



INSTRUCTION MANUAL

MF/HF MARINE TRANSCEIVER **IC-M801GMDSS**



FOREWORD

Thank you for purchasing this Icom product. The IC-M801GMDSS MF/HF MARINE TRANSCEIVER is designed and built with Icom's superior technology and craftsmanship. With proper care, this product should provide you with years of trouble-free operation.

We want to take a couple of moments of your time to thank you for making the IC-M801GMDSS your radio of choice, and hope you agree with Icom's philosophy of "technology first." Many hours of research and development went into the design of your IC-M801GMDSS.

◇ FEATURES

- Standard 4x8" remote controller
- Built-in DSC meets ITU Class A requirement

PRECAUTIONS

⚠ **WARNING HIGH VOLTAGE! NEVER** attach an antenna or internal antenna connector during transmission. This may result in an electrical shock or burn.

⚠ **WARNING! NEVER** connect the transceiver to an AC outlet directly. This may pose a fire hazard or result in an electric shock.

⚠ **WARNING! NEVER** mount the transceiver main unit overhead. The weight of the unit is approximately 8.5 kg, but its apparent weight will increase several fold due to wave shocks or vibration. The unit must be mounted on a flat hard surface only.

⚠ **NEVER** connect a power source of more than 31.2 V DC. This connection could cause a fire or ruin the transceiver.

⚠ **NEVER** place the transceiver where normal operation of the ship or vehicle may be hindered or where it could cause bodily injury.

⚠ **NEVER** let metal, wire or other objects touch any internal part or connectors on the rear panel of the transceiver. This may result in an electric shock.

DO NOT use chemical agents such as benzine or alcohol when cleaning, as they can damage the transceiver surface.

IMPORTANT

READ THIS INSTRUCTION MANUAL CAREFULLY before attempting to operate the transceiver.

SAVE THIS INSTRUCTION MANUAL. This manual contains important safety and operating instructions for the IC-M801GMDSS.

EXPLICIT DEFINITIONS

WORD	DEFINITION
⚠ WARNING	Personal injury, fire hazard or electric shock may occur.
CAUTION	Equipment damage may occur.
NOTE	If disregarded, inconvenience only. No risk or personal injury, fire or electric shock.

During maritime mobile operation, **KEEP** the transceiver and handset or microphone **as far away** as possible (at least 1 m) from the magnetic navigation **compass** to prevent erroneous indications.

Use Icom handset or microphones only (supplied or optional). Other manufacturer's handset or microphones have different pin assignments, and connection to the IC-M801GMDSS may damage the transceiver.


AVOID using or placing the transceiver in areas with temperatures below -15°C or above $+55^{\circ}\text{C}$.

AVOID placing the transceiver in excessively dusty environments or in direct sunlight.

AVOID placing the transceiver against walls or putting anything on top of the transceiver. This will obstruct heat dissipation.

Place the unit in a secure place to avoid inadvertent use by children.

BE CAREFUL! The transceiver main unit will become hot when operating the transceiver continuously for long periods.

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IN CASE OF EMERGENCY

When your ship requires assistance, contact other ships and the Coast Guard by sending a distress call using digital selective calling on an emergency frequency.

When immediate help is needed

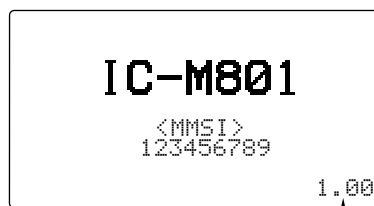
- ① Push and hold [DISTRESS] for 5 sec. until the short beeps become one long beep, to send the distress call.
- ② After the appropriate traffic frequency is automatically selected (after an acknowledgement call is received), push and hold the PTT switch on the handset or microphone and send the following information.
 1. "MAY DAY, MAY DAY, MAY DAY."
 2. "THIS IS" (name of ship)
 3. "LOCATED AT" (ship's position)
 4. Give the reason for the distress call.
 5. Explain what assistance you need.
 6. Give additional information:
 - Ship type
 - Ship length
 - Ship color
 - Number of people on-board

When potential problems exist

- ① Push [DSC] to select DSC watch mode, if necessary.
- ② Push [MODE SET] to select DSC menu, rotate [CH] to select "Geographical" then push [ENT].
- ③ Follow the guidance displayed on the LCD (bottom line), to set up the category, area, calling and traffic frequencies with [CH], [ENT] and keypad.
- ④ Push and hold [CALL] for 1 sec. until the short beeps become one long beep.
- ⑤ Transmit the appropriate information using voice.
 - DSC equipped ships may monitor your transmission.

