those of the transmitting station to reproduce an exact copy of the picture. You can find SPD and IOC of all facsimile stations in the publication "Meteorological Facsimile Broadcasts."

1) Press the [MODE] key.

```
Manual   START      ?
```

2) Press the [ENT] key.

```
SPD/IOC      60/576
```

IOC (• 288 (Low))
(• 576 (High))

Speed (• 60   • 90)
(• 120   • 240)
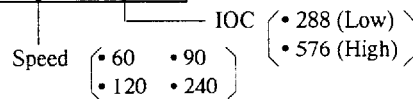
3) Press the [▲] and [▼] keys to set speed.

4) Press the [▶] key to place the cursor in the far right-hand column. Operate the [▲] and [▼] keys to set IOC.

5) Press the [ENT] key.

```
10*N  JMH       7305.0
```
(Normal Display)

Adjusting intensity of recording

Turn the PRINT control for an optimum recording intensity.

Stopping the printer

By stop signal (automatic)

6. Most facsimile stations transmit the stop signal at the end of a broadcast to stop printing automatically.

Manually

If the facsimile station does not transmit the stop signal, or you want to stop printing yourself, do the following.

1) Press the [MODE] key.

```
Manual   STOP       ?
```

2) Press the [ENT] key.

```
10*N  JMH       7305.0
```
(Normal Display)

7. Press the [⊙⁻] key to feed the recording paper. Tear off the recording.

3.2 When the Recording is Abnormal...

This section provides the information necessary for adjustment of the recording.

Wrong SPD/IOC setting

Wrong SPD causes overlapped picture or multiple pictures. Incorrect IOC expands (or shrinks) the picture vertically. Find the correct SPD and IOC numbers, and set them as shown in the following procedure.

1) Press the [SPD/IOC] key.

```
SPD/IOC   120/576
```

2) Operate the arrow keys to set both SPD and IOC.

3) Press the [ENT] key to register settings and return to the normal display.

```
10*N  JMH       7305.0
```

NOTE: *The [SPD/IOC] key is operative only while printing.*

Examples of recordings with wrong settings of SPD and IOC

What happens to picture when SPD or IOC is wrong

* Multiple pictures...Speed lower than correct speed.
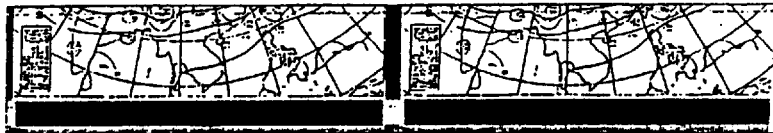
* Overlapped picture...Speed higher than correct speed.

*Enlarged picture
   ...IOC 576 signal but IOC 288 set on FAX-208 MARK-2.
   Shrunk picture: IOC 288 signal but IOC 576 signal set on FAX-208 MARK-2.

Phase mismatch

When the FAX-208 MARK-2 starts receiving a broadcast already in progress, or noise prevents detection of the phasing signal, the recording may be divided into two parts by a thick black (or white) stripe called a dead sector. This phenomenon is due to phase mismatching. When this occurs, use the [PHASE] key to shift the dead sector to the left edge of the recording paper.
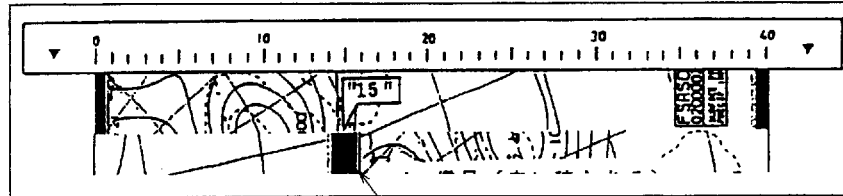
`Dead Sector (Can be white stripe)`

1) Press the [PHASE] key. The following display appears.

```
Set    PHASE : 0 0
```

2) Read the scale to find the center of the dead sector. Enter it by operating the [▲] and [▼] keys. For example, in the figure shown above the dead sector is centered at "15" on the scale. The setting range is 00 and 40.

```
Set    PHASE : 1 5
```

3) Press the [ENT] key. The dead sector shifts to the left edge of the recording paper.

Note that the [PHASE] key also is operative only while printing.

Phasing signal out of synchronization

The SYNC control functions to fine tune of the phasing signal. If the dead sector is plotted at an angle even when the PHASE is properly selected, turn the SYNC control in an appropriate direction to print the dead sector straightly.
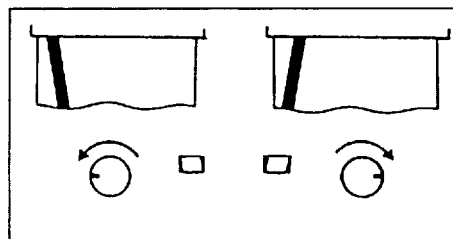
Press the SYNC control, to bring out.
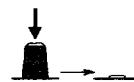
Push in the control when adjustment is completed.

Tuning

There are rare occurrences, where the actual receiving frequency slightly deviates from the nominal transmitting frequency. The TUNE indicator, composed of three lamps will "flow" upward when the receiving frequency is lower than the preprogrammed frequency data. Press and hold the [▲] key until the indicator stops flowing and only the center lamp lights stably. On the contrary, press the [▼] key if the indicator flows downward.

Note1. The TUNING is inoperative when selecting the scanning mode.
Note2. The indicator will always flow for a signal in LF band or for a picture of which the most part is occupied by the black signal, irrespective of frequency deviation.

3.3 Selection of Receive Frequency

General

A facsimile station will usually transmit a facsimile picture over several different frequencies (on the HF band). This allows the receiving station to select the most suitable frequency channel, to obtain a quality recording.
The general rule for selection of frequency is to select the highest useable frequency band first, and then switch to the next lower useable frequency band if the picture is not reproduced satisfactorily.
Further, other factors such as the distance to the transmitting station, receiving time, season, and year should be taken into consideration when selecting a frequency.

Scanning

The FAX-208 MARK-2 eliminates the inconvenience of manual frequency selection by using a scanning receiver to do the job automatically. The receiver scans the frequencies of a facsimile station and locks onto the frequency of which the signal strength is the highest. It scans by the following rules:

• If the signal level of two or more channels is the same, the highest frequency is selected.
• It always picks up an LF channel (80 kHz to 160 kHz) above a certain level, regardless of whether signal is stronger on other channel(s).
• It recommences scanning if the signal level stays below a certain level.

NOTE: *Another method for selection of frequency is to monitor signal strength through the built-in speaker. The clearer the signal, the higher the strength.*

When automatic scanning does not work...

The automatic scanning function may not work when, for example, the signal is too weak. In this case designate a channel instead of using automatic scanning.

4. REPLACEMENT OF RECORDING PAPER

[⊙ˆ] key

Red Stripe

Core

Paper Cover

Cut at angle.

Recording Paper

Paper should not be straightened.

RELEASE Lever

[⊙ˆ] key

Paper Exit

Brim

Paper Feed Slot
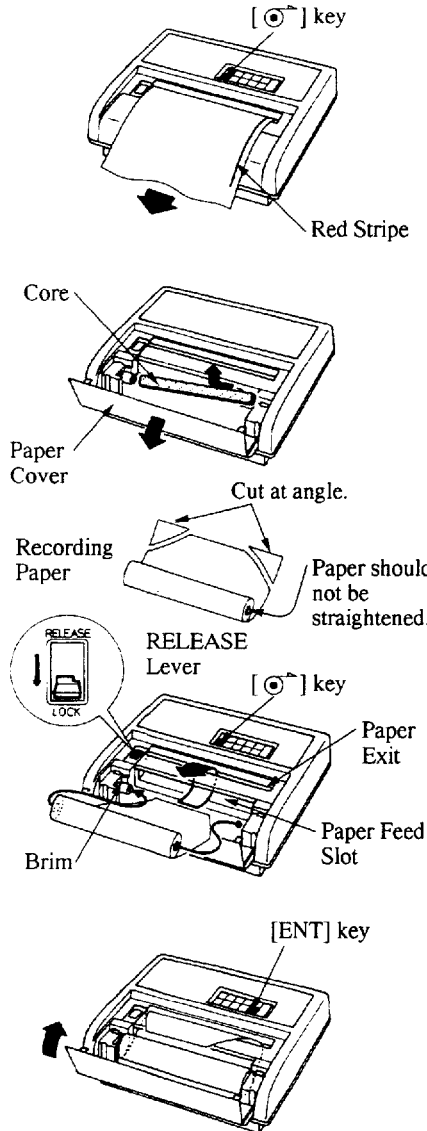
[ENT] key

1. Press the [⊙ˆ] key to feed out remaining paper.

2. Pull the paper cover forward. Take out the paper spool by pushing the spool catch leftward.

3. Set new paper roll to paper container. Cut both corners of the paper end to ensure smooth feeding. Set the RELEASE lever in the "RELEASE" position and insert paper through paper feed slot. Then manually adjust the paper so it comes out of paper exit as shown left.

