

## 11.5.5 Receiving an Individual Call

When receiving an Individual call, an acknowledgment must be sent back to the calling station, automatically or manual. The default setting is Automatic, but the radio has a selection that allows you to manually send a reply before the radio will switch to the requested calling channel. The default reply method is Automatic, but manual reply (before the radio switches to the requested calling channel) also is available. This selection is useful if you want to see who is calling and requesting you to switch to a channel for communications, similar to the caller ID on a cellular phone.

1. When an Individual call is received, the Individual call ringing alarm sounds. The radio automatically (automatic mode selected) switches to the requested channel and the LCD shows the MMSI of the vessel calling.
2. Press any key to stop the alarm.
3. Press the **PTT** on the microphone and talk to the calling ship.

```
25W USA
Received
Individual
10:45 UTC
Routine
CH 08
789012345
Exit [CLR] 08
```

## 11.6 CALL WAITING DIRECTORY

The **FM-4000** logs received Distress calls and Individual calls. The DSC Call Waiting feature is similar to an answering machine where calls are recorded for review. When a call is logged while the radio is set on the DSC Standby function, a “” icon appears on the LCD. The **FM-4000** can memorize up to 30 Distress calls, and up to 80 Individual calls.

```
25W USA MEM 06
33° 37.125N
118° 09.587W
Loc 12:45PM SAFETYV
```

### 11.6.1 Enabling the Call Waiting Feature

Follow the steps below to enable or disable the Call Waiting feature.

1. Press and hold down the [**CALL(MENU)**] key until “Radio Setup” menu appears.
2. Turn the **CHANNEL** selector knob to select “DSC Setup” menu.
3. Press the [**ENT**] key, then use the **CHANNEL** selector knob to select “Individual Ack.”
4. Press the [**ENT**] key.
5. Turn the **CHANNEL** selector knob to select “Able to comply” or “Unable.”
6. Press the [**ENT**] key to store the selected setting.
7. Press the [**CLR**] key twice to return to the “Radio Setup” menu, then press the [**CLR**] key again to return to radio operation.

```
-Setup Menu-
*Radio Setup
DSC Setup

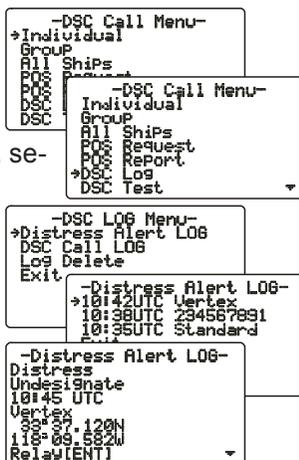
-Setup Menu-
Set>[[ *Radio Setup
DSC Setup

-DSC Setup-
Individual Directory
Individual Reply [CLR]
*Individual Ack
Individual Ack-Unable
Group
Pos:1
-Individual Ack-
Set>[[ *Able to comply
Unable

Set>[ENT], Clear>[CLR]
```

## 11.6.2 Reviewing Received Calls Logged into the Call Waiting Directory

1. Press the [CALL(MENU)] key to show the “DSC Call Menu.”
2. Turn the CHANNEL selector knob to select the “DSC Log” menu.
3. Press the [ENT] key, then turn the CHANNEL selector knob to select the category (“Distress Alert LOG” or “DSC Call Log”) you want to review and/or call back.
4. Press the [ENT] key, then turn the CHANNEL selector knob to select the station (name or MMSI number) you want to review and/or call back.
5. Press the [ENT] key to review details for the selected station.
6. Press the [ENT] key again to call the selected station.

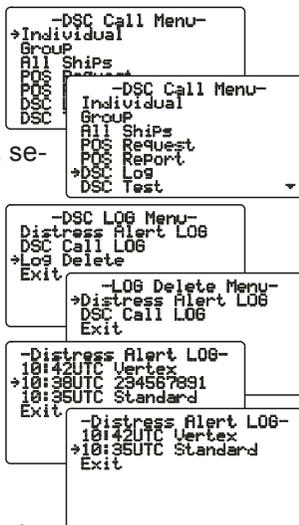


### NOTE

When there is an unread received call, the category (“Distress Alert LOG” or “DSC Call Log”) indication will blink.

## 11.6.3 To Delete the Received Log from the “DSC Log” Directory

1. Press the [CALL(MENU)] key to show the “DSC Call Menu.”
2. Turn the CHANNEL selector knob to select the “DSC Log” menu.
3. Press the [ENT] key, then turn the CHANNEL selector knob to select “Log Delete.”
4. Press the [ENT] key, then turn the CHANNEL selector knob to select the category (“Distress Alert LOG” or “DSC Call LOG”) to delete.
5. Press the [ENT] key, then turn the CHANNEL selector knob to select the station (name or MMSI number) to delete.
6. Press and hold the [ENT] key until the station (name or MMSI number) is removed from the display.
7. To exit this menu and return to radio operation mode, press the [16/9] key.



## 11.7 GROUP CALL

This feature allows the user to contact a group of specific vessels (example members of a yacht club) that have DSC radios with Group call function to automatically switch to a desired channel for voice communications.

### 11.7.1 Setting up a Group Call

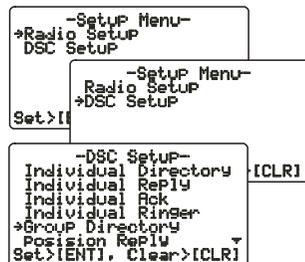
For this function to operate, the same Group MMSI must be programmed into all the DSC VHF radios within the group of vessels that use this feature. To understand about Group MMSI programming, first a Ship MMSI has to be understood.

**Ship MMSI:** The first three digits called a MID (Mobile Identity Group) of a Ship MMSI denote the country the ship registered for a MMSI. The last six digits are specific to the Ships ID.

*Ship MMSI Example:* If your MMSI is “366123456”, for example, “366” is the MID, which denotes the country, and “123456” is the ID of your ship.

#### Group MMSI:

- Group MMSI numbers are not assigned by the FCC or other organizations licensed to assign Ship MMSI numbers.
  - The first digit of a Group MMSI is always set to “0” in accordance with international regulations. All FURUNO radios are preset so when programming a Group MMSI the first digit is set to “0”.
  - The USCG recommends programming the MID of a Ship MMSI into the second, third and fourth digits of the Group MMSI as it denotes the area the ship is located.
  - The last five digits are decided upon by persons in the Group. This is an important step as all radios in the group must contain the same Group MMSI so they can be contacted by each other. There is a chance that another group of vessels have the same Group MMSI as yours. If this happens, simply change one or more of the last five digits of the Group MMSI.
1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
  2. Turn the CHANNEL selector knob to select the “DSC Setup” menu.
  3. Press the [ENT] key, then use the CHANNEL selector knob to select “Group Directory.”
  4. Press the [ENT] key, then select “Add” with the CHANNEL selector knob.
  5. Press the [ENT] key.

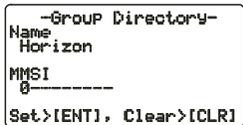


- Press applicable key to enter the first letter of the name of the group you want to reference in the directory.

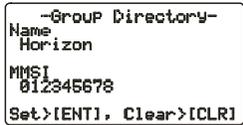
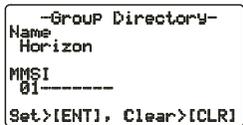
*Example:* Press the [2(MEM)] key repeatedly to toggle among the seven available characters associated with that key: 2 → A → B → C → a → b → c → 2 ... If you enter a wrong character, press the [CLR] key to delete the wrong character.



- Press the [ENT] key to store the first letter in the name.
- Repeat steps 6 and 7 to complete the name. The name can consist of up to 11 characters. If you do not use all 11 characters, press the [ENT] key to move to the next space. This method can also be used to enter a blank space in the name. If you enter a wrong character, press the [H/L] key until the wrong character is selected, then enter the correct character.



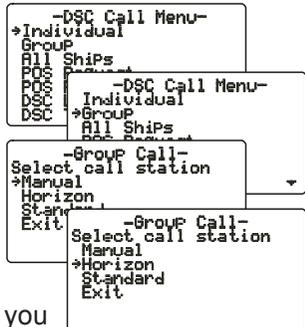
- After the 11th letter or space has been entered, press and hold the [ENT] key to advance to the Group MMSI (Maritime Mobile Service Identity Number) number entry.
- Enter the desired number. If you enter a wrong number, press the [H/L] key until the wrong number is selected, then enter the correct number.
- To store the data entered, press and hold the [ENT] key.
- To enter another group address, repeat steps 4 through 11.
- Press the [CLR] key twice to return to the "Radio Setup" menu, then press the [CLR] key again to return to radio operation.



### 11.7.2 Transmitting a Group Call

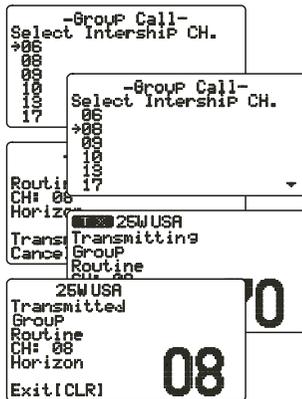
#### Using Pre-Programmed Vessel

- Press the [CALL(MENU)] key to show the "DSC Call Menu."
- Turn the CHANNEL selector knob to select "Group." (To cancel, press the [CLR] key.)
- Press the [ENT] key. The transceiver beeps, and the "Group directory" appears.
- Turn the CHANNEL selector knob to select the "Group" you want to contact.
- Press the [ENT] key, then turn the CHANNEL selector knob to select the operating channel you



want to communicate on, then press the [ENT] key.