MAIN FIRMWARE REVISION NUMBER

The main firmware revision number is displayed in the opening screen as below.
The revision number is also displayed when MMSI code check screen is selected. (see page 43)



Main firmware revision number indication

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Before transmitting, monitor the channel you wish to use so as to avoid interrupting transmissions already in progress.

•CALL PROCEDURE

Calls must be properly identified and the time limit must be respected.

- ① Give your call sign each time you call another ship or coast guard station. If you have no call sign, identify the station by giving your ship name and the name of the licensee.
- ② Give your call sign at the end of each transmission that lasts more than 3 min.
- ③ You must break and give your call sign at least once every 15 min. during long ship-to-shore calls.
- ④ Keep your unanswered calls short, less than 30 sec. Do not repeat a call for 2 min.
- ⑤ Unnecessary transmissions are not allowed.

•PRIORITIES

- ① Read all rules and regulations pertaining to priorities and keep an up-to-date copy handy. Safety and distress calls take priority over all others.
- ② False or fraudulent distress signals are prohibited and punishable by law.

•PRIVACY

- ① Information overheard but not intended for you, cannot lawfully be used in any way.
- ② Indecent or profane language is prohibited.

•LOGS

- ① All distress, emergency and safety calls must be recorded in complete details. Log data activity is usually recorded in 24 hour time. Universal Time Coordinated (UTC) is frequently used.
- ② Adjustments, repairs, channel frequency changes and authorized modifications affecting electrical operation of the equipment must be kept in the maintenance log; entries must be signed by the authorized licensed technician performing or supervising the work.

•RADIO LICENSES

(1) SHIP STATION LICENSE

You must have a current radio station license before using the transceiver. It is unlawful to operate a ship station which is not licensed.

Inquire through your dealer or the appropriate government agency for a Ship-Radiotelephone license application. This government-issued license states the call sign which is your craft's identification for radio purposes.

(2) OPERATOR'S LICENSE

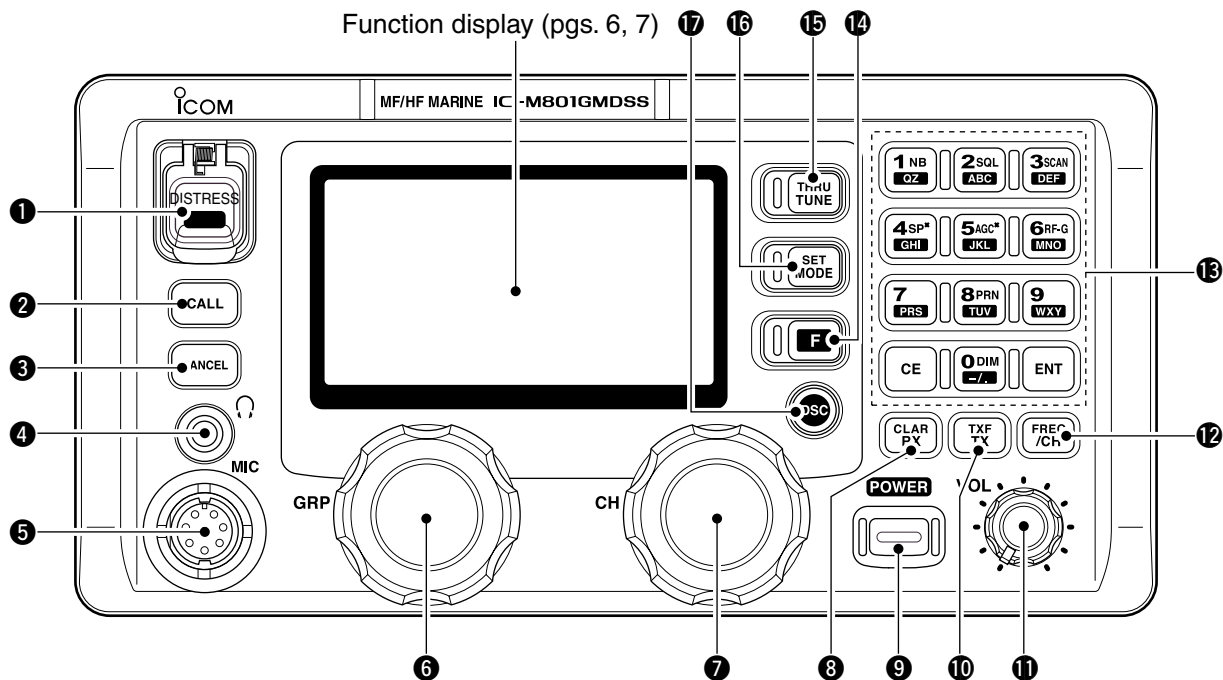
A Restricted Radiotelephone Operator Permit is the license most often held by small ship radio operators when a radio is not required for safety purposes.