4. If there is slack in the paper or it is uneven, adjust it.

5. Confirm that the RELEASE lever is set in the "LOCK" position. Close the paper cover.

6. Press the [ENT] key to return to the normal display. ("PAPER OUT" LED goes off.)

Name	Thermal Paper
Type	TP-0820B (216mm × 20m)
Code No.	005-946-000

5. CHANGING FREQUENCIES AND SETTINGS

5.1 Setting the Built-in Clock

When to set the clock

The time of the built-in clock must be accurate for effective timer recording. You will need to set the time when the unit is first installed, when the time is wrong, or when the memory is cleared. The clock continues working by a battery when the unit is off.

Procedure

1. Press the [RCL/PRG] key twice.

```
Set  CLOCK  ?
```

2. Press the [ENT] key. The following display appears.

```
Set  CLOCK  12:3█
```
                                    Cursor

3. Using the arrow keys, set UTC time in 24-hour notation. Press the [ENT] key at the exact moment the time signal sounds for the start of a new minute or hour.

```
Set  CLOCK  12:40
```
(Cursor disappears.)

```
10*N  JMH      7305.0
```
(Normal Display)

5.2 Changing Frequencies

General

The FAX-208 MARK-2's memory contains all frequencies for existing facsimile stations. However, if the transmit frequency of a station changes, change frequency data as shown in the procedure below.

Procedure

For example, the Tokyo, Japan station JMH (zone no. 1, station no. 0) will change the frequency of channel number 4 from 13597.0 kHz to 13582.0 kHz.

1. Press the [RCL/PRG] key twice. Press the [▲] and [▼] keys to show the following display.

```
Up  date  CH  FREQ       ?
```

2. Press the [ENT] key. The following display appears.

```
■0 0 N   P R V       7 9 9
```

3. Using the arrow keys, set zone number as "1," station no. as "0," and channel no. as "4." If the station transmits the facsimile picture in white characters on black background, change "N" to "R." (See next page.)

```
1 0 4 N   JMH   1 3 5 9 7. ■
```

4. Place the cursor in the frequency column. Press the [▲] and [▼] keys to change the frequency from 13597.0 to 13582.0.

```
1 0 4 N   JMH   1 3 5 8 2. ■
```

5. Confirm the data and then press the [ENT] key to register it and return to the normal display.

```
        S   E   T
```
↓
```
1 0 0 N   JMH   1 3 5 8 2.  0
```
(Normal Display)

Reverse picture
The usual facsimile picture format has black text on white background. Some stations, however, print white characters on black background. This information is programmed into the memory, thus you need not designate picture format when receiving a facsimile. However, if you are entering frequency data of a newly established station whose picture format is reverse, designate "R" (instead of "N") to print the picture in the usual format.

5.3 Entering New Frequencies

General
The FAX-208 MARK-2 provides a free memory for storage of new channels (private channels). You can store up to 310 channels, in the zone numbers 0 to 8.

Zone No.	Station No.	Call Sign	Channel no. (Qty)	Zone No.	Station No.	Call Sign	Channel no. (Qty)
0	0	PRV	0 ~ 9 (10)	3	A	AUX	0 ~ 9 (10)
	1	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	2	PRV	0 ~ 9 (10)	4	A	AUX	0 ~ 9 (10)
	3	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	4	PRV	0 ~ 9 (10)	5	A	AUX	0 ~ 9 (10)
	5	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	6	PRV	0 ~ 9 (10)	6	9	AUX	0 ~ 9 (10)
	7	PRV	0 ~ 9 (10)		A	AUX	0 ~ 9 (10)
	8	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	9	PRV	0 ~ 9 (10)	7	9	AUX	0 ~ 9 (10)
	A	PRV	0 ~ 9 (10)		A	AUX	0 ~ 9 (10)
	B	PRV	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
1	B	AUX	0 ~ 9 (10)	8	9	AUX	0 ~ 9 (10)
2	9	AUX	0 ~ 9 (10)		A	AUX	0 ~ 9 (10)
	A	AUX	0 ~ 9 (10)		B	AUX	0 ~ 9 (10)
	B	AUX	0 ~ 9 (10)				

You may enter facsimile station data in any zone. However, it is probably less confusing if you use zone "0" for new frequencies and enter other frequencies in corresponding zones. (Sorting by zone is especially important for efficient scanning.) The procedure for entering frequencies is the same as in "5.2 Changing Frequencies."

Recalling channel frequency list

1. Press the [RCL/PRG] key and operate the [▲] and [▼] keys to display the following message.

```
Recall   CH   FREQ   ?
```

2. Press the [ENT] key. Then recall a channel frequency you wish to see by selecting zone, station and channel with the arrow keys.

Printing channel frequency list

You may wish to print a hard copy of all frequencies (both user entered and preprogrammed) stored in the unit.

1. Turn off the power. While pressing and holding down the [RCL/PRG] key, turn on the power. Release the [RCL/PRG] key when a display appears.

2. Press the [▲] and [▼] keys to display the following message.

```
Print   CH   FREQ   ?
```

3. Press the [ENT] key to print.

```
Print   CH   FREQ
```

4. After the list is completely printed, turn the power off.

```
                       xxx  Channel  Frequency  xxx

------------------------------  Zone No. 0  ------------------------------
Station - 0          PRV
    799         799     799     799     799     799     799     799     799     799

Station - 0          PRV
    799         799     799     799     799     799     799     799     799     799

------------------------------  Zone No. 1  ------------------------------
Station - 0          JMH
  36225    49020   73050   99700  135970  182200  235229
Station - 1          JMJ
  33650    54050   94380  146925  184412
Station - 2          JJC
  43160    84675  127455  169710  170696  225420  162700  238641
Station - 3          JFA
  42740    64145   86580  130740  169075  224455
Station - 4          3SD
  84600   128300  223380  169020
```

```
                  E N D
```

6. NAVTEX OPERATION

6.1 About NAVTEX Messages

This chapter describes operation of the NAVTEX receiver (option).

Message categories

NAVTEX stations throughout the world provide mariners with weather and navigational NAVTEX messages. These messages carry a four character header code which identifies transmitting station, category of message, and message number, numbered from 00 to 99. Message number "00" is reserved for important emergency messages. The categories of messages available in the NAVTEX system are shown in the table which follows.

Message Categories	
A : Coastal navigational warning	H : Loran-C message
B : Meteorological warning	I : Omega message
C : Ice report	J : Differential Omega message
D : Search and Rescue Alert (SAR)	K : Other electronic navigator system message
E : Meteorological forecast	L : Navarea warnings
F : Pilot message	M to Y : No category allocated
G : Decca message	Z : QRU (no message on hand)

The user may select which message categories to receive and the stations from which to receive them. Categories A, B and D must be received; international regulations require all NAVTEX receivers to print these messages because of their importance.

Receiving navtex messages

When the unit receives a routine NAVTEX message while receiving a facsimile broadcast, the NAVTEX message is stored in the memory and printed upon completion of the facsimile broadcast. For an SAR message (category D), the "SAR" LED lights, alarm sounds and the message is printed immediately.

6.2 Selection of NAVTEX Stations/Messages

As noted in the previous section you may freely select NAVTEX stations and messages.

Selecting stations

1. Press the [RCL/PRG] key twice. Operate the [▲] and [▼] keys to display the following message.

```
Set  NAVTEX  ?
```

2. Press the [ENT] key. NAVTEX stations A through H appear. You can display stations I through Z by pressing the [▶] key several times.

```
Station;█BCDEFGH
```

3. Operate the [▲] or [▼] key to select or deselect stations as shown in the figure below.

```
Station;ABCDEFGH
```
(Display in upper case to select.)

[▲] ↕ [▼]

```
Station;ABCDeFGH
```
(Display in lower case to deselect.)

Selecting message categories

4. Press the [ENT] key to register stations and show the "MESSAGE" display.

```
Message;ABCDEFGH
```

5. Similar to how you selected (or deselected) NAVTEX stations, select or deselect NAVTEX messages. You cannot deselect message categories A, B and D.

6. Press the [ENT] key to register message categories and return to the normal display.

```
┌─────────────────────────────┐
│          S   E   T          │
└─────────────────────────────┘
                │
                ↓
┌─────────────────────────────┐
│  1 0 0 N   J M H    3 6 2 2. 5 │   (Normal Display)
└─────────────────────────────┘
```
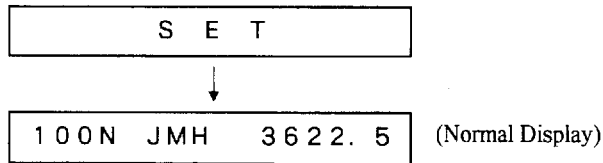
To silence the alarm of a D message, press the [ENT] key.