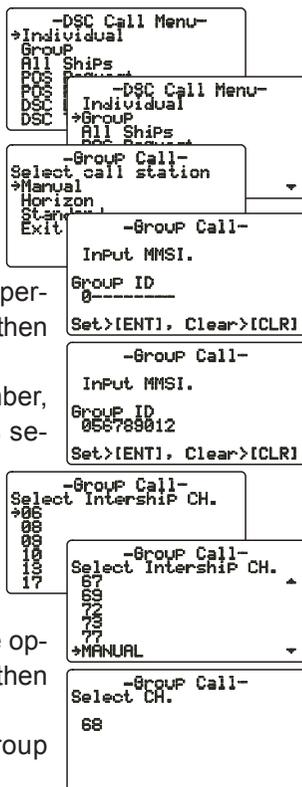
6. Press the [ENT] key again to transmit the Group call signal.
7. When the Group call signal is sent, the LCD displays the information shown in the illustration at right.
8. After the Group call is transmitted, all the radios in the group switch to the designated channel.
9. Listen to the channel to make sure it is not busy, then key the microphone and call the other vessels you desire to communicate with.



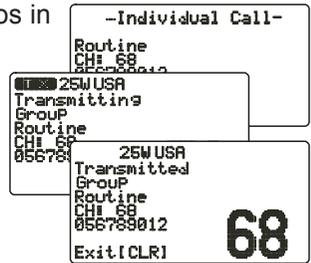
### Manual Calling

You may enter a Group MMSI number manually to contact a group whose Group call number is not registered in the radio.

1. Press the [CALL(MENU)] key to show the “DSC Call Menu.”
2. Turn the CHANNEL selector knob to select “Group.” (To cancel, press the [CLR] key.)
3. Press the [ENT] key. The transceiver beeps then the “Group Directory” appears.
4. Turn the CHANNEL selector knob to select “Manual,” then press the [ENT] key.
5. Enter the MMSI number (nine digits: first digit permanently set to “0”) which you want to contact, then press the [ENT] key.
6. If you enter a wrong number in the MMSI number, press the [H/L] key until the wrong number is selected, then enter the correct number.
7. When you have finished entering the MMSI number, press and hold the [ENT] key.
8. Turn the CHANNEL selector knob to select “Manual,” then press the [ENT] key.
9. Turn the CHANNEL selector knob to select the operating channel you want to communicate on, then press the [ENT] key.
10. Press the [ENT] key again to transmit the Group call signal.



11. After the Group call is transmitted, all the radios in the group switch to the designated channel.
12. Listen to the channel to make sure it is not busy, then key the microphone and call the other vessels.



### 11.7.3 Receiving a Group Call

1. When a Group call is received, the **FM-4000** sounds a ringing alarm and the radio automatically switches to the requested channel.
2. Press any key to stop the alarm.
3. Monitor the channel for a message sent by a person calling the Group.
4. If you want to respond, monitor the channel to make sure it is clear, then press the **PTT** on the microphone and talk to the calling ship(s).



#### **NOTE**

After a Group call is received, the time the call was made and the ship's MMSI or vessel's name appear on the LCD.

## 11.8 POSITION REQUEST

Advancements in DSC have made it possible to poll the location of another vessel and show the position of that vessel on the display of the **FM-4000**. FURUNO has taken this feature one step further. If any FURUNO GPS chart plotters are connected to the **FM-4000**, the polled position of the vessel is shown on the display of the GPS chart plotter, making it easy to navigate to the location of the polled vessel. This is a great feature for anyone wanting to know the position of another vessel. For example, your buddy that is catching fish, or finding the location of a person you are cruising with.

### NOTE

The other vessel must have an operating GPS receiver connected to its DSC transceiver and must not have its transceiver set to deny position requests. (See the section “**11.5 INDIVIDUAL CALL**” to enter information into the individual directory).

### 11.8.1 Setting up Position Reply

The **FM-4000** can automatically or manually send your position to another vessel. This selection is important if you are concerned about someone polling the position of your vessel that you may not want to. In the manual mode you will see the MMSI or person’s name shown on the display, allowing you to choose to send your position to the requesting vessel or not.

1. Press and hold down the **[CALL(MENU)]** key until the “**Radio Setup**” menu appears.
2. Turn the **CHANNEL** selector knob to select the “**DSC Setup**” menu.
3. Press the **[ENT]** key, then use the **CHANNEL** selector knob to select “**Position Reply**.”
4. Turn the **CHANNEL** selector knob to select “**Automatic**” or “**Manual**.” In the “**Automatic**” mode, after a DSC POS Request is received, the radio will automatically transmit your vessel’s position. In the “**Manual**” mode, the display of the **FM-4000** will show who is requesting your position.
5. Press the **[ENT]** key to store the selected setting.
6. Press the **[CLR]** key twice to return to the “**Radio Setup**” menu, then press the **[CLR]** key again to return to radio operation.

```
-Setup Menu-
*Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-Setup Menu-
Radio Setup
*DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-DSC Setup-
Individual Directory
Individual Reply
Individual Rck
Individual Rinser
Group Directory
*Position Reply
Set>[ENT], Clear>[CLR]
```

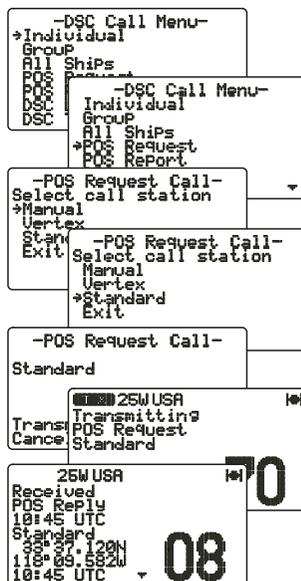
```
-Position Reply-
*Automatic
Manual

Set>[ENT], Clear>[CLR]
```

## 11.8.2 Transmitting a Position Request to Another Vessel

### Using Pre-Programmed Vessel

1. Press the [CALL(MENU)] key to show the “DSC Call Menu.”
2. Turn the CHANNEL selector knob to select “Pos Request.”
3. Press [ENT] key to show the Position Request Directory. This directory uses the Individual Directory information.
4. Turn the CHANNEL selector knob to select a name, then press the [ENT] key.
5. Press the [ENT] key again to transmit the Position Request DSC call.
6. When the FM-4000 receives the position from the polled vessel it is shown on the radio display and also transferred to the GPS chart plotter.



### NOTE

If the FM-4000 does not receive position data from the polled vessel, the LCD shows “NO POSITION DATA.”

### Manual Request

You may enter an MMSI number manually to request the position of a vessel that is not registered in the Setting up the Individual / Position Call Directory.

1. Press the [CALL(MENU)] key to show the “DSC Call Menu.”
2. Turn the CHANNEL selector knob to select “Pos Request.”
3. Press the [ENT] key to show the Position Request directory. This directory uses the Individual Directory information.
4. Turn the CHANNEL selector knob to select “Manual,” then press the [ENT] key.
5. Enter the MMSI number (nine digits) which you want to contact by the keypad, then press the [ENT] key.
6. If you enter a wrong number in the MMSI number, press the [H/L] key until the wrong num-



- ber is selected, then enter the correct number.
- When you have finished entering the MMSI number, press and hold the [ENT] key.
  - Press the [ENT] key to transmit the Position Request DSC call.
  - When the **FM-4000** receives the position from the polled vessel it is shown on the radio display and also transferred to the GPS chart plotter.

```

-POS Request Call-
234567891

Transmit [ENT]
Cancel [CLR]

```

```

25W USA
Transmitting
POS Request
234567891

```

```

25W USA
Received
POS Request
10:45 UTC
234567891
09:27.120N
118:09.582W
10:45 UTC
08

```

### 11.8.3 Receiving a Position Request

When a Position Request call is received from another vessel, a ringing alarm will sound and “POS REQUEST” appears. Operation and transceiver function differ depending on the “Position Reply” setting in the “DSC Setup” menu.

#### **Automatically reply:**

- When a Position Request call is received, a calling alarm sounds four times. Then requested position coordinates are transmitted automatically to the vessel requesting your vessel’s position.
- To exit from the Position Request display, press the [CLR] key.

```

25W USA
Received
POS Request
10:45 UTC
Standard
Exit [CLR]
08

```

#### **Manually reply:**

- When a Position Request call is received from another vessel, the LCD shows the time and MMSI or name of person requesting your vessel’s position.
- A ringing alarm sounds four times. To send your vessel’s position to the requesting vessel, press the [ENT] key. Or to exit from Position Request display, press the [CLR] key.

```

25W USA
Received
POS Request
10:45 UTC
Standard
Reply [ENT]
Exit [CLR]
08

```

## 11.9 POSITION SEND

The feature is similar to Position Request, however instead of requesting a position of another vessel this function allows you to send your position to another vessel. Your vessel must have an operating GPS receiver connected to the **FM-4000** to send your position.

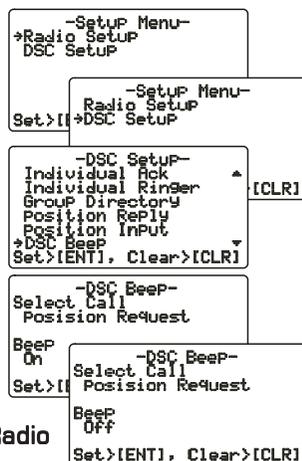
### NOTE

To transmit a Position Send call, you must set up the **FM-4000** DSC Individual / Position Call Directory with the name of the vessel(s) or person and the MMSI of the DSC radio you wish to send your position to. To setup this directory, see section “**11.5.1 Setting up the Individual / Position Call Directory.**”

### 11.9.1 Setting up a Position Send Ringer

The **FM-4000** has the capability to turn off the Position Send ringer as follows.

1. Press and hold down the **[CALL(MENU)]** key until the “**Radio Setup**” menu appears.
2. Turn the **CHANNEL** selector knob to select the “**DSC Setup**” menu.
3. Press the **[ENT]** key, then use the **CHANNEL** selector knob to select “**DSC Beep.**”
4. Press the **[ENT]** key, then use the **CHANNEL** selector knob to select “**Position Report.**”
5. Press the **[ENT]** key, then select “**Off**” with the **CHANNEL** selector knob.
6. Press the **[ENT]** key to store the selected setting.
7. Press the **[CLR]** key twice to return to the “**Radio Setup**” menu, then press the **[CLR]** key again to return to radio operation.