The Restricted Radiotelephone Operator Permit must be posted or kept with the operator. Only a licensed radio operator may operate the transceiver.

However, non-licensed individuals may talk over a transceiver if a licensed operator starts, supervises, and ends the call and makes the necessary log entries.

Keep a copy of the current government rules and regulation handy.

■ Controller (RC-25GMDSS)



1 DISTRESS SWITCH [DISTRESS] (p. 18)

Push and hold for 5 sec. (approx.) to make a distress call.

2 CALL SWITCH [CALL]

Push and hold for 1 sec. to start calling after DSC contents are setup.

3 CANCEL SWITCH [CANCEL]

Cancels a distress or DSC repeat call.

4 HEADPHONE JACK [Ω]

Accepts headphones.

- Output power: 2.5 mW with a 16 Ω load (stereo/monaural)

5 MICROPHONE CONNECTOR [MIC]

Accepts the supplied or optional microphone.

- See p. 65 for appropriate microphones.
- See p. 62 for microphone connector information.

6 GROUP SELECTOR [GRP]

- ➔ Selects groups in 20 channel steps and ITU marine channel groups. (p. 8)
- ➔ Selects items during quick/initial set mode, etc.

7 CHANNEL SELECTOR [CH]

- ➔ Selects an operating channel within the selected channel group such as ITU channels. (p. 8)
 - User channels can be selected from 1 to 160 (max.) in sequence regardless of the channel group.
- ➔ Changes setting or value of the selected item during quick/initial set mode, etc.

8 RX/CLARITY SWITCH [RX CLAR]

- ➔ After pushing [F], turns the clarity function ON and OFF. (p. 12)
 - [CH] is used for clarity control.
- ➔ During DSC watch mode, enters Received Call Log screen. (p. 29)
 - [CH] is used for distress and other call selection.

9 POWER SWITCH [POWER]

- ➔ Push to turn the power ON.
- ➔ Push and hold for 1 sec. to turn the power OFF.

10 TX/TRANSMIT FREQUENCY SWITCH [TX TXF]

- ➔ After pushing [F], displays the transmit frequency, and opens the squelch. Checks and monitors the transmit frequency while holding. (p. 10)
- ➔ During DSC watch mode, enters TX memory select screen. (p. 40)
 - [CH] is used for memory selection.

11 VOLUME CONTROL [VOL]

Adjusts the audio output level.

- Audio does not come from the speaker when:
 - The speaker OFF switch is turned ON.
 - The squelch function is turned ON and no signal is being received.
- Pick the handset up with speaker switch “” position. (p. 5)
- During DSC watch mode.

12 FREQUENCY/CHANNEL SWITCH [FREQ/CH]

- ➔ Selects indication type: (p. 8)
- When channel comment indication is ON; switches channel comment indication ON and OFF.
- When channel comment indication is OFF; switches transmit frequency indication ON and OFF.
- ➔ After pushing [F], enters channel name programming mode, when channel comment indication is ON. (p. 13)