Sample NAVTEX message

The figure which follows shows an actual NAVTEX message. All NAVTEX messages begin with "ZCZC" and end with "NNNN." On the top line notice the characters "JA77." J is the transmitting station, A is the message category (coastal navigation warning), and 77 is the message number.

```
ZCZC  JA77
010930  UTC  FEB  94
JAPAN  NAVTEX  N.W.   NR  0173/1994
HONSYU.  NW  COAST.
E  OF  AWA  SIMA.
LOG  ADRIFT  FOLLOWING  EACH  POSITIONS
AT  010153Z  FEB.
(1)  38-26.6N  139-17.6E.
(2)  38-28.7N  139-24.3E.

NNNN
```

Remarks on NAVTEX messages

• An asterisk (*) is printed in place of actual character when it could not be read.
• When more than 33 percent of the main text of a message is in error printing is stopped.

Sample message showing asterisks

```
ZCZC  QB79
240740  UTC  *EPT  *QOOW
T*XW  NR31  XSG
*SHAI  OBSY  *ROP*CAL  ST*RM  9219  (9219)*TED
W*IOING  24080*Z*  N*16
*54***:-)  '5***  92**  (***MG*W***L**V**J*FP**PY*O****
```

• Message number "00" contains important emergency messages. It is printed every time it is received.

Confirming NAVTEX settings

You may display and print NAVTEX settings.

Displaying

1. Press the [RCL/PRG] key. Press the [▲] and [▼] keys to display the following message.

```
Recall  NAVTEX  ?
```

2. Press the [ENT] key. The "STATION" display appears. Use the [◄] and [►] keys to scroll the display leftward and rightward. Press the [▲] and [▼] keys to display station and message alternately.

```
Station;abcDefgh
```

[▲] ↕ [▼]

```
Message;ABcDefgh
```

Printing

1. Turn off the unit. While pressing and holding down the [RCL/PRG] key, turn on the power. Release the [RCL/PRG] key when the following message appears.

2. Press the [▲] key to show the following display.

```
Print  NAVTEX  ?
```

3. Press the [ENT] key to print.

6.3 Monitoring the NAVTEX Signal

You may monitor the NAVTEX signal (instead of the facsimile signal) through the speaker .

1. Press the [MODE] key twice.

2. Press the [▲] and [▼] keys to display the following message.

```
Monitor  NAVTEX  ?
```

3. Press the [ENT] key to return to the normal display.

To again monitor the facsimile signal, display "Monitor FAX?" in step 2 of the above procedure and press the [ENT] key.

7. MAINTENANCE

7.1 Visual Checks and Cleaning

Visual checks

This unit is designed and manufactured to provide many years of trouble free performance. However, no machine can perform its intended function unless properly maintained.

The unit should be visually checked on a regular basis, following the check points shown in the table below.

Check Point	Action/Remedy
Whip antenna	Check for damage. Replace if necessary.
Antenna wire	Check sheath for cracks. Tape minor cracks. Replace the antenna if there are signs of water leakage.
Junction between whip antenna and preamp (option)	Check for corrosion and tight connection. Clean and waterproof with sealing compound, if necessary.
Coaxial cable	Check for damage and tight connection. Replace if damaged.
Power cable	Check for tight connection at battery and unit.
Ground terminal	Check for tight connection and corrosion. Remove rust.

Cleaning

Keep the unit clean and dry at all times. Dust can be removed with a soft cloth. If necessary, the unit can be cleaned with a mild detergent diluted with fresh water. Chemical solvents should never be used to clean the unit. They can remove paint and markings.

7.2 Cleaning of the Printing Head

When to clean the printing head

The printing head is capable of printing more than 60 rolls of paper. However, if dust is allowed to accumulate on the surface of the head, print quality will drop considerably. A cleaning pen comes with the printing head. Clean the head with the pen every three to five rolls of paper as follows.

Procedure

1. Detach the paper cover and remove the three tapping screws shown in the figure at right.

Tapping Screw (ϕ 4 × 12)

2. Lift up the top chassis, being careful not to damage the flat cable connected between the top and bottom chassis.

Bottom Chassis

Printing Head

3. Clean the head with the cleaning pen.

4. Refasten the top chassis and close the paper cover.

Printing Head

Head Cleaning Pen
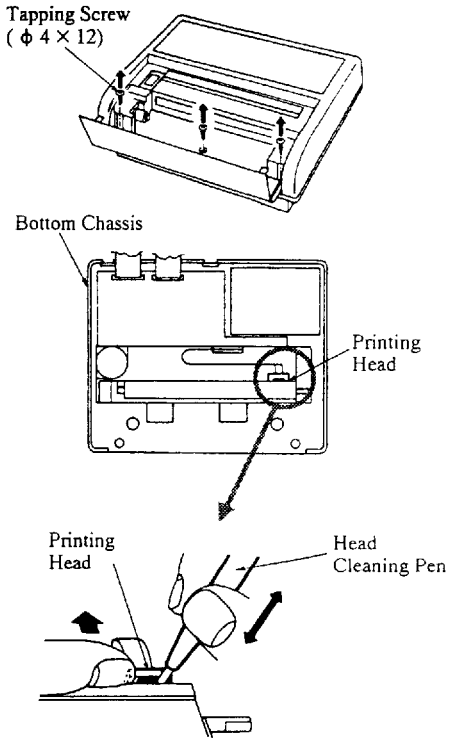
Name	Thermal Head Cleaner
Type	OWP-FD-6A1-01
Code No.	005-861-030

7.3 Replacement of Fuses

Two 7A fuses in the power cable protect the unit from reverse polarity of the power source and equipment fault. If a fuse blows, find out the cause before replacing the fuse.

⚠ **CAUTION**

Use the correct fuse.

Use of the wrong fuse can cause fire or equipment damage.

7A Fuse

Close

Open
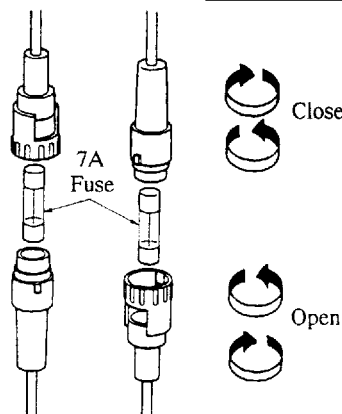
Type	FGBO 7A 125V
Code No.	000-549-013

8. TROUBLESHOOTING
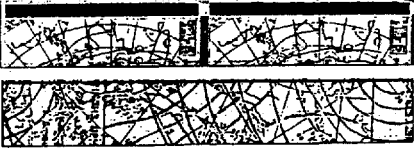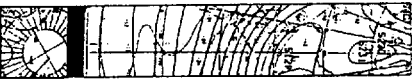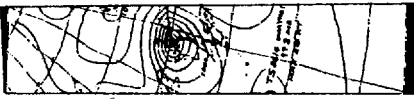
8.1 Operator Troubleshooting

⚠ WARNING

Do not open the cover of the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death. Only qualified personnel should work inside the equipment.
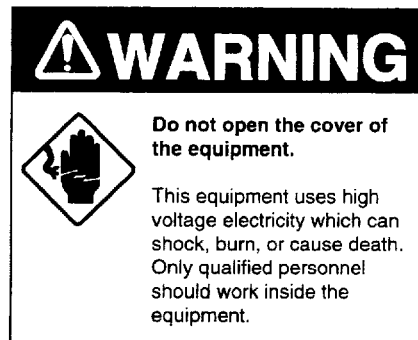
Problems with the equipment may be caused not only by a faulty circuit but also by the incoming signal condition, inadequate installation, or even operator error.

The list below shows the typical troubles which may be mistaken as equipment malfunction.

SYMPTOM	POSSIBLE CAUSE	REMEDY
Power won't come on. (No display nor sound)	1. Switch at main switchboard is turned off 2. Power connector is loose or pulled out. 3. Power fuse has blown. 4. Battery is fully discharged. (for dc mains)	1. Turn on the main switch. Plug connector firmly. 2. Check mains voltage and polarity first, and put a new fuse. 3. If it blows again, call for service. 4. Charge or replace battery.
Lamp lighs but no or faint display.	1. Improper LCD contrast setting	1. Adjust the [LCD] control.
Unreadable character displayed	1. Backup memory contents are destroyed. 2. Keep-alive battery is discharged.	1. Perform "Cold Start." (See page 8-5.) 2. Replace the battery. (Refer to Service Manual.)
No audible sound	1. [VOLUME] is set too low.	1. Adjust [VOLUME] control.
Noise heard but no or very weak signal	1. Antenna connector is loose or pulled out. 2. Antenna cable is cut or shorted.	1. Fasten connector tightly. 2. Repair or replace cable.
No response to key operation	1. Internal connector is pulled out.	1. Check internal cable connections.
Can't start recording.	1. Paper has run out.	1. Load a new roll of paper.