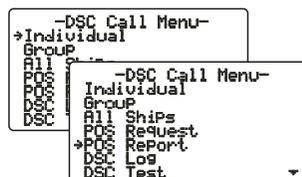


To enable the ringer tone, select “**On**” at step “6” in this procedure.

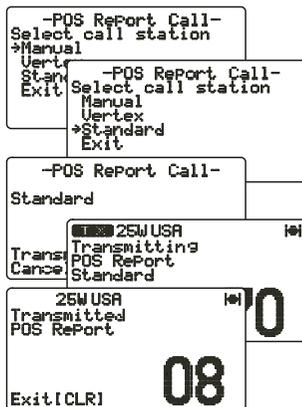
### 11.9.2 Transmitting a DSC Position Send Call

*Using Pre-Programmed Vessel*

1. Press the **[CALL(MENU)]** key to show the “**DSC Call Menu.**”
2. Turn the **CHANNEL** selector knob to select “**Pos Report.**”



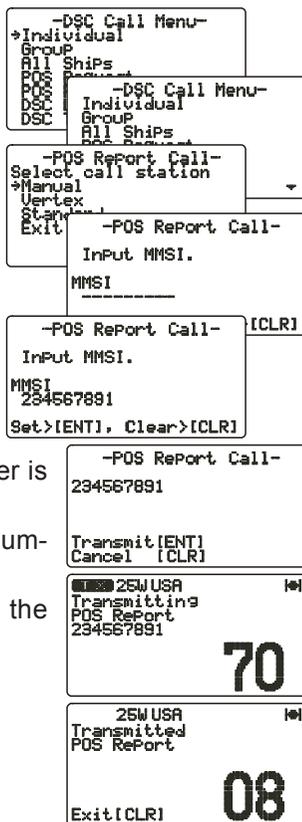
3. Press [ENT] key to show the Position Send Directory. This directory uses the Individual Directory information.
4. Turn the **CHANNEL** selector knob to select a name in the directory, then press the [ENT] key.
5. Press the [ENT] key again to send your position to the selected vessel.
6. Press the [CLR] key twice to return to the “Radio Setup” menu, then press the [CLR] key again to return to radio operation.



### Manual Calling

You may enter an MMSI number manually to send your position to that vessel without entering it into the Setting up the Individual / Position Call Directory.

1. Press the [CALL(MENU)] key to show the “DSC Call Menu.”
2. Turn the **CHANNEL** selector knob to select “Pos Report.”
3. Press [ENT] key to show the Position Send Directory. This directory uses the Individual Directory information.
4. Turn the **CHANNEL** selector knob to select “Manual,” then press the [ENT] key.
5. Enter the MMSI number (nine digits: first digit permanently set to “0”) which you want to contact, then press the [ENT] key.
6. If you enter a wrong number in the MMSI number, press the [H/L] key until the wrong number is selected, then enter the correct number.
7. When you have finished entering the MMSI number, press and hold the [ENT] key.
8. Press the [ENT] key to send your position to the selected vessel.



### 11.9.3 Receiving a DSC Position Send Call

When another vessel transmits its location to the **FM-4000**, the following occurs:

1. A ringing sound is generated when the call is received.
2. Press any key to stop the ringing sound.
3. The position of the vessel is shown and also transferred to any FURUNO GPS chart plotter if connected.

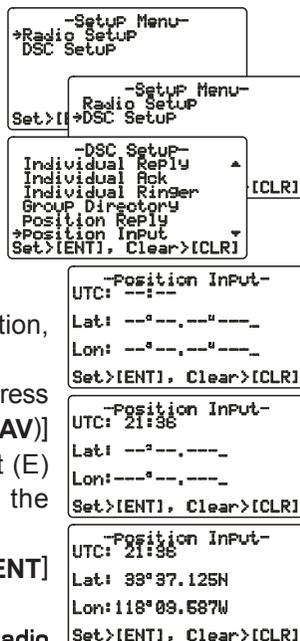


### 11.10 MANUAL INPUT OF POSITION (LAT/LON)

You may send the latitude/longitude of your vessel manually when the **FM-4000** is not connected to a GPS receiver.

After the position is entered, any DSC Distress, Position Request, or Position Send will contain the manually entered position.

1. Press and hold down the **[CALL(MENU)]** key until the “Radio Setup” menu appears.
2. Turn the **CHANNEL** selector knob to select the “DSC Setup” menu.
3. Press the **[ENT]** key, then use the **CHANNEL** selector knob to select “Position Input.”
4. Press the **[ENT]** key. The transceiver beeps, then the display looks something like the one in the illustration at right.
5. Enter your local UTC time in the 24-hour notation, then press the **[ENT]** key.
6. Enter the latitude/longitude of your vessel, then press the **[ENT]** key. To select North (N) press the **[6(NAV)]** key, South (S) press the **[7(SCRM)]** key, East (E) press the **[3(SCAN)]** key or West (W) press the **[9(FOG)]** key.
7. To store the data entered, press and hold the **[ENT]** key.
8. Press the **[CLR]** key twice to return to the “Radio Setup” menu, then press the **[CLR]** key again to return to radio operation.



## 12 RADIO SETUP

### NOTE

The optional **CMP30** Remote MIC can also access the SETUP menu.  
See page 73 for details.

### 12.1 LCD CONTRAST

Adjust the LCD contrast for best viewability.

1. Press and hold down the [**CALL(MENU)**] key until “**Radio Setup**” menu appears.
2. Press the [**ENT**] key, then use the **CHANNEL** selector knob to select “**Contrast.**”
3. Press the [**ENT**] key.
4. Turn the **CHANNEL** selector knob to select the desired level. The contrast level can be set from “0” to “31.”
5. Press the [**ENT**] key to store the selected level.
6. To exit this menu and return to radio operation mode, press the [**16/9**] key.

```
-Setup Menu-
+Radio Setup
DSC Setup
Set>[ENT], Clear>[CLR]
```

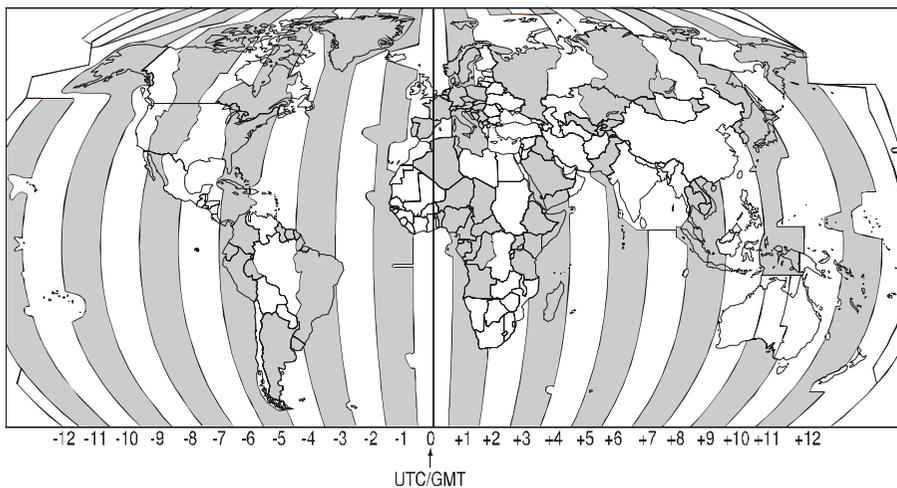
```
-Radio Setup-
+Contrast
Time Offset
Time Display
SDG Unit
Magnetic
Priority CH
Set>[ENT], Clear>[CLR]
```

```
-Contrast-
20
110000
110000
110000
110000
+000
Set>[ENT], Clear>[CLR]
```

## 12.2 TIME OFFSET

“Time Offset” sets the time offset between local time and UTC in order to display local time. The time display requires connection of a GPS receiver.

1. Press and hold down the **[CALL(MENU)]** key until the “Radio Setup” menu appears.
2. Press the **[ENT]** key, then use the **CHANNEL** selector knob to select “Time Offset.”
3. Press the **[ENT]** key.
4. Turn the **CHANNEL** selector knob to select time offset from UTC. See the illustration below to find your offset time from UTC. If “0:00” is assigned, the time is the same as UTC (Universal Time Coordinated or GMT Greenwich Mean Time).
5. Press the **[ENT]** key to store the time offset.
6. To exit this menu and return to radio operation mode, press the **[16/9]** key.



**OFFSET TIME TABLE**

## 12.3 TIME DISPLAY

The time can be shown in local or UTC time. The time display requires connection of a GPS receiver.

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Time Display.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select “UTC” or “Local.”
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

```

-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
    
```

```

-Radio Setup-
Contrast
Time Offset
+Time Display
SOG Unit
Magnetic
Priority CH
Set>[ENT], Clear>[CLR]
    
```

```

-Time Display-
+UTC
Local

Set>[ENT], Clear>[CLR]
    
```

In the local time mode, the display shows the time by the 12-hour system, while the display shows the time by the 24-hour system in the UTC mode.

```

25W USA      MEM  [M]
SOG:15kts
COG:180°r
33° 37.125N
118° 09.587W
UTC 18:45
06 SAFETY
    
```

(“UTC” mode)

```

25W USA      MEM  [M]
SOG:15kts
COG:180°r
33° 37.125N
118° 09.587W
Loc 12:45PM
06 SAFETY
    
```

(“LOCAL” mode)

## 12.4 SOG (SPEED OVER GROUND) UNIT

The SOG indication can be shown in knot, mph or kph.

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “SOG Unit.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select desired unit.
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

```

-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
    
```

```

-Radio Setup-
Contrast
Time Offset
Time Display
+SOG Unit
Magnetic
Priority CH
Set>[ENT], Clear>[CLR]
    
```

```

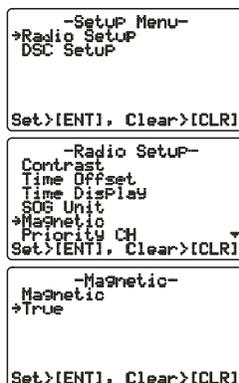
-SOG Unit-
+Kts :Knots
MPH :Mile/hour
Kmh :Kilo-Meter/hour

Set>[ENT], Clear>[CLR]
    
```

## 12.5 TRUE MAGNETIC CHANGE (NAV DISPLAY)

The GPS COG (Course Over Ground) indication can be shown in True or Magnetic.