13 KEYPAD

- 1 NB QZ** ➔ Inputs numeral "1" for channel number input, etc.
- ➔ Inputs "1," "Q," "Z," "q," "z" or space for channel comment input.
- ➔ After pushing [F], turns the noise blanker function ON and OFF. (p. 11)
- 2 SQL ABC** ➔ Inputs numeral "2" for channel number input, etc.
- ➔ Inputs "2," "A," "B," "C," "a," "b" or "c" for channel comment input.
- ➔ After pushing [F], turns the squelch function ON and OFF. (p. 11)
- 3 SCAN DEF** ➔ Inputs numeral "3" for channel number input, etc.
- ➔ Inputs "3," "D," "E," "F," "d," "e" or "f" for channel comment input.
- ➔ After pushing [F], starts and stops the scan function. (p. 9)
- 4 SP* GHI** ➔ Inputs numeral "4" for channel number input, etc.
- ➔ Inputs "4," "G," "H," "I," "g," "h" or "i" for channel comment input.
- ➔ After pushing [F], turns the external speaker output ON and OFF. (p. 10)
- 5 AGC* JKL** ➔ Inputs numeral "5" for channel number input, etc.
- ➔ Inputs "5," "J," "K," "L," "j," "k" or "l" for channel comment input.
- ➔ After pushing [F], turns the AGC OFF function ON and OFF. (p. 11)
- 6 RF-G MNO** ➔ Inputs numeral "6" for channel number input, etc.
- ➔ Inputs "6," "M," "N," "O," "m," "n" or "o" for channel comment input.
- ➔ After pushing [F], enters the RF gain adjustment mode. (p. 11)
- 7 PRS** ➔ Inputs numeral "7" for channel number input, etc.
- ➔ Inputs "7," "P," "R," "S," "p," "r" or "s" for channel comment input.

- 8 PRN TUV** ➔ Inputs numeral "8" for channel number input, etc.
- ➔ Inputs "8," "T," "U," "V," "t," "u" or "v" for channel comment input.
- ➔ After pushing [F], push for 1 sec. to print out the DSC contents, etc. (p. 44)

- 9 WXY** ➔ Inputs numeral "9" for channel number input, etc.
- ➔ Inputs "9," "W," "X," "Y," "w," "x" or "y" for channel comment input.

- 0 DIM -/** ➔ Inputs numeral "0" for channel number input, etc.
- ➔ Inputs "0" and symbols (., ^, <, >, *, +, -, /, <=, >=, @) for channel comment input.
- ➔ After pushing [F], selects LCD backlight brightness.

- ENT** ➔ Fixes input of channel number and channel comment, etc.
- ➔ When pushed for 1 sec., stores programmed frequency, operating mode and memory comment into a channel.

- CE** ➔ Clears entered digits and retrieves the previous frequency, channel or channel names during setting.

14 FUNCTION SWITCH [F]

- After pushing, activates the secondary functions.
- "[F]" appears when a secondary function can be accessed.

15 TUNE/THROUGH SWITCH [TUNE THRU]

- ➔ Starts tuning the connected AT-141 HF AUTOMATIC ANTENNA TUNER.
- "TUNE" appears when tuned.
- When the tuner cannot tune the antenna, the tuning circuit is bypassed automatically after 15 sec.
- ➔ After pushing [F], bypasses the connected antenna tuner. (p. 12)
- "THRU" appears instead of "TUNE" indication.

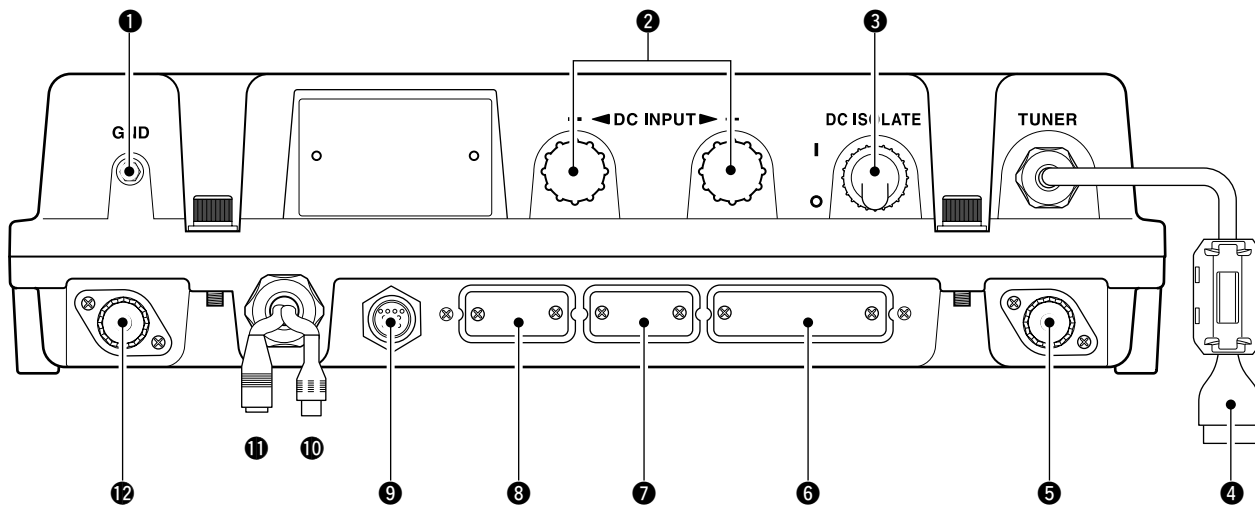
16 MODE/SET SWITCH [MODE SET]