Paper won't advance.	1. Paper is jammed. 2. Paper roll is not supported properly.	1. Clean paper path. 2. Load paper correctly.(See page 4-1.)
Paper feeds but no recording.	1. Paper is loaded with front-side-back. 2. Non-thermal paper is used.	1. Load paper correctly. 2. Use specified thermal paper.
Recording is too faint or too dark.	1. Improper print darkness setting.	1. Adjust [RECORD] control properly.
Multiple or overlapped picture	1. Speed mismatch 	1. Select correct speed.
Split picture (dead sector in the middle)	1. Out of phase 	1. Set PHASE manually. (See page 3-5.)
Verticall expanded or compressed picture.	1. IOC mismatch 	1. Change IOC manually.
Skew picture.	1. SYNC is deviated. 	1. Adjust [SYNC] control. (See page 3-5.)
Faint or distorted picture	1. Weak incoming signal 2. Receiver detuned	1. Select another frequency. 2. Adjust frequency manually. (See page 3-6.)
Won't start recording as scheduled.	1. Remote start mode is selected but no start signal transmitted. 2. Improper schedule setting (Two programs ovelapped in time — later schedule will be cancelled.)	1. Use time start mode if dead sector is transmitted in black. 2. Review schedule.
Schedule is lost.	1. Keep-alive battery is discharged.	1. Replace the battery.
Paper turned black	1. Paper has been store in hot environment or exposed to active gas.	1. Store paper in dry and cool place.

8.2 Self-Test

To aid the service technician in tracing down a defective circuit block inside the equipment, the FAX-208 MARK-2 is equipped with a self-test facility. As this test is intended for use by service personnel, do not attempt further circuit check inside even if the faulty block can be identified. Prior to starting the self-test, make sure that the mains voltage is within the rated range (10V − 40VDC) and the power fuses are not blown. Check also that the recording paper is loaded correctly. To start the test, turn on the POWER switch while holding down the [MODE] key.

START

[MODE] + [POWER] ON

Self test starts? — No → POWER PACK (08P3117)

Lamps light? — No → POWER PACK (08P3117)

Lamps light? — Yes → MASTER CPU Board (08P3171)

"Self Test" display on LCD? — No → LCD Board (DM005Z − 2AR) [LCD] Control

Prog. No. and copyright printed? — No → PRINTER (EPT-3051)

Character-set printed correctly? — No → PRINTER (EPT-3051)

Test pattern printed correctly? — No → MASTER CPU Board (08P3171), PRINTER [RECORD] Control

SPEED & PHASE LEDs light? — No → LED Board (08P3172)

− cont −

Self Test

Prints program version number and copyright message.

< FAX >   Program No. 0850-1571-00
FURUNO   Electric Co., LTD.   Japan   1991. 7.

* Program number (and the date of issue) is sbject to change.

Test Printer

Prints complete character-set.

Printer CPU Self Test

abcdefghijklmnopqrstuvwxyz0123456789 ...
ABCDEFGHIJKLMNOPQRSTUVWXYZ0123456789...

Test FAX

Prints eight-tone checker pattern.

FAX CPU Self Test

Puts PHASE and SPEED LEDs on.

8-3

```
                                        ┌─────────────────────────┐
                          ┌ ─ ─ ─ ─ ─ ─ │  T e s t   N A V T E X  │
                                        └─────────────────────────┘
   ╱‾‾‾‾‾‾‾‾‾‾‾╲  No
  ╱  RAM/ROM    ╲                        The test is available only when NAV RCV
  ╲  all OK?    ╱                        boaed is incorporated.
   ╲_____╱
        │ Yes                             o Checks ROM/RAM on NAV RCV
        │                                   board.
   ╱‾‾‾‾‾‾‾‾‾‾‾‾╲  No   ┌───────────────┐  o Performs local loop-back test. (The
  ╱ NAVTEX meaasge╲─────│ NAV RCV Board │    frequency-shift tone can be heard.)
  ╲ printed correctly?  │ (08P3119)     │
   ╲_____╱ └───────────────┘
        │ Yes
        │
   ╱‾‾‾‾‾‾‾‾‾‾‾‾╲  No
  ╱ Loop-back test OK? ╲
   ╲_____╱
        │ Yes
```

(NAVTEX Self Test printout)
```
------------- NAVTEX Self Test -------------
ROM Test  OK
RAM Test  OK
ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890
NAVTEX Signal Send and Receive (Local Loop Test)
ZCZC TE01
ABCDEFGHIJKLMNOPQRSTUVWXYZ 01234567890
NNNN
```
───────────────── message sent (generated)
───────────────── message received

```
                                        ┌─────────────────────────┐
                          ┌ ─ ─ ─ ─ ─ ─ │  T e s t   M a s t e r  │
                                        └─────────────────────────┘
   ╱‾‾‾‾‾‾‾‾‾‾‾╲  No   ┌───────────────┐
  ╱ LEDs light? ╲──────│ LED Board     │  Checks RAM/ROM on MAIN CPU.
  ╲_____╱       │ (08P3172)     │  Light all LEDs on front panel.
        │ Yes          └───────────────┘
        │
   ╱‾‾‾‾‾‾‾‾‾‾‾╲  No   ┌───────────────┐
  ╱  RAM/ROM    ╲──────│ MASTER CPU    │
  ╲  all OK?    ╱      │ Board (08P3171)│
   ╲_____╱       └───────────────┘
        │ Yes
```

(Master CPU Self Test printout)
```
------------- Master CPU Self Test -------------
Internal RAM OK
External RAM OK
ROM          OK
(FAX Receiver Test)
   5000.0 kHz    Sense-Level = 5
  10000.0 kHz    Sense-Level = 3
  15000.0 kHz    Sense-Level = 7
```

```
                      ┌───────────────┐
                   ┌──│ FAX RCV Board │
                   │  │ (08P3162)     │
   ╱‾‾‾‾‾‾‾‾‾‾‾‾╲  No │  └───────────────┘
  ╱ Signal levels 3 to 9? ╲─┤ ┌───────────────┐
  ╲_____╱   ├──│ LF/HF PREAMP  │
        │ Yes            │  │ (FAX - 5)     │
        │                │  └───────────────┘
        │                │  ┌───────────────┐
        │                └──│ TB Board      │
        │                   │ (08P3176)     │
        │                   └───────────────┘
```

Receives standard time signal (WWX, JJY, MSF, ZUO, etc.) at 5, 10 and 15MHz and prints each signal level (0 to 9) If abnormal, signal level will be 0 to 2.

```
   ╱‾‾‾‾‾‾‾‾‾‾‾‾╲  No   ┌───────────────┐
  ╱ All keys accepted? ╲─│ KEY LED Board │
  ╲ (excl. Dimmer key)  │ (08P3125)     │
   ╲_____╱ └───────────────┘
        │ Yes
```

```
┌───────────────────────────┐
│  P u s h   [ R C L / P R G ]│
└───────────────────────────┘
            │
┌───────────────────────────┐
│  P u s h   [ M O D E ]     │
└───────────────────────────┘
            │
┌───────────────────────────┐
│  A l l   k e y   O K       │
└───────────────────────────┘
            │
┌───────────────────────────┐
│  E n d   o f   T e s t     │
└───────────────────────────┘
```

Press the key as LCD prompts.

If the key operation is accepted, a beep is generated and the LCD shows the next key to be pressed.

```
   ┌───────────────┐
   │ PASSED ALL    │
   │ THE TESTS     │
   └───────────────┘
        │
   ┌───────────────┐
   │ [POWER] OFF   │
   └───────────────┘
        │
   (    END    )
```

8.3 Clearing the Memory (Cold Start)

When to clear the memory

The FAX-208 MARK-2 retains all user-entered information, such as time, timer programs and frequencies, in a memory. A "back-up" battery, of which the estimated life is five years, preserves the contents of the memory when the power is off. However, the contents of the memory may become jumbled because of a dead battery. When this occurs, clear the memory to remove any stray data that may still remain there after replacement of the battery. All data are cleared and the unit starts operation with default settings. If the information you have entered is important to you, jot it down in a log before clearing the memory.

Procedure

1. Turn off the power. While pressing and holding down the [CH] key, turn on the power. Release the [CH] key when the following message appears.

```
Cold  Start  ?
```

2. Press the [ENT] key. The display changes in the following sequence.

```
Cold  Start
```
↓
```
FURUNO   < DFAX >
```
↓
```
TIME      0 : 0 0
```
↓
```
100N  JMH      3622.5
```
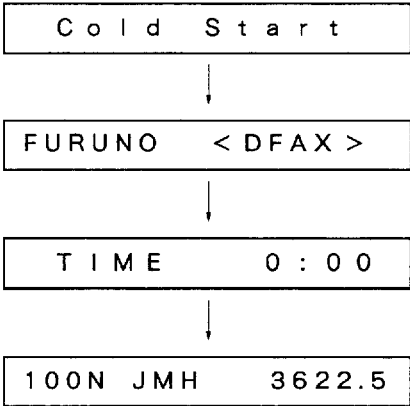
9. SPECIFICATIONS

RECORDER SECTION

Recording System: Serial thermal recording system (16 dot)

Scanning Speed: 60, 90, 120 and 240 rpm

Index of Cooperation: 576 (high density) and 288 (low density)
(I.O.C.)

Recording Resolution: 5 lines/mm approx.