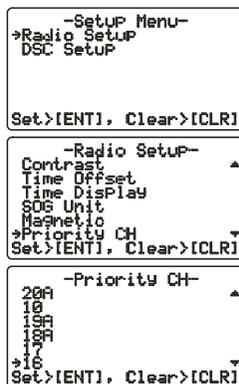
1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Magnetic.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select “Magnetic” or “True.”
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.



## 12.6 PRIORITY CHANNEL

You can set the priority channel to use when priority scan is enabled.

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Priority CH.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select the channel to be a priority.
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.



## 12.7 SCAN TYPE

You can set the scan mode between “Memory Scan” and “Priority Scan.”

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “SCAN Type.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select “Priority SCAN” or “Memory SCAN.”
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

```
-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-Radio Setup-
Time Offset ▲
Time Display
SOG Unit
Magnetic
Priority CH
+SCAN Type ▼
Set>[ENT], Clear>[CLR]
```

```
-SCAN TYPE-
+Priority SCAN
Memory SCAN

Set>[ENT], Clear>[CLR]
```

## 12.8 SCAN RESUME TIME

Set the amount of time the FM-4000 waits after a transmission ends before starting scanning.

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “SCAN Resume.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select the desired resume time. The resume time can be set to “1sec” through “5sec,” or “Off.” In the “Off” selection, the scanning resumes after the other station stops transmitting (carrier drops).
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

```
-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-Radio Setup-
Time Offset ▲
Time Display
SOG Unit
Magnetic
Priority CH
SCAN TYPE
+SCAN Resume ▼
Set>[ENT], Clear>[CLR]
```

```
-SCAN Resume-
Off
1sec
+2sec
3sec
4sec
5sec
Set>[ENT], Clear>[CLR]
```

## 12.9 KEY BEEP

Set the beep tone volume level when a key is pressed.

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Key Beep.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select the desired level. The beep can be set from “Level 1” to “Level 6,” “High,” or “Off.”
5. Press the [ENT] key to set the key beep condition.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

```
-Setup Menu-
->Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-Radio Setup-
SOG Unit
Magnetic
Priority CH
SCAN Type
SCAN Resume
->Key Beep
Set>[ENT], Clear>[CLR]
```

```
-Key Beep-
Level 6
Level 5
Level 4
Level 3
Level 2
Level 1
->Off
Set>[ENT], Clear>[CLR]
```

### NOTE

Emergency alarm and beeps for DSC operation cannot be turned OFF.

## 12.10 WEATHER ALERT SETUP

The NOAA Weather alert can be enabled or disabled. The default setting is “On SCAN and WX CH.”

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Weather Alert.”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select the desired WX alert mode. The WX alert mode can be set to “On WX CH,” “On SCAN,” “On SCAN and WX CH,” or “Off.”
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

```
-Setup Menu-
->Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-Radio Setup-
Magnetic
Priority CH
SCAN Type
SCAN Resume
->Key Beep
Weather Alert
Set>[ENT], Clear>[CLR]
```

```
-Weather Alert-
On WX CH
On SCAN
->On SCAN and WX CH
Off

Set>[ENT], Clear>[CLR]
```

## 12.11 CHANNEL NAMING

You may change the name of a channel.

**Example:** CH84 “CALL HOME”

1. Press and hold down the [**CALL(MENU)**] key until the “Radio Setup” menu appears.
2. Press the [**ENT**] key, then use the **CHANNEL** selector knob to select “CH Name.”
3. Press the [**ENT**] key.
4. Turn the **CHANNEL** selector knob to select the channel to name, then press the [**ENT**] key.
5. Press applicable key to enter the first letter of the channel name.

*Example:* Press the [4(**GHI**)] key repeatedly to toggle among the seven available characters associated with that key: 4 → G → H → I → g → h → i → 2 ....

6. Press the [**ENT**] key to enter the desired letter and move the cursor one space to the right.
7. Repeat steps 5 and 6 to complete the name. The name can consist of up to 16 characters. If you do not use all 16 characters, press the [**ENT**] key to move to the next space. This method can also be used to enter a blank space in the name. To clear the previous letter, press the [**CLR**] key.
8. Press and hold down the [**ENT**] key to enter the name.
9. If you want to change the name of another channel, repeat steps 3 through 8.
10. To exit this menu and return to radio operation mode, press the [**16/9**] key.

```
-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
```

```
-Radio Setup-
Priority CH
SCAN Type
SCAN Resume
Key Beep
Weather Alert
+CH Name
Set>[ENT], Clear>[CLR]
```

```
-CH Name-
Select CH
88
CH Name
PLEASURE
Set>[ENT], Clear>[CLR]
```

```
-CH Name-
Select CH
88
CH Name
PLEASURE
Set>[ENT], Clear>[CLR]
```

```
-CH Name-
Select CH
88
CH Name
HOOORPRE
Set>[ENT], Clear>[CLR]
```

```
-CH Name-
Select CH
88
CH Name
HOOORUP
Set>[ENT], Clear>[CLR]
```

## 12.12 NAMING THE RADIO OR REMOTE MIC

You can change the name of the RADIO or Remote MIC. Example: “RADIO - Cabin,” “RAM1 - Flybridge.”

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Unit Name.”
3. Press the [ENT] key.
4. With the Remote MIC connected, turn the CHANNEL selector knob to select the Unit (“Radio” or “RAM1”) to name, then press the [ENT] key, otherwise press the [ENT] key.
5. Press applicable key to enter the first letter of channel name.  
*Example:* Press the [2(MEM)] key repeatedly to toggle among the seven available characters associated with that key: 2 → A → B → C → a → b → c → 2 ...
6. Press the [ENT] key to enter the first letter in the name and move to the next letter to the right.
7. Repeat steps 5 and 6 to complete the name. The name can consist of up to eight characters. If you do not use all eight characters press the [ENT] key to move to the next space. This method can also be used to enter a blank space in the name. To clear the previous letter, press the [CLR] key.
8. Press and hold the [ENT] key to enter the name and return to the “Unit Name” menu.
9. If you want to enter the name of another unit, repeat steps 4 through 8.
10. To exit this menu and return to radio operation mode, press the [16/9] key.

```

-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
    
```

```

-Radio Setup-
SCAN Type
SCAN Resume
Key Beep
Weather Alert
CH Name
+Unit Name
Set>[ENT], Clear>[CLR]
    
```

```

-Unit Name-
Select Unit
RADIO

Unit Name
RADIO

Set>[ENT], Clear>[CLR]
    
```

```

-Unit Name-
Select Unit
RADIO

Unit Name
CADIO

Set>[ENT], Clear>[CLR]
    
```

```

-Unit Name-
Select Unit
RADIO

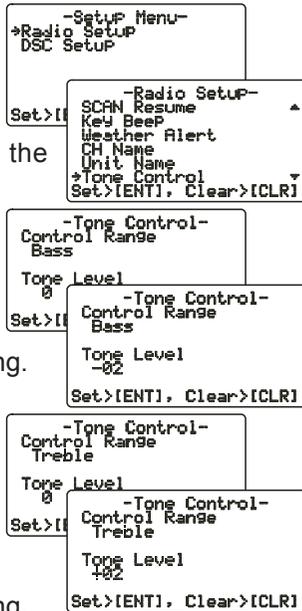
Unit Name
Cabin

Set>[ENT], Clear>[CLR]
    
```

## 12.13 ADJUSTING THE TREBLE AND BASS

Adjust the treble and bass of the speaker audio for best listening in noisy environments. The effect is similar to adjusting the treble and bass controls on a stereo.

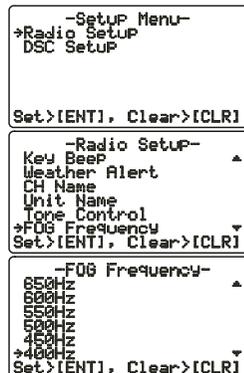
1. Press and hold down the [CALL(MENU)] key until “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “Tone Control.”
3. Press the [ENT] key, then select “Bass” with the CHANNEL selector knob.
4. Press the [ENT] key, then turn the CHANNEL selector knob to select desired audio response in the lower frequency range. Available selections are “-6” through “+6.”
5. Press the [ENT] key to store the selected setting.
6. Select “Treble” with the CHANNEL selector knob, then press the [ENT] key.
7. Turn the CHANNEL selector knob to select desired audio response in the higher frequency range. Available selections are “-6” through “+6.”
8. Press the [ENT] key to store the selected setting.
9. To exit this menu and return to radio operation mode, press the [16/9] key.



## 12.14 FOG ALERT TONE FREQUENCY

You can select the tone frequency for the PA/Fog operation. The available frequency range is 200 Hz - 850 Hz, in 50 Hz steps. The default tone frequency is 400 Hz.

1. Press and hold down the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key, then use the CHANNEL selector knob to select “FOG Frequency..”
3. Press the [ENT] key.
4. Turn the CHANNEL selector knob to select desired tone frequency.
5. Press the [ENT] key to store the selected setting.
6. To exit this menu and return to radio operation mode, press the [16/9] key.



## 12.15 CALENDAR SETUP

### Calendar Menu

The **FM-4000** has a clock that remembers date, time, latitude and longitude. Connecting a GPS receiver to the **FM-4000** is very important as it not only will be used to update the calendar automatically and also when a DSC Distress call is transmitted will send your vessel's location to other vessels to aid in the rescue. See section "8.5 ACCESSORY CABLE."