- ➔ Push to select an operating mode.
- J3E (USB), H3E (AM), LSB, J2B (AFSK), F1B (FSK), and A1A (CW) modes are available, depending on version or countries.
- ➔ After pushing [F], enters quick set mode. (p. 45)
- ➔ During DSC watch mode, enters DSC menu.

17 DSC SWITCH [DSC]

- Switches DSC watch mode and voice communication mode when pushed.

■ Main unit



1 GROUND TERMINAL

IMPORTANT! Connects a ship's ground. See page 53 for details.

2 DC POWER TERMINALS (pgs. 51, 54)

Accepts 24 V DC through the supplied DC power cables.

Red terminal is for positive and black terminal is for negative connection.

3 DC ISOLATE SWITCH [DC ISOLATE] (p. 51)

Turns the transceiver's main power ON and OFF.

4 TUNER CONTROL SOCKET (pgs. 51, 55)

Connects a control cable to the antenna tuner, AT-141.

A female connector kit is supplied for antenna tuner connection.

5 ANTENNA CONNECTOR 1 (pgs. 51, 55)

Connects a 50 Ω HF band antenna via a 50 Ω matched coaxial cable with a PL-259 plug for both transmit and receive operation.

6 PRINTER CONNECTOR (pgs. 52, 63)

Connects an IBM® centronics or compatible printer to print out received DSC information automatically or manually.

7 REMOTE CONNECTOR [REMOTE] (p. 63)

Connects a cable (D-sub 9-pin) for remote control in the IEC61162-1 format.

8 MODEM CONNECTOR [AF/MOD] (pgs. 52, 62)

Connects to an NBDP (Narrow Band Direct Printing) or FAX system via a D-sub 15-pin cable.

This connector can also be used as SSB telephony interface (600 Ω).

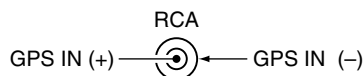
9 CONTROLLER CONNECTOR [CONTROLLER]

(p. 51)

Connects the supplied remote controller, RC-25GMDSS.

10 GPS CONNECTOR [GPS] (p. 52)

Input position and UTC data (IEC6112-1 format), such as from a GPS receiver, etc., for setting your positioning and time data automatically without manual input for DSC operation.



11 SPEAKER JACK [SP] (p. 51)

Connects the supplied external speaker, SP-24E.

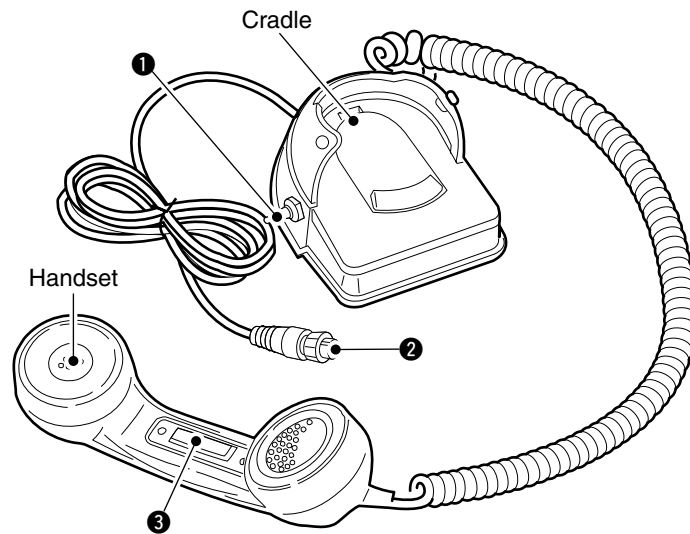
12 ANTENNA CONNECTOR 2 (p. 51)

Connects a 50 Ω HF band antenna via a 50 Ω matched coaxial cable with a PL-259 plug for DSC receiver.