Gradation: Eight levels

Recording Controls:
a. Start/stop
   Automatic by schedule timer and/or
   WMO remote control signals, or Manual
b. Scanning speed
   Automatic or Manual
c. I.O.C.
   Automatic by WMO start signals or Manual
d. Phase matching
   Automatic by line sync. signal or Manual

External Input Signal: Black 1500Hz, white 2300Hz FSK or FM signal
(signal level; 0 dBm at 600 ohms)

Recording Paper: Thermal paper TP-0820B, 216mm(W) × 20m(L),
effective width 200.2mm (1420 dot)

RECEIVER SECTION

Frequency Range: LF: 80kHz to 160kHz in 100 Hz steps
MF/HF: 2MHz to 25MHz in 100Hz steps

Number of Channels: All existing facsimile stations and frequencies plus 310
private frequencies (both re-programmable by operator)

Frequency Selection:	• Automatic channel search for highest signal strength within a selected zone/station • Manual selection of zone, station and channel number • Manual tuning in 100 Hz steps by font panel controls
Tuning Indication:	Flow-up/flow-down (detuned) and steady (tuned) by three LEDs
Class of Emission:	F3C, J3C (USB/LSB selectable)
Receiving Sensitivity:	LF: better than 10 μV at 20dB SINAD MF/HF: better than 2μV at 20dB SINAD
Selectivity:	2.6kHz at $-$ 6dB 8kHz at $-$ 60dB

GENERAL SPECIFICATIONS

Power Supply:	10 to 40VDC universal or 100/110/220VAC, 1 ϕ , 50/60Hz (Rectifier is required)
Power Consumption:	Stand-by: less than 15W Recording: less than 30W
Environmental Condition:	$-$ 15 ℃ to +55 ℃ (95%RH at 35 ℃)

COMPASS SAFE DISTANCE

Unit	Standard Compass	Steering Compass
FAX-208 MARK-2	1.0 m	0.55 m

LF/HF PREAMP UNIT (FAX- 5: Option)

Frequency Range:	80kHz to 30MHz
Applicable Antenna:	Wire antenna or 2.6m Whip antenna
Input Protection:	Protected against 30Vrms antenna input for 15 minutes
Output Impedance:	50 ohms

APPENDIX 1
PRINCIPLE OF FACSIMILE
AND NAVTEX SYSTEMS

HOW A FACSIMILE SYSTEM WORKS

The picture on a TV screen is composed of many fine horizontal lines. This is because of its transmission system that a frame of picture is sliced into narrow strips and sent piece by piece serially to a receiving station, where the strips are reassembled to reconstruct the original picture. As the frequency band assigned for TV broadcasting is comparatively wide, 25 or 30 frames of pictures can be sent in a second.

The radio facsimile uses much the same principle as the TV broadcasting system, but in a lower frequency and in a narrower bandwidth. Due to this limitation, it takes several minutes for the facsimile transmitter to send a frame of picture.

Though the transmission speed is slower than that of the TV, the facsimile signals in LF or HF bands propagate at much greater distances than the normal TV signal.

RADIO FACSIMILE SYSTEM
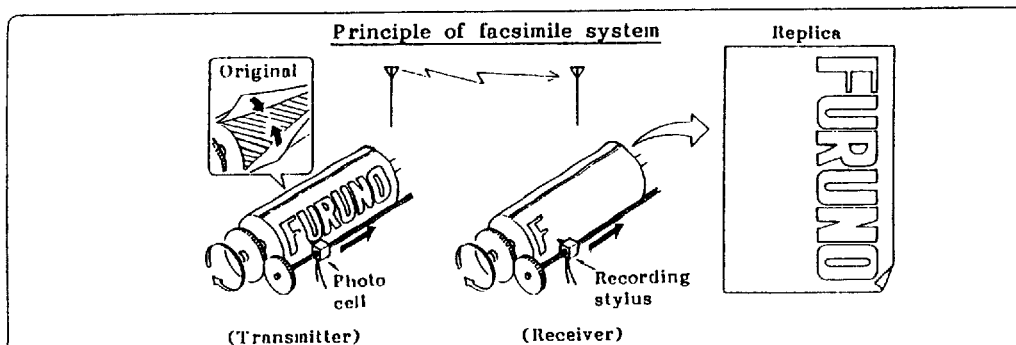
At the facsimile transmitter, the original picture is fitted on a drum rotating at 60, 90, 120 or 240 rpm, and a photo cell mounted on the threaded shaft moves slowly along the drum. The photo cell, focused on a point on the drum, converts black and white information into an electrical signal. As the drum rotates and the photo cell moves, the picture information is sliced into narrow pieces and a series of black and white signals are obtained. In the transmitter, the black and white signals are converted into 1500Hz (black) and 2300Hz (white) frequency shifts and modulates the radio frequency assigned for the station. (The black and white frequencies will be reversed in the LSB transmission.)

At the receiver, the frequency shift (FS) signals are converted into a black and white recording signal and the marks are printed on the recording paper.

To obtain an exact copy of the original picture at the receiver, the rotating speed and phasing of the transmitter and receiver must agree with each other, i.e., synchronization in rotation and synchronization in position.

To achieve automatic synchronization, most transmitters transmit a phasing signal before sending pictures. The phasing signal is a continuous black signal with narrow white gaps at the seam of the original picture. In the automatic facsimile receiver, the repetition rate and position of the white gaps are detected to determine rotating speed and phase.

In addition to the speed and phase synchronization, the line density with respect to the picture width for the transmitter and receiver must agree with each other to obtain an exact copy of the original picture. Otherwise the reproduced picture may be expanded or compressed vertically. To maintain international compatibility, two line density standards are assigned by WMO; high density $-$ IOC 576 and low density $-$ IOC 288.

IOC stands for Index Of Cooperation, and indicates the horizontal/vertical ratio of a picture. In practice, it is the product of line density and drum diameter.

$$IOC = (\text{line density}) \times (\text{drum diameter})$$

or

$$IOC = \frac{(\text{line density}) \times (\text{picture width})}{\pi}$$

Start Signal
$$\begin{bmatrix} 300Hz: & IOC & 576 \\ 675Hz: & IOC & 288 \end{bmatrix}$$

Phasing Signal

To enable fully automatic start and stop of picture recording, most facsimile transmitters send remote start and remote stop signals before and after transmission of pictures. The remote signals appear as black/white stripes as shown right.

For identification of start, stop and line density of picture transmission, three frequencies are used as remote signals. The start signal is either 300Hz or 675Hz to indicate the line density of the forthcoming picture. The remote stop signal is always 450Hz.

Stop Signal
(450Hz)
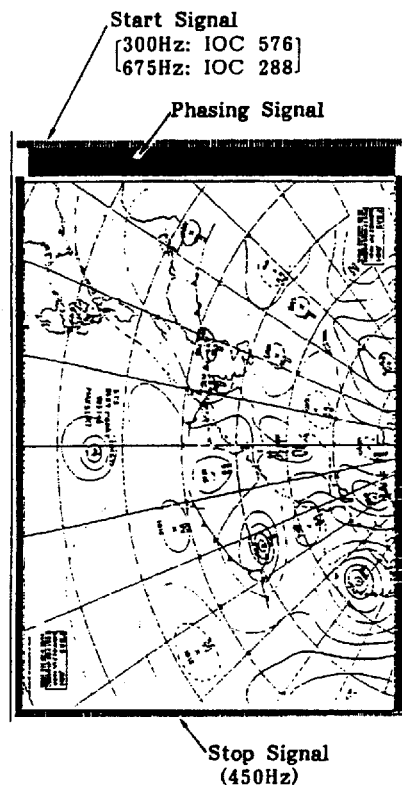
RECORDING SYSTEM ON THE FAX-208 MARK-2

The recording system used in FAX-208 MARK-2 is somewhat different from conventional facsimile recorders.

The received signal is first stored and assembled in the memory according to the given speed, phase and IOC. It is then printed out by the parallel printer head when a certain amount of picture information is accumulated in the memory. For IOC 576, one piece of the picture, corresponding to approximately 30 scan lines of incoming signal, is printed at a time.

Picture recording is performed by controlling the temperature of each thermal element rapidly while moving the parallel head on the recording paper. Depending on the temperature, chemical material on the paper changes the color of the paper and reproduces picture.

HOW NAVTEX WORKS

There are many types of navigational and meteorological information available on radio such as NAVAREA, HYDROPAC, etc. However, these systems rely heavily upon the operator's experience and skill in tuning the radio and interpreting messages. In addition, constant monitoring to pick up wanted information among a vast volume of messages is not practical with a limited radio staff.

To provide all mariners with up-to-the-minute information automatically, the NAVTEX system was developed.

NAVTEX is an acronym meanings Navigational Telex, and as its name shows, it is a kind of narrow band radio teletype system for sending (by frequency shift keying) text messages expressed in a 7-unit code. The difference between the conventional narrow band teletype system and the NAVTEX is that a NAVTEX transmitter transmits nine control characters (header code) ahead of the main message, so that the receiver can identify the station, message type and serial number automatically.