### GPS Receiver Connected

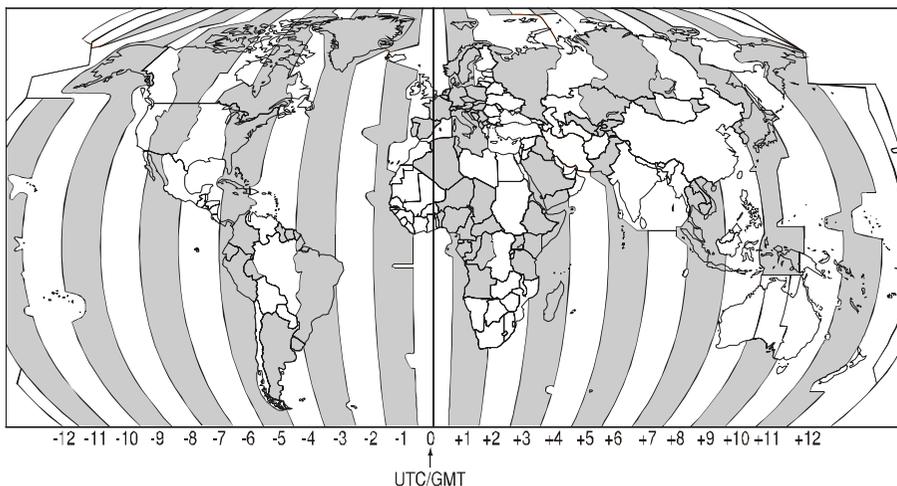
When a GPS receiver is connected, the **FM-4000** will automatically store the calendar date and time information after being connected for one hour.

### GPS Receiver Not Connected

If a GPS receiver is not connected to the **FM-4000**, manually enter the date and time into the Calendar Menu in order for the clock to operate. The time you will enter will be your local time in UTC format. To calculate your local UTC time, first find your location on the Standard Time table below.

#### NOTE

The table below shows Standard Time. For Daylight Savings subtract one hour from your offset.



## Examples:

### NOTE

If you are west of UTC time you will add the offset to your time.  
 If you are East of UTC time you will subtract the offset from your time.

City	Los Angeles
Offset	-8
Time (convert local time to 24 hour)	4:00PM (local) or 16:00 (24hour)
Calculate 24hour local + Offset (East of UTC)	16:00 + 08:00 = 22:00
City	NY
Offset	-5
Time (convert local time to 24 hour)	4:00PM (local) or 16:00 (24hour)
Calculate 24hour local + Offset (East of UTC)	16:00 + 05:00 = 21:00
City	Rome
Offset	+1
Time (convert local time to 24 hour)	4:00PM (local) or 16:00 (24hour)
Calculate 24hour local + Offset (East of UTC)	16:00 - 01:00 = 15:00

1. Press and hold the [CALL(MENU)] key until the “Radio Setup” menu appears.
2. Press the [ENT] key
3. Select “Calendar” with the CHANNEL selector knob.
4. Press the [ENT] key
5. Select “Date (20YY/MM/DD)” with the CHANNEL selector knob.
6. Press the [ENT] key.
7. Enter the current date (Yr/Mo/Day).
8. If you enter a wrong number, press the [H/L] key until the wrong number is selected, then enter the correct number.
9. Using the Standard time table above, calculate the UTC time of your position.  
**Note:** For daylight savings time subtract one hour to the offset in your time zone.
10. To enter the time, press the [ENT] key until the first digit in the “Time (hh/mm [UTC])” is selected on the display, then enter the time.
11. Press and hold down the [ENT] key to store the selected setting.
12. Select “Update” with the CHANNEL selector knob, then press the [ENT] key.

```

-Setup Menu-
+Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
    
```

```

-Calendar-
+Calendar
Update

Set>[ENT], Clear>[CLR]
    
```

```

-Date-
Date<20YY/MM/DD>
20--/--/--

Time<hh/mm[UTC]>
--:--

Set>[ENT], Clear>[CLR]
    
```

```

-Date-
Date<20YY/MM/DD>
2007/04/01

Time<hh/mm[UTC]>
--:--

Set>[ENT], Clear>[CLR]
    
```

```

-Date-
Date<20YY/MM/DD>
2007/04/01

Time<hh/mm[UTC]>
18:00

Set>[ENT], Clear>[CLR]
    
```

```

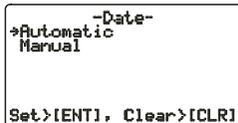
-Calendar-
+Calendar
+Update

Set>[ENT], Clear>[CLR]
    
```

13. Turn the **CHANNEL** selector knob to select the method of the time adjustment between “**Automatic**” and “**Manual**.”

14. Press the [ENT] key to store the selected setting.

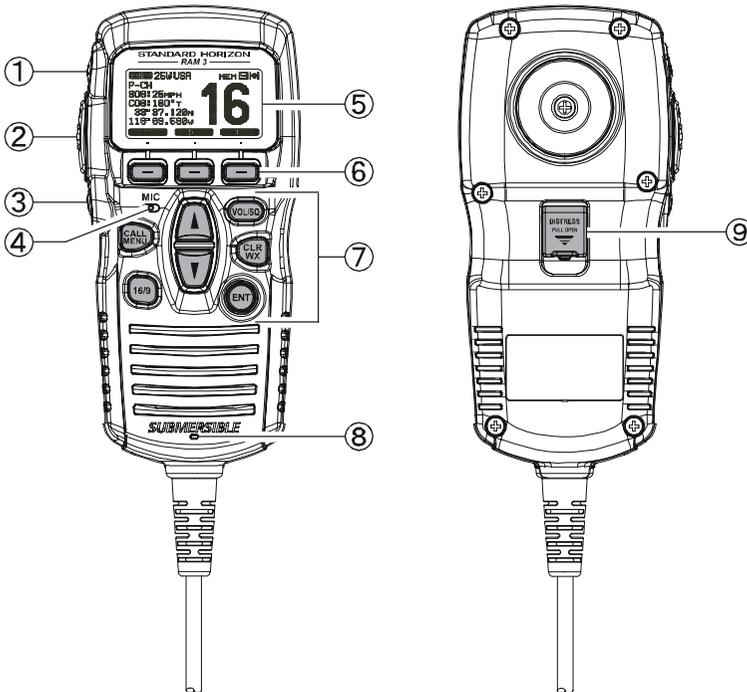
15. To exit this menu and return to radio operation mode, press the [16/9] key.



## 13 REMOTE MIC OPERATION

When the Remote MIC is connected to the **FM-4000**, most VHF, DSC, setup menus and PA modes can be remotely operated. The Remote MIC is supplied with 23 feet (7 m) of routing cable and can be extended up to 70 feet (21 m) using three 23-foot extension cables model **CT-100**. The Intercom feature can be used between the Remote MIC and the transceiver. In addition, speaker wires are supplied at the panel mount of the routing cable for external speakers to be connected in noisy environments.

### 13.1 REMOTE MIC CONTROLS



#### ① [H/L] KEY

Toggles between high and low power. When the [H/L] key is pressed while the transceiver is on CH13 or CH67, the power is temporarily switched from LO to HI until the **PTT** switch is released. The [H/L] key does not function on transmit inhibited and low-power only channels.

#### ② PTT (Push-To-Talk) Key

Activates transmission.

③ **POWER (⏻) Key**

Press and hold down this key to turn to the transceiver and Remote MIC on or off.

④ **MICROPHONE**

The internal microphone is located here.

When transmitting, position your mouth about 1/2 to 1 inch (1.2 ~ 2.5 cm) away from the small mic hole. Speak slowly and clearly into the microphone.

⑤ **DISPLAY**

Channel display.

⑥ **SOFT KEY**

These three key's functions can be customized by the Setup Menu mode. When press one of these key briefly, the key functions will appear at the LCD bottom. The factory defaults are shown below.

**[SCAN] Key**

Starts and stops scanning of programmed channels.

**[DW] Key**

Watches for a transmission on CH16 and another selected channel until either signal is received. (Dual watch)

**[IC] Key**

Get Intercom operation between radio and the Remote MIC.

⑦ **KEY PAD**

**[CALL/MENU] Key**

Press this key to access the DSC OPERATION menu.

Press and hold this key to access the SETUP menu.

**[16/9] Key**

**First press:** channel 16 is immediately selected.

**Second press:** recalls the last selected channel.

**Press and hold:** selects channel 9.

**[▲](UP)/[▼](DOWN) Key**

These keys are used to select channels, adjust the volume and squelch level, and to choose DSC calls, DSC setup and Radio setup function.

**[VOL/SQ] Key (Volume Control / Squelch Control)**

Press this key to toggle the function of the Remote MIC's [▲] or [▼] key between the channel selections, volume level adjustment, and squelch level adjustment.

## [CLR/WX] Key

Immediately recalls the previously selected NOAA weather channel.  
Cancel the menu selection and/or keypad entry.

### Secondary use

Hold down the [16/9] key while pressing the [WX] key to change the mode from USA to International or Canadian.

## [ENT] Key

This key functions as the enter key.

### ⑧ SPEAKER

The internal speaker is located here.

### ⑨ [DISTRESS] KEY

Used to send a DSC Distress call.

## 13.2 INTERCOM OPERATION

### 13.2.1 Communication

1. Press one of the Soft key briefly to appear the key functions at the LCD bottom, then press the [IC] key to activate the “Intercom” mode.

2. If your **FM-4000** is equipped with two Remote MICs, use the [▼]/[▲] key to select the station (**RADIO**, **RAM**, or **ALL**) you wish to communicate with, then press the [ENT] key.

3. When the “Intercom” feature is activated, “Intercom” appears on the **FM-4000** and **CMP30**.

4. Press the **PTT** switch and “TALK” is displayed.

**NOTE:** A warning beep is emitted when the Remote MIC’s **PTT** switch is pressed while the transceiver microphone’s **PTT** switch is pressed.

5. Speak slowly and clearly into the microphone, holding the microphone about 1/2 inch away from your mouth.

6. When finished, release the **PTT** switch.

7. Press the [CLR(WX)] key again to revert to the “RADIO” mode.



(FM-4000 display)



(CMP30 display)



(CMP30's PTT switch is pressed)



(FM-4000's PTT switch is pressed)



## 13.2.2 Calling

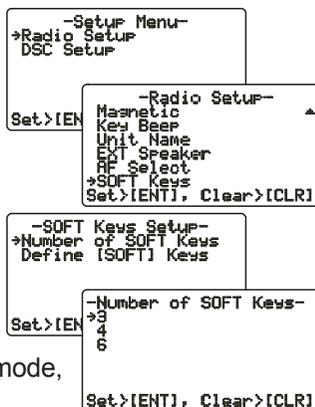
Press and hold the **[DW(IC)]** key for one second when the “Intercom” mode is active. A calling beep is emitted from the speaker.