IMPORTANT!: An HF antenna should be connected to this antenna connector, otherwise no DSC call can be received.

✓ For detailed "ANTENNA AND GROUNDING CONSIDERATIONS," see pages 71 to 73.

■ Handset (HS-98)



① SPEAKER SWITCH

Toggle the connected external speaker output ON and OFF when pick the handset up.

• **When the switch is set to “” position**

- Emits the receiving audio from the connected external speaker.

• **When the switch is set to “” position**

- Mutes the connected external speaker output.

- The receiving audio can be heard from the earpiece of the handset.

- Replace the handset into the cradle to emits the receiving audio from the connected external speaker.

② HANDSET CONNECTOR

Connects to [MIC] connector on the remote controller. (p. 51)

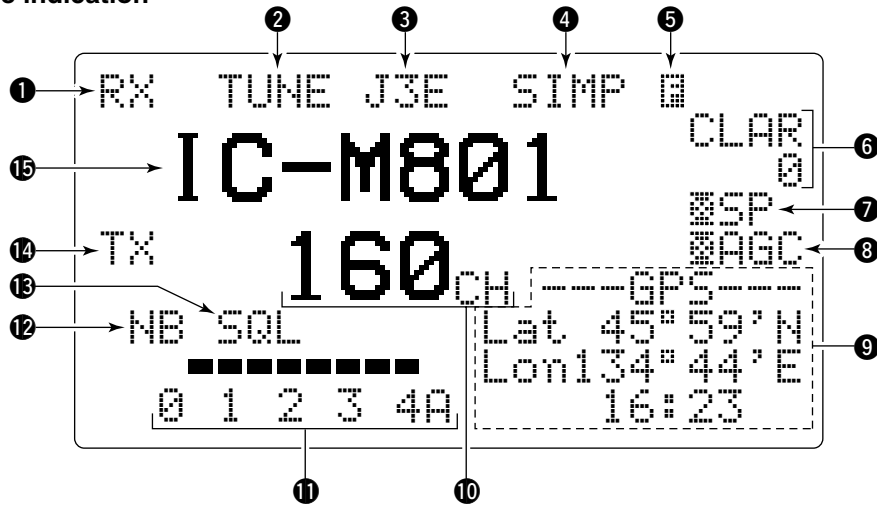
③ PTT SWITCH [PTT]

Push and hold to transmit; release to receive.

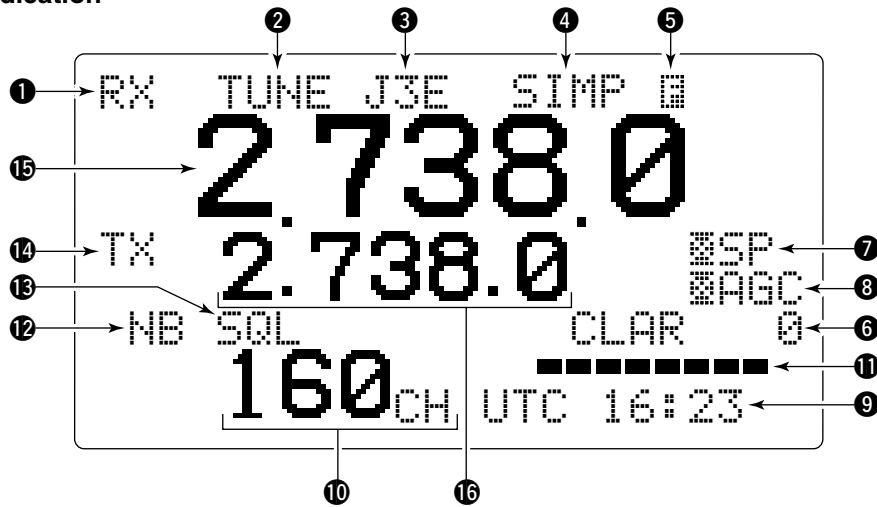
■ LCD screen

The IC-M801GMDSS has 2 indication types, one is channel name indication and the other is frequency indication. These indication types can be switched with a push of a button, depending on set mode's setting. See pages 8 and 47 for display type settings.

• Channel name indication



• Frequency indication



• DSC watch mode indication



1 RECEIVE INDICATOR

“RX” appears when signals are received or the squelch is open.