NAXTEX SYSTEM OPERATION

For navigation purposes, the world is divided into 16 areas as shown in the figure below. Each NAVTEX station in each area has an identification code, from "A" to "Z."
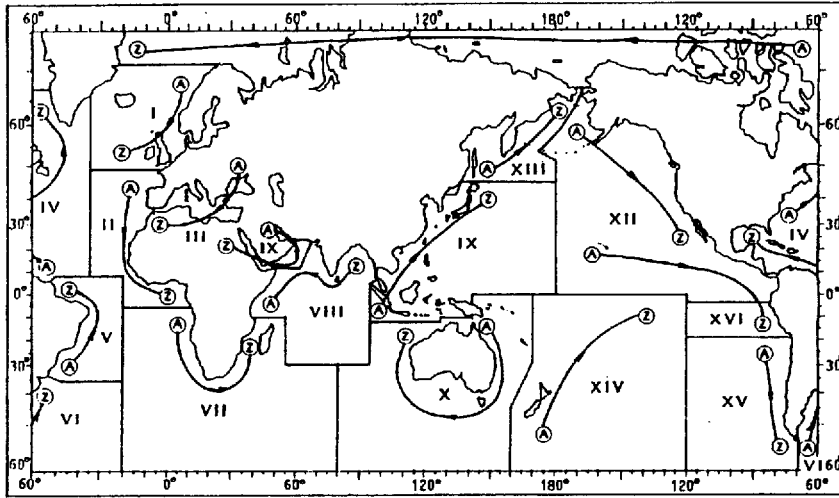
The frequency assigned to NAVTEX is only one (518kHz), and many stations exist in the same service coverage. If the stations were to transmit without any rule, the system would collapse due to mutual interference. To avoid this problem, the following rules apply.

• The transmission schedule is determined so that two or more stations having common a service area may not overlap in time.

• Each station transmits with minimum required power to cover its service area (200 nautical miles nominal).

The table below shows the transmission time schedule in Navarea I.

Station						
Reykjavik (R)	0318	0718	1118	1518	1918	2318
Scheveningen (P)	0348	0748	1148	1548	1948	2348
Stockholm (J)	0330	0730	1130	1530	1930	2330
Oostend (T)	0248	0648		1248	1848	2248
Rogoland (L)	0148	0548	0948	1348	1748	2148
Brest le C. (F)	0118	0518	0918	1318	1718	2118
Cullercoast (G)	0048	0448	0848		1648	2048
Tallin (U)	0030	0430	0830	1230	1630	2030
Haernoesand (H)	0000	0400	0800	1200	1600	2000
Rodo (B)	0018	0418	0900	1218	1618	2100

AP1-4

MESSAGE FORMAT

For automatic identification of messages, each message starts with nine control characters so called "Header codes."

The first five characters are always "ZCZC " and common to all messages. This part is used for message synchronization. The latter four characters are designated as B1, B2, B3 and B4, and indicate origin, category and serial number of the message.

Character B1 is the identification letter of the Navtex station; "A" thru "Z." Character B2 indicates the type of message, "A" thru "Z", as listed in the following page. Characters B3 and B4 indicate the serial number of the message. The serial numbers are counted up from "01" to "99", and starts from "01" again. Number "00" is specially reserved for important emergency messages, such as a search and rescue (SAR) message.

The end of each message is indicated by "NNNN" (four successive Ns').

General message format is summarized below.

[Type of message (category)]

A: Coastal navigational information
B: Meteorological warning
C: Ice report
D: Search and rescue alert
E: Meteorological forecast
F: Pilot message
G: Decca message

H: Loran C-message
I: Omega message
J: Differential Omega message
K: Other electronic nav. system message
L: NAVAREA message
M − Y: No category assigned
Z: QRU (no message on hand)

APPENDIX 2 FACSIMILE STATION MAP/STATION LIST

FACSIMILE STATION MAP

FACSIMILE STATION LIST

STA-TION	CALL SIGN	TRANSMITTED FROM	
ZONE 1		**NORTH PACIFIC OCEAN WESTERN PART**	
0	JMH	Tokyo	JAPAN
1	JMJ	Tokyo	JAPAN
2	JJC	Tokyo	JAPAN
	9VF *	Tokyo	Via SINGAPORE
3	JFA	Tokyo	JAPAN
4	3SD	Beijing	CHINA
5	BAF	Beijing	CHINA
6	BDF	Shanghai	CHINA
7	BMF	Taipei	TAIWAN
8	RHB	Khabarovsk	RUSSIA
9	HLL	Seoul	KOREA
ZONE 2		**NORTH PACIFIC OCEAN EASTERN PART**	
0	NPN	Guam	MARIANA IS.
1	NPO	Sanglay Point	PHILIPINES
2	HSW	Bangkok	THAILAND
3	NPM	Pearl Harbour	USA
4	KVM	Honolulu	USA
5	NOJ	Kodiak Alaska	USA
6	CKN	Esquimalt	CANADA
7	NMC	San Francisco	USA
8	WWD	La Jolla	USA
9	AUX		
ZONE 3		**SOUTH PACIFIC OCEAN, INDIAN OCEAN, PERSIAN GULF**	
0	AXI	Darwin	AUSTRALIA
1	AXM	Camberra	AUSTRALIA
2	ZKLF	Auckland	NEW ZEALAND
3	NPN	Guam	Via AUSTRALIA
		Guam	Via JAPAN
4	ATP	New Delhi	INDIA
5	EPD	Teheran	IRAN
	NPN *	Guam	Via Diego Garcia
6	5YE	Nairobi	KENYA
7	ZRO	Pretoria	SOUTH AFRICA
8	HXP	Saint Denis	MAURITIUS
9	RUZU	Molodezhnaya	RUSSIA
ZONE 4		**SOUTH ATLANTIC OCEAN**	
0	CLX	Casablanca	CUBA
1	FFP	Fort de France	MARTINIQUE
2	GYA		
3	PPN	Brasilia	BRASIL
4	PWZ	Rio de Janeiro	BRASIL
	PRO *	Orinda	BRASIL
5	LRO	Buenos Aires	ALGENTINE
6	CCS	Santiago	CHILE
7	CCV	Belloto	CHILE
8	LFB	Centro Meteorologeco	ANTARCTIC
9	CBV	Valparaiso Armada de	CHILE

ZONE[0] is allocated for private channels.
(10 channels each for 12 stations)
*: Callsign not displayed.

AP2-2

STA-TION	CALL SIGN	TRANSMITTED FROM	
ZONE 5		**NORTH ATLANTIC OCEAN WESTERN PART**	
0	WLO	Mobile	USA
1	NAM	Norfoik	USA
2	KWAF	Washington DC	USA
3	KW	Lewes	USA
		Dalaware	USA
4	WFH	Brentwood	USA
5	NIK	Boston	USA
6	NMF	Boston	USA
7	CFH	Halifax	CANADA
8	VFF	Frobisher	CANADA
9	OXT	Skamlebaek	GREENLAND
	XPM		
ZONE 6		**NORTH ATLANTIC OCEAN EASTERN PART**	
0	GFA	Bracknell	UK
1		Bracknell	UK
2	GYA	Northwood	UK
	GZZ *		
	GYJ *		
3	FTE	Paris	FRANCE
4	CTV	Monsanto	PORTUGAL
5	AOK	Rota	SPAIN
6	MAD	Madrid	SPAIN
	NPN *		
7	NHY	Kenitora	MOROCCO
8	6VU	Dakar	SENEGAL
9	AUX		
ZONE 7		**NORTH ATLANTIC OCEAN NORTHERN PART**	
0	DCF	Offenbach	GERMANY
1	DDK	Hamburg	GERMANY
	DDH *		
2	OXT	Copenhagen	DENMARK
3	OLT	Praha-Modrany	CZECHOSLOVAKIA
4	SMA	Norrkoping	SWEDEN
5	LMO	Oslo	NORWAY
6	OFA	Helsinki	FINLAND
	OFH *		
	OHG *		
7	OFW	Vaasa	FINLAND
	TFA *	Reykjavic	ICELAND
8	RBI	Moscow	RUSSIA
9	AUX		
ZONE 8		**MEDITERRANEAN SEA**	
0	IMB	Rome	ITALY
1	NPN	Ahtens	GREECE
	SVG4 *		
2	YZZ	Beograde	YUGOSLAVIA
3	NGR	Athens	GREECE
4	LZJ2	Sofia	BULGALIA
5	YMA	Ankara	TURKEY
6	MKS	Episkopi	CYPRUS
7	SUU	Cairo	EGYPT
8	JED	Jeddah	SAUDI ARABIA
	HZN *		
9	AUX		

FACSIMILE STATION LIST (Alphabetic)