## 13.3 KEY ASSIGNMENT

### 13.3.1 Number of Soft Keys

Three soft keys are set as default. However the Remote MIC allows assigning of up to six soft keys with the instructions below:

1. Press and hold down the **[CALL(MENU)]** key until “Radio Setup” menu appears.
2. Press the **[ENT]** key, then press the **[▼]** key to select “SOFT Keys.”
3. Press the **[ENT]** key.
4. Press the **[▲]** or **[▼]** key to select “Number of SOFT Keys” and press the **[ENT]** key.
5. Press the **[▲]** or **[▼]** key to select the number of soft keys (**3**, **4**, or **6**) and press the **[ENT]** key.
6. To exit this menu and return to radio operation mode, press the **[16/9]** key.

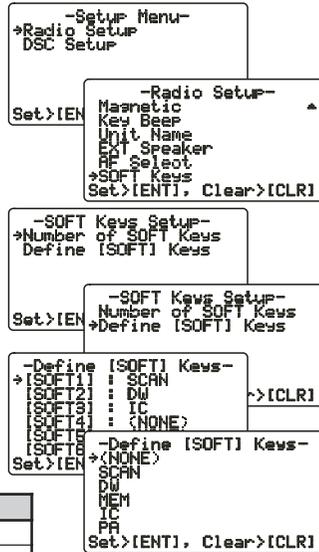


### 13.3.2 Define the Soft Keys

By default the soft keys are assigned as SCAN, DW and NAV, however their function can be changed. In addition the soft keys can be increased or reassigned as follows:

1. Press and hold down the [CALL(MENU)] key until “Radio Setup” menu appears.
2. Press the [ENT] key, then press the [▼] key to select “SOFT Keys.”
3. Press the [ENT] key.
4. Press the [▼] key to select “Define [SOFT] Keys” and press the [ENT] key.
5. Press the [▲] or [▼] key to select the [Soft] key, and press the [ENT] key. Then, press the [▲] or [▼] key to select the new function to be assigned, and press the [ENT] key. Available functions are listed below.
6. To exit this menu and return to radio operation mode, press the [16/9] key.

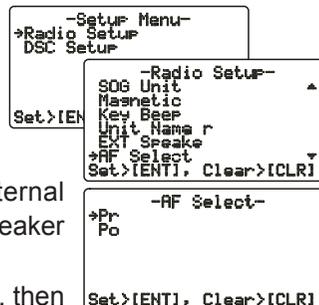
DISPLAY	FUNCTION
SCAN	Stops and starts scanning.
DW	Stops and starts Dual Watch Scan.
MEM	When pressed memorizes a channel for scanning.
IC	Activates the Intercom function.
PA	Operates the PA function.
FOG	Operates the Fog Horn function.
SCRM	Toggles the Voice Scrambler “on” and “off”.



### 13.4 EXTERNAL SPEAKER AF SELECTION

The “AF Select” menu allows you to set the audio output level of the Remote MIC’s External Speaker to a fixed level regardless of the VOL level setting of the Remote MIC, which is useful when using the amplified speaker (not option) with on/off volume control.

1. Press and hold down the [CALL(MENU)] key until “Radio Setup” menu appears.
2. Press the [ENT] key, then use the [▲]/[▼] key to select “AF Select.”
3. Press the [ENT] key.
4. Press the [▲] or [▼] key to select “Pr” (External Speaker Level is “Fixed”) or “Po” (External Speaker Level is “Adjustable”).
5. Press the [ENT] key to store the data entered, then press the [16/9] key to exit this menu and return to radio operation mode.



### 13.5 DSC/RADIO SETUP MODE

The Remote MIC can access the DSC SETUP / RADIO SETUP menu (see section “11 DIGITAL SELECTIVE CALLING” and section “12 RADIO SETUP MENU” for details). However, the Dimmer, Contrast, and Key Beep menu items which are accessed from the Remote MIC only controls the Remote MIC’s display and speaker.

DSC SETUP /RADIO SETUP menu from the Remote MIC:

1. Press and hold down the [CALL(MENU)] key until “Radio Setup” menu appears.
2. Press the [▲]/[▼] key to select “Radio Setup” or “DSC Setup.”
3. Press the [ENT] key, then use the [▲]/[▼] key to select the menu item you wish to work on.
4. Press the [ENT] key.
5. Press the [▲]/[▼] key to change the value or condition for the menu item, then press the [ENT] key to save the new setting.
6. Press the [16/9] key to return to the normal operation.

```

-Setup Menu-
>Radio Setup
DSC Setup

Set>[ENT], Clear>[CLR]
    
```

```

- Radio Setup-
>Dimmer
Contrast
SOG Unit
Magnetic
Key Beep
Unit Name
Set>[ENT], Clear>[CLR]
    
```

```

-Dimmer-
>High
Low
Auto
Set>[ENT], Clear>[CLR]
    
```

Radio Setup	Function
Dimmer	Adjusts the backlight.
Contrast	Adjusts display contrast.
SOG Unit	Selects SOC unit, knots, MPH or KPH.
Magnetic	Selects COG indication format, True or Magnetic.
Key Beep	Turns key beep on or off.
Unit Name	Allows changing the name of the connected MIC.
EXT Speaker	Selects the speaker to use, Internal or External.
AF Select	Selects the audio output,
Soft Keys	Sets the key assignment.

DSC SETUP	Function
Individual Directory	Sets the Individual Directory.
Individual Reply	Sets how to reply to an Individual call, Automatic or Manual.
Individual Ack	Sets how to acknowledge an Individual call, Able or Unable.
Individual Ringer	Selects individual call ringer tone, among four choices.
Group Directory	Setup the Group Directory.
Position Reply	Selects how to respond to request for your position, Automatic or Manual.
Position Input	Sets the latitude/longitude of your vessel manually.
DSC BEEP	Turns on or off the Individual, Group, Position request or send beep.

## 14 MAINTENANCE

The inherent quality of the solid-state components used in this transceiver will provide many years of continuous use. Taking the following precautions will prevent damage to the transceiver.

- Keep the microphone connected or the jack covered at all times to prevent corrosion of electrical contacts.
- Never key the microphone unless an antenna or suitable dummy load is connected to the transceiver.
- Ensure that the supply voltage to the transceiver does not exceed 16 VDC or fall below 11 VDC.
- Use only FURUNO-approved accessories and replacement parts.

In the unlikely event of serious problems, please contact your dealer.

## 14.1 TROUBLESHOOTING CHART

SYMPTOM	PROBABLE CAUSE	REMEDY
Cannot power the transceiver.	No DC voltage to the transceiver, or blown fuse.	a. Check the battery connections and the fuse. b. The <b>PWR</b> switch needs to be pressed and held to turn the radio on.
Transceiver blows fuse when connected to power supply.	Reversed power wires.	Check the power cable for DC voltage. Check the fuse (6A 250V). Make sure the red wire is connected to the positive (+) battery post, and the black wire is connected to the negative (-) battery post. If the fuse blows after replacement, contact your dealer for advice.
Popping or whining noise from the speaker while engine runs.	Engine noise.	Reroute the DC power cables away from the engine. Add noise suppressor on the power cable. Change to resistive spark plug wires and/or add an alternator whine filter.
Sound is not emitted from the internal or external speaker.	Accessory cable.	Check if the accessory cable is firmly fastened. (Short circuit the external speaker cable WHITE/SHIELD).
Sound is not emitted from the PA speaker.	Accessory cable.	Check if the accessory cable is firmly fastened. (Short circuit the PA speaker cable RED/SHIELD).
Receiving station reports low TX power, even with transceiver set to HI power.	Antenna.	Have the antenna checked or test the transceiver with another antenna. If the problem persists, contact your dealer for advice.
"HI BATTERY" or "LO BATTERY" appears when the power is turned on.	The power supply voltage is too high or too low.	Confirm that the connected power supply voltage is not over 17 volts or lower than 10 volts.
"PA ERROR" or "FOG ERROR" is shown when the PA/FOG mode is activated.	Accessory cable.	Check if the accessory cable is firmly fastened. (Short circuit the PA speaker cable RED/SHIELD).
Your position is not displayed.	Accessory cable.	Check if the accessory cable is firmly fastened. Some GPS receivers use the battery ground line for NMEA connection.
	Setting at the GPS receiver.	Check the output signal format of the GPS receiver. This radio requires NMEA0183 format with GLL, RMB, or RMC sentence as an output signal. If the GPS receiver has a facility for setting baud rate and parity, select "4800" and "NONE," respectively.
While in PA or Fog listen-back modes, AM broadcasts can be heard.	Strong AM radio stations are being pickup up by the speaker wires.	Replace the speaker wires to a sheilded 2-conductor wire. See section " <b>8.5 ACCESSORY CABLE</b> " for cable connections.

## 15 CHANNEL ASSIGNMENTS

This chapter provides the VHF Marine Channel assignments for U.S.A. and International use. Below are listed some data about the charts.