2 TUNE INDICATOR

“TUNE” blinks while tuning. (p. 10)

- “TUNE” appears after tuning is completed with AT-141.
- “THRU” appears when the tuner through function is activated.
- “SWR” appears when the antenna SWR worsens during transmit, depending on the transmit output power. If it appears, check your antenna system.

3 OPERATING MODE INDICATOR

Shows the selected operating mode.

- “J3E,” “USB,” “H3E,” “AM,” “LSB,” “J2B,” “AFS,” “F1B,” “FSK,” “A1A” or “CW” appears depending on operating mode and setting.

4 SIMPLEX/DUPLEX INDICATOR

“SMP” appears when a simplex channel is selected.

“DUP” appears when a duplex channel is selected.

5 FUNCTION INDICATOR

“F” appears when a secondary function can be accessed.

6 CLARITY INDICATOR (p. 12)

“CLAR” appears when the clarity function is activated and shows shifting frequency in “Hz.”

7 SPEAKER OFF INDICATOR (p. 10)

“SPO” appears when the speaker output is turned OFF.

8 AGC OFF INDICATOR (p. 11)

“AGC” appears when the AGC OFF function is turned ON.

9 POSITION/UTC TIME INDICATOR (p. 17)

Shows position and/or UTC (or local) time. When an IEC61162-1 data is applied to [GPS], the indication is up dated automatically.

- When no IEC61162-1 data is applied, the position and UTC time must be set in advance.
- “GPS” appears when an IEC61162-1 data is applied to [GPS], “MAN” appears when the position is manually set.
- “UTC” appears when the offset time has not been programmed. (No “UTC” indication when offset time is programmed and shows local time.)

10 CHANNEL NUMBER INDICATION

Shows the selected channel number.

11 S/ANTENNA CURRENT INDICATOR

Shows relative driving antenna current levels during transmit and receiving signal strength during receive.

12 NOISE BLANKER INDICATOR (p. 11)

“NB” appears when the noise blanker function is activated.

13 SQUELCH INDICATOR (p. 11)

“SQL” appears when the squelch is ON.

14 TRANSMIT INDICATOR

➤ “TX” appears during transmit.

➤ “TX” blinks while monitoring a transmit frequency. (p. 10)

15 CHANNEL NAME/RECEIVE FREQUENCY READOUT

➤ Shows the programmed channel names.

➤ Shows receive frequency when no channel name is programmed, or during frequency indication.

➤ During DSC watch mode, displays “DSC WATCH.”

16 TRANSMIT FREQUENCY READOUT

Shows transmit frequency.

17 OPERATING GUIDE INDICATION

During DSC watch mode operation, shows several types of guidance, according to the selected condition.

18 SCANNING FREQUENCY READOUT

During DSC watch mode operation, shows the programmed scan frequency.

- Decimal points blink.

19 MMSI CODE INDICATION

During DSC watch mode operation, shows the programmed MMSI code.

20 AUTO ACKNOWLEDGEMENT INDICATOR

Appears when the automatic acknowledgement function is set to ON. (p. 48)

21 UNREAD MESSAGE INDICATOR

Appears when an unread DSC message is available.

22 SCANNING DISTRESS FREQUENCY INDICATOR

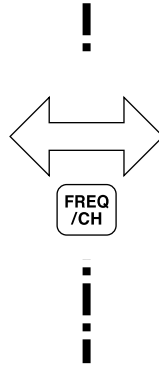
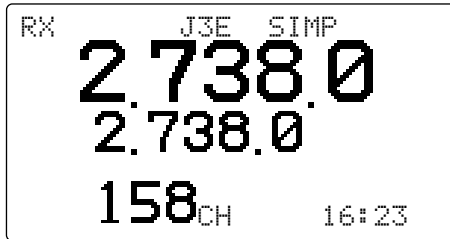
Shows the scanning distress frequency initials for DSC operation. (p. 43)

■ Selecting a channel

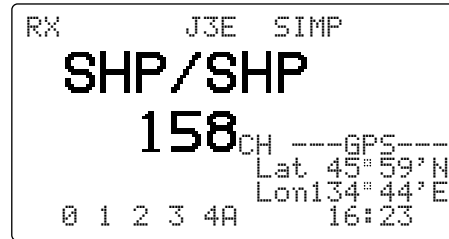
The transceiver has 160 user channels and ITU channels. However, the number of user channels can be optionally restricted.