	Nation	City	Zone No.	Station No.	Call sign	Remarks
M	MARIANA IS.	Guam	2	0	NPN	US Navy
	MARTINIQUE	Fort de France	4	1	FFP	
	MAURITIUS	Sain Denis	3	8	HXP	
	MOROCCO	Kenitora	6	7	NHY	
N	NEW ZEALAND	Auckland	3	2	ZKLF	
	NORWAY	Oslo	7	5	LMO	
P	PHILIPPINES	Sanglay Point	2	1	NPO	US Navy
	PORTUGAL	Monsanto	8	4	CTV	
S	SENEGAL	Dakar	6	8	6VU	
	SAUDI ARABIA	Jeddah	8	8	JED	
	SOUTH AFRICA	Pretoria	3	7	HZN	
	SPAIN	Rota	6	5	ZRO, AOK	US Navy
		Madrid	6	6	MAD, NPN	
	SWEDEN	Norrkoping	7	4	SMA	
T	TAIWAN	Taipei	1	7	BMF	
	THAILAND	Bangkok	2	2	HSW	
	TURKEY	Ankara	8	5	YMA	
U	UK	Bracknell	6	0	GFA	
		Bracknell	6	1	GFA	
		Northwood	4	2	GYA	For S. A.
		Northwood	6	2	GYA, GZZ, GYJ	
	USA	Boston	5	5	NIK	
		Boston	5	6	NMF	
		Brentwood	5	4	WFH	
		Diego Garcia	3	5	NPN	
		Honolulu	2	4	KVM	
		Kodiak Alaska	2	5	NOJ	
		La Jolla	2	8	WWD	
		Lewes Delaware	5	3	KWX, KWX	
		Mobile	5	0	WLO	
		Norfolk	5	1	NAM	
		Pearl Harbour	2	3	NPM	
		San Francisco	2	7	NMC	US Navy
		Washington DC	5	2	KWAF, RHB	AIR Force
W	RUSSIA	Khabarovsk	1	8	RUZU	
		Molodezhnaya	3	9	RBI	
		Moscow	7	8		
	GERMANY	Hamburg	7	1	DDK, DDH	
		Offenback	7	0	DCF	
Y	YUGOSLAVIA	Belgrade	8	2	YZZ	

	Nation	City	Zone No.	Station No.	Call sign	Remarks
A	ANTARCTIC	Meteorologic.	4	8	LFB	
	ARGENTINE	Buenos Aires	4	5	LRO	
	AUSTRALIA	Canberra	3	1	AXM	
		Darwin	3	0	AXI	
		H. E. Holt	3	3	NPN	US Navy
B	BRAZIL	Brasilia	4	3	PPN	
		Orinda	4	4	PPO	
		Rio de Janeiro	4	4	PWZ	
	BULGARIA	Sofia	8	4	LZ/2	
C	CANADA	Esquimalt	2	6	CKN	
		Frobishier	5	8	VFF	
		Halifax	5	7	CFH	
	CHILE	Belloto	4	7	CCV	
		Santiago	4	6	CCS	
		Valparaiso	4	9	CBV	
	CHINA	Beijing	1	4	3SD	
		Beijing	1	5	BAF	
		Shanghai	1	6	BDF	
	CUBA	Casablanca	4	0	CLX	
	CYPRUS	Episkopi	8	6	MKS	
	CZECHOSLOVAKIA	Praha-Modrany	7	3	OLT	
D	DENMARK	Copenhagen	7	2	OXT	
E	EGYPT	Cairo	8	7	SUU	US Navy
F	FINLAND	Helsinki	7	6	OFA, OFH, OHG, OFW, FTE	
G	FRANCE	Vaasa	7	7	NPN	
		Paris	8		SVG4	
	GREECE	Athens	8	1	NGR	
	GREENLAND	Athens	8	3	OXT	
		Skamlebaek	5	9	XPM	
I	ICELAND	Reykjavik	7	7	TFA	
	INDIA	New Delhi	3	4	ATP	
	IRAN	Teheran	3	5	EPD	
	ITALY	Rome	8	0	IMB	
J	JAPAN	Tokyo	1	0	JMH	No. 1
		Tokyo	1	1	JMJ	No. 2
		Tokyo	1	2	JJC, 9VF	JMSA & Kyodo
		Tokyo	1	3	JFA	Chuo Gyogyo
K	KENYA	Nairobi	3	6	5YE	
	KOREA	Seoul	1	9	HLL	

APPENDIX 3 NAVTEX
STATION MAP/STATION LIST

NAVTEX STATION MAP
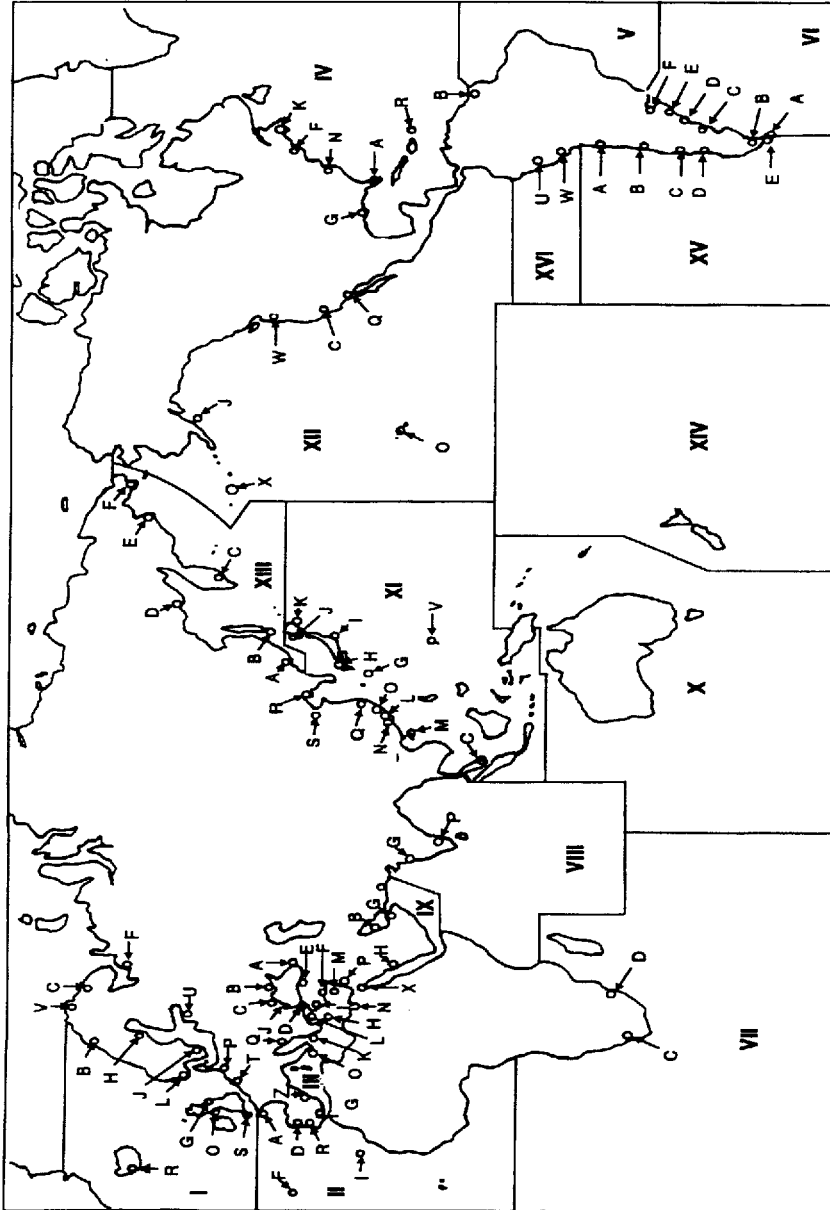
NAVTEX STATION LIST (1/3)