1. VTS. Where indicated, these channels are part of the U.S. Coast Guard's **Vessel Traffic System**.
2. Alpha channel numbers, that is, channel numbers followed by the letter A (such as Channel 07**A**) are **simplex** channels on the U.S.A. or Canadian channel assignments whose counterparts in the International assignments are **duplex** channels. International channels do not use "alpha" numbers. If you call the Coast Guard on Channel 16, they will sometimes ask you to "**go to channel 22 Alpha**." This is a channel assigned to U.S.A., and Canadian Coast Guards for handling distress and other calls. If your radio is set for **International** operation you will go to Channel 22 instead of 22**A**, and will not be able to communicate with the Coast Guard. To use Channel 22**A**, your radio must be set for **USA** or **Canada** operation, usually by a U/I/C (USA/International/Canada) control or combination of controls. Channel 22 (without an "A") is an **International** duplex channel for port operations. Some radios indicate an "A" adjacent to the alpha channels on the display; on others "alpha" is not indicated but the proper channel is selected based on the U/I/C setting.
3. Bridge-to-Bridge channels (for example, Channel 13) are for use by bridge operators on intercoastal waterways and rivers. It is also used by marine vessels in the vicinity of these bridges for navigation and for communicating with the bridge operators. Note that a limit of 1 Watt is specified for these channels. See page 27 for additional information.
4. The **S/D** column on the chart indicates either S (simplex) or D (duplex). **Simplex** means transmitting and receiving on the same frequency. Only one party at a time can talk, unlike a telephone. Be sure to say "**over**" and release your microphone push-to-talk switch at the end of each transmission. **Duplex** operation involves the use of one frequency for transmitting and a separate frequency for receiving. On channels specified as duplex on the charts, correct mode of operation is established automatically by your radio when you select a channel; you cannot change the mode. And you still must release the push-to-talk switch after each transmission in order to listen to the radio.
5. Channels normally used by recreational boaters are those that include the term "non-commercial" in the **Channel Use** column of the chart. Some of these are shared with other users and some are used only in certain geographic regions.
6. Marine vessels equipped with VHF radios are required to monitor Channel 16.

VHF MARINE CHANNEL CHART							
CH	U	C	I	S/D	TX	RX	CHANNEL USE
01		X	X	D	156.050	160.650	Public Correspondence (Marine Operator)
01A	X			S	156.050		Port Operation and Commercial. VTS in selected areas
02		X	X	D	156.100	160.700	Public Correspondence (Marine Operator)
03		X	X	D	156.150	160.750	Public Correspondence (Marine Operator)
<b>03A</b>	<b>X</b>			<b>S</b>	<b>156.150</b>		<b>U.S. Government Only, Coast Guard</b>
04			X	D	156.200	160.800	Public Correspondence (Marine Operator), Port operation, ship movement
04A		X		S	156.200		Pacific coast: Coast Guard, East Coast: Commercial fishing
05			X	D	156.250	160.850	Public Correspondence (Marine Operator), Port operation, ship movement
05A	X	X		S	156.250		Port operation. VTS in Seattle
06	X	X	X	S	156.300		Inter-ship Safety
07			X	D	156.350	160.950	Public Correspondence (Marine Operator), Port operation, ship movement
07A	X	X		S	156.350		Commercial
08	X	X	X	S	156.400		Commercial (Inter-ship only)
09	X	X	X	S	156.450		Boater Calling channel, Commercial & Non-commercial (Recreational)
10	X	X	X	S	156.500		Commercial
11	X	X	X	S	156.550		Commercial. VTS in selected areas.
12	X	X	X	S	156.600		Port operation. VTS in selected areas.
13	X	X	X	S	156.650		Inter-ship Navigation Safety (Bridge-to-bridge)
14	X	X	X	S	156.700		Port operation. VTS in selected areas.
15	X			S	---	156.750	Environmental (Receive only)
15		X	X	S	156.750		Commercial, non-commercial, ship movement (1 W)
16	X	X	X	S	156.800		International Distress, Safety and Calling
17	X	X	X	S	156.850		State Controlled (1 W)
18			X	D	156.900	161.500	Port operation, ship movement
18A	X	X		S	156.900		Commercial
19			X	D	156.950	161.550	Port operation, ship movement
19A	X			S	156.950		US: Commercial
19A		X		S	156.950		Coast Guard
20	X	X	X	D	157.000	161.600	Canadian Coast Guard Only, International: port operations and shipment
20A	X			S	157.000		Port operation
21			X	D	157.050	161.650	Port operation, ship movement
<b>21A</b>	<b>X</b>	<b>X</b>		<b>S</b>	<b>157.050</b>		<b>U.S. Government Only, Canadian Coast Guard</b>
22			X	D	157.100	161.700	Port operation, ship movement
22A	X	X		S	157.100		US and Canadian Coast Guard Liaison and Maritime Safety Information Broadcasts announced on channel 16
23		X	X	D	157.150	161.750	Public Correspondence (Marine Operator)
<b>23A</b>	<b>X</b>			<b>S</b>	<b>157.150</b>		<b>U.S. Government Only</b>
24	X	X	X	D	157.200	161.800	Public Correspondence (Marine Operator)
25	X	X	X	D	157.250	161.850	Public Correspondence (Marine Operator)
26	X	X	X	D	157.300	161.900	Public Correspondence (Marine Operator)
27	X	X	X	D	157.350	161.950	Public Correspondence (Marine Operator)
28	X	X	X	D	157.400	162.000	Public Correspondence (Marine Operator)

VHF MARINE CHANNEL CHART							
CH	U	C	I	S/D	TX	RX	CHANNEL USE
60		X	X	D	156.025	160.625	Public Correspondence (Marine Operator)
61			X	D	156.075	160.675	Public Correspondence (Marine Operator), Port operation, ship movement
<b>61A</b>	<b>X</b>	<b>X</b>		<b>S</b>	<b>156.075</b>		<b>Public Coast: Coast Guard; East Coast: commercial fishing only</b>
62			X	D	156.125	160.725	Public Correspondence (Marine Operator), Port operation, ship movement
62A		X		S	156.125		Public Coast: Coast Guard; East Coast: commercial fishing only
63			X	D	156.175	160.775	Public Correspondence (Marine Operator), Port operation, ship movement
63A	X	X		S	156.175		Port Operation and Commercial. VTS in selected areas.
64		X	X	D	156.225	160.825	Public Correspondence (Marine Operator), Port operation, ship movement
<b>64A</b>	<b>X</b>	<b>X</b>		<b>S</b>	<b>156.225</b>		<b>Public Correspondence (Marine Operator), Port operation, ship movement</b>
65			X	D	156.275	160.875	Public Correspondence (Marine Operator), Port operation, ship movement
65A	X	X		S	156.275		Port Operations
66			X	D	156.325	160.925	Public Correspondence (Marine Operator), Port operation, ship movement
66A	X	X		S	156.325		Port Operations
67	X	X	X	S	156.375		US: Commercial. Used for Bridge-to-bridge com- muni-cations in lower Mississippi River. Inter-ship only, Canada: Commercial fishing, S&R
68	X	X	X	S	156.425		Non-commercial (Recreational)
69	X	X	X	S	156.475		US: Non-commercial (Recreational), Canada: Commercial fishing only, International: Inter-ship, Port operations and Ship movement
70	X	X	X	S	156.525		Digital selective calling (voice communications not allowed)
71	X	X	X	S	156.575		US, Canada: Non-commercial (Recreational), International: Port operations and Ship movement
72	X	X	X	S	156.625		Non-commercial (Inter-ship only)
73	X	X	X	S	156.675		US: Port Operations, Canada: Commercial fish ing only, International: Inter-ship, Port operations and Ship movement
74	X	X	X	S	156.725		US: Port Operations, Canada: Commercial fishing only, International: Inter-ship, Port operations and Ship movement
75	X	X	X	S	156.775		Port Operations (Inter-ship only) (1W)
76	X	X	X	S	156.825		Port Operations (Inter-ship only) (1W)
77	X	X		S	156.875		Port Operations (Inter-ship only) (1W)
77			X	S	156.875		Port Operations (Inter-ship only)
78			X	D	156.925	161.525	Public Correspondence (Marine Operator), Port operation, ship-movement
78A	X	X		S	156.925		Non-commercial (Recreational)
79			X	D	156.975	161.575	Port operation and Ship movement
79A	X	X		S	156.975		Commercial

VHF MARINE CHANNEL CHART							
CH	U	C	I	S/D	TX	RX	CHANNEL USE
80			X	D	157.025	161.625	Port operation, ship movement
80A	X	X		S	157.025		Commercial
81			X	D	157.075	161.675	Port operation, ship movement
<b>81A</b>	<b>X</b>			<b>S</b>	<b>157.075</b>		<b>U.S. Government Only - Environmental protection operations.</b>
81A		X		S	157.075		Canadian Coast Guard Only
82			X	D	157.125	161.725	Public Correspondence (Marine Operator), Port operation, ship movement
<b>82A</b>	<b>X</b>	<b>X</b>		<b>S</b>	<b>157.125</b>		<b>U.S. Government Only, Canadian Coast Guard Only</b>
83		X		D	157.175	161.775	Canadian Coast Guard Only
83			X	D	157.175	161.775	Public Correspondence (Marine Operator)
<b>83A</b>	<b>X</b>	<b>X</b>		<b>S</b>	<b>157.175</b>		<b>U.S. Government Only, Canadian Coast Guard Only</b>
84	X	X	X	D	157.225	161.825	Public Correspondence (Marine Operator)
85	X	X	X	D	157.275	161.875	Public Correspondence (Marine Operator)
86	X	X	X	D	157.325	161.925	Public Correspondence (Marine Operator)
87		X	X	S	157.375		Port operation, ship movement
87A	X			S	157.375		Public Correspondence (Marine Operator)
88		X	X	S	157.425		Port operation, ship movement
88A	X			S	157.425		Commercial, Inter-ship Only
WX01	X	X	X	D	---	162.550	Weather (receive only)
WX02	X	X	X	D	---	162.400	Weather (receive only)
WX03	X	X	X	D	---	162.475	Weather (receive only)
WX04	X	X	X	D	---	162.425	Weather (receive only)
WX05	X	X	X	D	---	162.450	Weather (receive only)
WX06	X	X	X	D	---	162.500	Weather (receive only)
WX07	X	X	X	D	---	162.525	Weather (receive only)
WX08	X	X	X	D	---	161.650	Weather (receive only)
WX09	X	X	X	D	---	161.775	Weather (receive only)
WX10	X	X	X	D	---	163.275	Weather (receive only)

**NOTE:** Simplex channels, 3A, 21A, 23A, 61A, 64A, 81A, 82A and 83A CANNOT be lawfully used by the general public in U.S.A. waters.

Channel designator	Carrier frequency (MHz)		Points of communication (Intership and between coast and ship unless otherwise indicated)	
	Ship transmit	Coast transmit		
<b>Port Operations</b>				
01A <sup>1</sup>	156.050	156.050	Intership only.	
63A <sup>1</sup>	156.175	156.175		
05 <sup>2</sup>	156.250	156.250		
65A	156.275	156.275		
66A	156.325	156.325		
12 <sup>3</sup>	156.600	156.600		
73	156.675	156.675		
14 <sup>3</sup>	156.700	156.700		
74	156.725	156.725		
77 <sup>4</sup>	156.875			
20	157.000	161.600		
20A <sup>12</sup>	157.000			
<b>Navigational (Bridge-to-Bridge)<sup>5</sup></b>				
13 <sup>6</sup>	156.650	156.650		
67 <sup>7</sup>	156.375	156.375		
<b>Commercial</b>				
01A <sup>1</sup>	156.050	156.050	Intership only. Do.	
63A <sup>1</sup>	156.175	156.175		
07A	156.350	156.350		
67 <sup>7</sup>	156.375			
08	156.400	.....		
09	156.450	156.450		
10	156.500	156.500		
11 <sup>3</sup>	156.550	156.550		
18A	156.900	156.900		
19A	156.950	156.950		
79A	156.975	156.975		
80A	157.025	157.025		
88A <sup>8</sup>	157.425	.....		
72 <sup>14</sup>	156.625	.....		
<b>Digital Selective Calling</b>				
70 <sup>15</sup>	156.525	156.525		

Channel designator	Carrier frequency (MHz)		Points of communication (Intership and between coast and ship unless otherwise indicated)
	Ship transmit	Coast transmit	
<b>Noncommercial</b>			
68 <sup>17</sup>	156.425	156.425	Intership only. Great Lakes only. Do. Internship only.
09 <sup>16</sup>	156.450	156.450	
69	156.475	156.475	
71	156.575	156.575	
72	156.625	.....	
78A	156.925	156.925	
79A	156.975	156.975	
80A	157.025	157.025	
67 <sup>14</sup>	156.375	.....	
<b>Distress, Safety and Calling</b>			
16	156.800	156.800	EPRIB
<b>Intership Safety</b>			
06	156.300	.....	a. Intership, or b. For SAR: Ship and aircraft for the U.S. Coast Guard.
<b>Environmental</b>			
15 <sup>13</sup>	.....	156.750	Coast to ship only.
<b>Maritime Control</b>			
17 <sup>9,10</sup>	156.850	156.850	
<b>Liaison, U.S. Coast Guard</b>			
22A <sup>11</sup>	157.100	157.100	Ship, aircraft, and coast stations of the U.S. Coast Guard and at Lake Mead, Nev., ship and coast stations of the National Park Service, U.S. Department of the Interior.

- 156.050 MHz and 156.175 MHz are available for port operations and commercial communications purposes when used only within the U.S. Coast Guard designated Vessel Traffic Services (VTS) area of New Orleans, on the lower Mississippi River from the various pass entrances in the Gulf of Mexico to Devil's Swamp Light at River Mile 242.4 above head of passes near Baton Rouge.
- 156.250 MHz is available for port operations communications use only within the U.S. Coast Guard designated VTS radio protection areas of New Orleans and Houston described in Sec. 80.383. 156.250 MHz is available for intership port operations communications used only within the area of Los Angeles and Long Beach harbors, within a 25-nautical mile radius of Point Fermin, California.
- 156.550 MHz, 156.600 MHz and 156.700 MHz are available in the U.S. Coast Guard designated port areas only for VTS communications and in the Great Lakes available primarily for communications relating to the movement of ships in sectors designated by the St. Lawrence Seaway Development Corporation or the U.S. Coast Guard. The use of these frequencies outside VTS and ship movement sector protected areas is permitted provided they cause no interference to VTS and ship movement communications in their respective designated sectors.

- 4: Use of 156.875 MHz is limited to communications with pilots regarding the movement and docking of ships. Normal output power must not exceed 1 watt.
- 5: 156.375 MHz and 156.650 MHz are available primarily for intership navigational communications. These frequencies are available between coast and ship on a secondary basis when used on or in the vicinity of locks or drawbridges. Normal output power must not exceed 1 watt. Maximum output power must not exceed 10 watts for coast stations or 25 watts for ship stations.
- 6: On the Great Lakes, in addition to bridge-to-bridge communications, 156.650 MHz is available for vessel control purposes in established vessel traffic systems. 156.650 MHz is not available for use in the Mississippi River from South Pass Lighted Whistle Buoy "2" and Southwest Pass entrance Midchannel Lighted Whistle Buoy to mile 242.4 above Head of Passes near Baton Rouge. Additionally it is not available for use in the Mississippi River-Gulf Outlet, the Mississippi River-Gulf Outlet Canal, and the Inner Harbor Navigational Canal, except to aid the transition from these areas.
- 7: Use of 156.375 MHz is available for navigational communications only in the Mississippi River from South Pass Lighted Whistle Buoy "2" and Southwest Pass entrance Midchannel Lighted Whistle Buoy to mile 242.4 above head of Passes near Baton Rouge, and in addition over the full length of the Mississippi River-Gulf Outlet Canal from entrance to its junction with the Inner Harbor Navigation Canal, and over the full length of the Inner Harbor Navigation Canal from its junction with the Mississippi River to its entry to Lake Pontchartrain at the New Seabrook vehicular bridge.
- 8: Within 120 km (75 miles) of the United States/Canada border, in the area of the Puget Sound and the Strait of Juan de Fuca and its approaches, 157.425 MHz is half of the duplex pair designated as Channel 88. In this area, Channel 88 is available to ship stations for communications with public coast stations only. More than 120 km (75 miles) from the United States/Canada border in the area of the Puget Sound and the Strait of Juan de Fuca, its approaches, the Great Lakes, and the St. Lawrence Seaway, 157.425 MHz is available for intership and commercial communications. Outside Puget Sound area and its approaches and the Great Lakes, 157.425 MHz is also available for communications between commercial fishing vessels and associated aircraft while engaged in commercial fishing activities.
- 9: When the frequency 156.850 MHz is authorized, it may be used additionally for search and rescue training exercises conducted by state or local governments.
- 10: The frequency 156.850 MHz is additionally available to coast stations on the Great Lakes for transmission of scheduled Coded Marine Weather Forecasts (MAFOR), Great Lakes Weather Broadcast (LAWEB) and unscheduled Notices to Mariners or Bulletins. F3C and J3C emissions are permitted. Coast Stations on the Great Lakes must cease weather broadcasts which cause interference to stations operating on 156.800 MHz until the interference problem is resolved.
- 11: The frequency 157.100 MHz is authorized for search and rescue training exercises by state or local government in conjunction with U.S. Coast Guard stations. Prior U.S. Coast Guard approval is required. Use must cease immediately on U.S. Coast Guard request.
- 12: The duplex pair for channel 20 (157.000/161.600 MHz) may be used for ship to coast station communications.
- 13: Available for assignment to coast stations, the use of which is in accord with an agreed program, for the broadcast of information to ship stations concerning the environmental conditions in which vessels operate, i.e., weather; sea conditions; time signals; notices to mariners; and hazards to navigation.
- 14: Available only in the Puget Sound and the Strait of Juan de Fuca.
- 15: The frequency 156.525 MHz is to be used exclusively for distress, safety and calling using digital selective calling techniques. No other uses are permitted.
- 16: The frequency 156.450 MHz is available for intership, ship and coast general purpose calling by noncommercial vessels, such as recreational boats and private coast stations.
- 17: The frequency 156.425 MHz is assigned by rule to private coast stations in Alaska for facsimile transmissions as well as voice communications.

## 16 SPECIFICATIONS

Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice.

### 16.1 GENERAL

Channels .....	All USA, International and Canadian
Input Voltage .....	13.8 VDC $\pm$ 20%
Current Drain	
Standby .....	0.5 A
Receive .....	1.5 A
Transmit .....	5.0 A (Hi); 1.5 A (Lo)
Dimensions .....	3.5" H x 9.1" W x 5.9" D (90 H x 230 W x 150 D mm)
Flush-Mount Dimensions .....	2.8" H x 8.1" W x 5.1" D (72 H x 205 W x 130 D mm)
Weight .....	3.2 lbs (1.45 kg)

### 16.2 TRANSMITTER

Frequency Range .....	156.025 to 157.425 MHz
RF Output .....	25 W (Hi); 1 W (Lo)
Conducted Spurious Emissions .....	80 dB (Hi); 66 dB (Lo)
Audio Response .....	within +1/-3 of a 6 dB/octave pre-emphasis characteristic at 300 to 3000 Hz
Audio Distortion .....	5 %
Modulation .....	16K0G3E, for DSC 16K0G2B
Frequency Stability (-4 °F to +140 °F; -20 °C to +60 °C) .....	$\pm$ 0.0005%
FM Hum and Noise .....	50 dB

### 16.3 RECEIVER

Frequency Range .....	156.050 to 163.275 MHz
Sensitivity	
20 dB Quieting .....	0.35 $\mu$ V
12 dB SINAD .....	0.30 $\mu$ V
Squelch Sensitivity (Threshold) .....	0.13 $\mu$ V
Modulation Acceptance Bandwidth .....	$\pm$ 7.5 kHz
Selectivity (Typical)	
Spurious and Image Rejection .....	-80 dB
Intermodulation and Rejection at 12 dB SINAD .....	-80 dB
Audio Output .....	4.5 W
Audio Response .....	within + 1/-3 of a 6 dB/octave de-emphasis characteristic at 300 to 3000 Hz
Frequency Stability (-4 °F to +140 °F; -20 °C to +60 °C) .....	$\pm$ 0.0005 %
Channel Spacing .....	25 kHz
DSC Format .....	EN 301 025
NMEA Input/Output .....	Output - DSC, DSE Input - GLL, GGA, RMC and GNS



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