Nav-area	Stn ID	Country	City	Time Schedule (UTC)	Remarks
I	B	NORWAY	Bodo	0018, 0418, 0900, 1218, 1618, 2100	Pre-operational
	C	RUSSIA	Murmansk	0120, 0520, 0920, 1320, 1720, 2120	
	F	RUSSIA	Arkhangelsk	0200, 0600, 1000, 1400, 1800, 2200	
	G	U. K.	Cullercoats	0048, 0448, 0848, 1248, 1648, 2048	
	H	SWEDEN	Haernoesand	0000, 0400, 0800, 1200, 1600, 2000	
	J	SWEDEN	Stockholm	0300, 0730, 1130, 1530, 1930, 2330	
	L	NORWAY	Rogaland	0148, 0548, 0948, 1348, 1748, 2148	
	O	U. K.	Portpatrick	0130, 0530, 0930, 1330, 1730, 2130	
	P	NETH. L	Scheveningen	0348, 0748, 1148, 1548, 1948, 2348	
	R	ICELAND	Reykjavik	0318, 0718, 1118, 1518, 1918, 2318	
	S	U. K.	Niton	0018, 0418, 0900, 1218, 1618, 2100	
	T	BELGIUM	Oostende	0248, 0648, 1048, 1448, 1848, 2248	
	U	RUSSIA	Tallin	0030, 0430, 0830, 1230, 1630, 2030	
	V	NORWAY	Vardoe	0300, 0700, 1100, 1500, 1900, 2300	
II	A	FRANCE	Brest-Le conq		Planned
	D	SPAIN	Finisterre	0030, 0430, 0830, 1230, 1630, 2030	
	F	PORTUGAL	Azores	0050, 0450, 0850, 1250, 1650, 2050	
	I	SPAIN	Canary Islands	0100, 0500, 0900, 1300, 1700, 2100	
	R	PORTUGAL	Lisbon	0250, 0650, 1050, 1450, 1850, 2250	
		CAMEROON	Douala		Planned
III	A	RUSSIA	Novorossiysk	0300, 0700, 1100, 1500, 1900, 2300	
	B	RUSSIA	Mariupol	0100, 0500, 0900, 1300, 1700, 2100	
	C	RUSSIA	Odessa	0230, 0630, 1030, 1430, 1830, 2230	
	D	TURKEY	Istanbul	0030, 0430, 0830, 1230, 1630, 2030	Planned
	E	TURKEY	Samsun	0040, 0440, 0840, 1240, 1640, 2040	
	F	TURKEY	Antalya	0050, 0450, 0850, 1250, 1650, 2050	
	G	SPAIN	Tarifa	0100, 0500, 0900, 1300, 1700, 2100	
	H	GREECE	Iraklion	0110, 0510, 0910, 1310, 1710, 2110	
	I	TURKEY	Izmir	0120, 0520, 0920, 1320, 1720, 2120	
	J	BULGARIA	Varna	0130, 0530, 0930, 1330, 1730, 2130	
	K	GREECE	Kerkyra	0140, 0540, 0940, 1340, 1740, 2140	Planned
	L	GREECE	Limnos	0150, 0550, 0950, 1350, 1750, 2150	
	M	CYPRUS	Troodos	0200, 0600, 1000, 1400, 1800, 2200	
	N	EGYPT	Alexandria	0210, 0610, 1010, 1410, 1810, 2210	
	O	MALTA	Malta	0220, 0620, 1020, 1420, 1820, 2220	Planned
	P	ISRAEL	Haifa	0020, 0420, 0820, 1220, 1620, 2020	Planned
	Q	YUGO	Split	0250, 0650, 1050, 1450, 1850, 2250	
	Z	SPAIN	Cabo La Nao		
		FRANCE	La Garde		
IV	A	USA	Miami	0000, 0600, 1200, 1800	Pre-operational
	B	BERMUDA	St. Georges	0100, 0700, 1300, 1900	
	F	USA	Boston	0445, 1045, 1645, 2245	
	G	USA	New Orleans	0300, 0900, 1500, 2100	
	K	CANADA	Sydney	0040, 0540, 0940, 1340, 1740, 2140	Under trials
	N	USA	Portsmouth	0130, 0730, 1330, 1930	Pre-operational
	R	USA	San Juan	0415, 1015, 1615, 2215	Pre-operational

NAVTEX STATION LIST (2/3)

Nav-area	Stn ID	Country	City	Time Schedule (UTC)	Remarks
V		URUGUAY	Colonia		Planned
		URUGUAY	Laguna D Sauce		Planned
		URUGUAY	La Paloma		Planned
		URUGUAY	Montevideo		Planned
		URUGUAY	Punta de Este		Planned
		URUGUAY	Salto		Planned
VI	A	ARGENTINA	Ushuaia	0240, 0840, 1440, 2040	
	B	ARGENTINA	Rio Gallegos	0140, 1740, 1340, 1940	
	C	ARGENTINA	Rivadavia	0040, 0640, 1240, 1840	
	D	ARGENTINA	Bahia Blanca	0210, 0810, 1410, 2010	Planned
	E	ARGENTINA	Mar Del Plata	0110, 0710, 1310, 1910	
	F	ARGENTINA	Buenos Aires	0510, 1110, 1710, 2310	
	G	ARGENTINA	Rosario	0110, 0610, 1210, 1810	
VII	C	S. AFRICA	Capetown	0020, 0420, 0820, 1220, 1620, 2020	
	D	S. AFRICA	Durban	0120, 0520, 0920, 1320, 1720, 2120	
VIII	G	INDIA	Bombay	0100, 0500, 0900, 1300, 1700, 2100	
	P	INDIA	Madras	0230, 0630, 1030, 1430, 1830, 2230	
IX	H	S. ARABIA	Jeddah		Planned
	G	S. ARABIA	Dammam		Planned
	X	EGYPT	Ismailia		Planned
	B	BAHRAIN	Hamala	0010, 0410, 0810, 1210, 1610, 2010	Planned
XI	V	USA	Guam	0100, 0700, 1300, 1900	
	C	SINGAPORE	Jurong	0020, 0420, 0820, 1220, 1620, 2020	
	G	JAPAN	Naha	0100, 0500, 0900, 1300, 1700, 2100	
	H	JAPAN	Moji	0110, 0510, 0910, 1310, 1710, 2110	
	I	JAPAN	Yokohama	0120, 0520, 0920, 1320, 1720, 2120	
	J	JAPAN	Otaru	0130, 0530, 0930, 1330, 1730, 2130	
	K	JAPAN	Kushiro	0140, 0540, 0940, 1340, 1740, 2140	
	L	HONG KONG	Hong Kong	0200, 0600, 1000, 1400, 1800, 2200	
	M	CHINA	Zhanjiang		
	N	CHINA	Guangzhou	0210, 0610, 1010, 1410, 2210	
	O	CHINA	Fuzhou		
	R	CHINA	Dalian	0250, 0650, 1050, 1450, 2250	
	Q	CHINA	Shanghai	0240, 0640, 1040, 1440, 2240	
	S	CHINA	Tianjin		
		CHINA	Hainan		
XII	C	USA	San Francisco	0400, 1000, 1600, 2200	Pre-operational
	W	USA	Astoria	0130, 0730, 1330, 1930	Pre-operational
	Q	USA	Cambria	0445, 1045, 1645, 2245	Pre-operational
	J	USA	Kodiak	0300, 0900, 1500, 2100	Pre-operational
	O	USA	Honolulu	0040, 0640, 1240, 1840	
	X	USA	Adak	0000, 0600, 1200, 1745	Planned
XIII	A	RUSSIA	Vladivostok	0000, 0400, 0800, 1200, 1600, 2000	
	B	RUSSIA	Kholmsk	0010, 0410, 0810, 1210, 1610, 2010	
	C	RUSSIA	Petropavlovsk	0050, 0450, 0850	
	D	RUSSIA	Magadan	0030, 0430, 0830, 1230, 1630, 2030	
	E	RUSSIA	Beringovskiy	0040, 0440, 0840, 1240, 1640, 2040	
	F	RUSSIA	Providenya	0050, 0450, 0850, 1250, 1650, 2050	

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NAVTEX STATION LIST (3/3)

Nav-area	Stn ID	Country	City	Time Schedule (UTC)	Remarks
XV	A B C D E	CHILE CHILE CHILE CHILE CHILE	Antofagasta Valparaiso Talcahuano Puetro Montt Magallanes	0010, 0410, 0810, 1210, 1610, 2010	
XVI	S U W	PERU PERU PERU	Paita Callao Mollendo	0300, 0700, 1100, 1500, 1900, 2300 0320, 0720, 1120, 1520, 1920, 2320 0340, 0740, 1140, 1540, 1940, 2340	Planned Planned Planned

NOTE: *The list above shows the stations registered with the International Frequency Registration Board (IFRB) for transmission of 518 kHz (as of Jan. 1994). Note that not all stations are operational.*

AP3-4

APPENDIX 4
USER FREQUENCY LISTS

Private Channel List

Zone	Station	Channel	Call sign on LCD	Actual call sign	Freq.	Remarks
0		0	PRV			
		1	PRV			
		2	PRV			
		3	PRV			
		4	PRV			
		5	PRV			
		6	PRV			
		7	PRV			
		8	PRV			
		9	PRV			

Zone	Station	Channel	Call sign on LCD	Actual call sign	Freq.	Remarks
0		0	PRV			
		1	PRV			
		2	PRV			
		3	PRV			
		4	PRV			
		5	PRV			
		6	PRV			
		7	PRV			
		8	PRV			
		9	PRV			

Zone	Station	Channel	Call sign on LCD	Actual call sign	Freq.	Remarks
0		0	PRV			
		1	PRV			
		2	PRV			
		3	PRV			
		4	PRV			
		5	PRV			
		6	PRV			
		7	PRV			
		8	PRV			
		9	PRV			

Timer Program List

No.	Zone	Station	CH	Speed	Start signal	Time		Off/On	Remarks
						Start	Stop		
1				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
2				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
3				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
4				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
5				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
6				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
7				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
8				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
9				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
10				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
11				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
12				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
13				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
14				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
15				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
16				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	

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Timer Program List

No.	Zone	Station	CH	Speed	Start signal	Time		Off/On	Remarks
						Start	Stop		
1				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
2				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
3				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
4				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
5				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
6				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
7				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
8				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
9				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
10				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
11				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
12				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
13				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
14				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
15				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	
16				* (Auto) a (60rpm) b (90rpm) c (120rpm) d (240rpm)	* (Auto) s (Time: High) f (Time: Low)	:	:	Y (Off) N (On)	

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