◇ Display selection

FREQUENCY indication



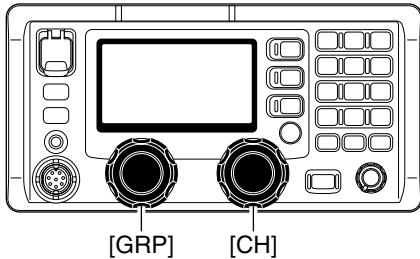
CHANNEL indication



NOTE: Channel name (alphanumeric) may not appear during frequency indication depending on initial set mode setting. (p. 47)

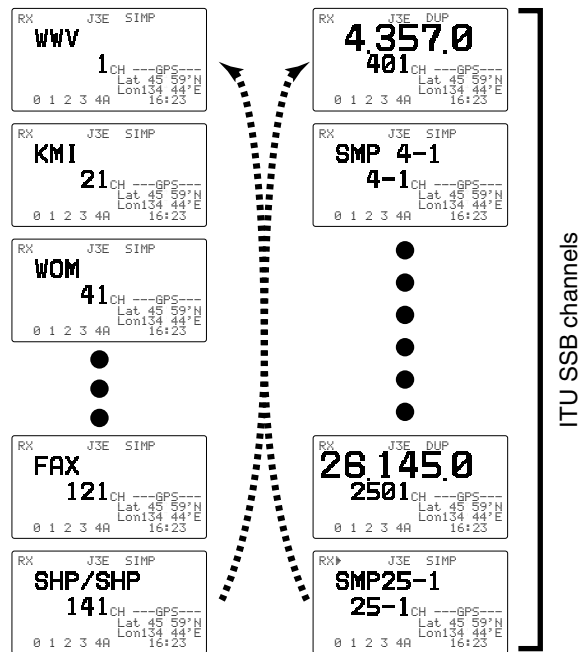
◇ Using the channel selector

The transceiver has two large controls for group selection and channel selection. The [GRP] changes channels in 20 channel increments and selects ITU channel groups; and the [CH] selects each channel.



- ① Rotate [GRP] to select the desired channel group as shown at right and/or below.
- ② Rotate [CH] to select the desired channel.

[EXAMPLE]: Selection with the [GRP]



CHANNEL GROUPS

*[GRP] changes in 20 channels steps. *2SITOR use— no group separation.

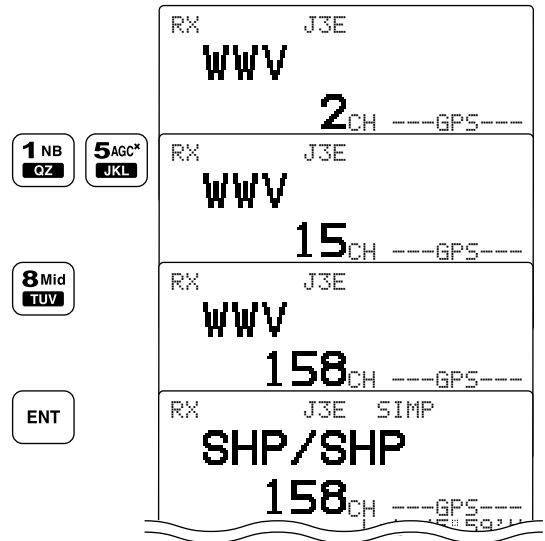
Channel No.	Description	Channel No.	Description	Channel No.	Description
1 to 160	User Ch.*1	1201 to 1241	12 MHz ITU duplex Ch.	22-1 to 22-9	22 MHz ITU simplex Ch.
401 to 427	4 MHz ITU duplex Ch.	12-1 to 12-9	12 MHz ITU simplex Ch.	2501 to 2510	25 MHz ITU duplex Ch.
4-1 to 4-9	4 MHz ITU simplex Ch.	1601 to 1656	16 MHz ITU duplex Ch.	25-1 to 25-9	25 MHz ITU simplex Ch.
601 to 608	6 MHz ITU duplex Ch.	16-1 to 16-9	16 MHz ITU simplex Ch.	C1-1 to C1-21	C1 channels
6-1 to 6-9	6 MHz ITU simplex Ch.	1801 to 1815	18 MHz ITU duplex Ch.	C2-1 to C2-31	C2 channels
801 to 832	8 MHz ITU duplex Ch.	18-1 to 18-9	18 MHz ITU simplex Ch.	4001 to 25040	ITU FSK duplex Ch.*2
8-1 to 8-9	8 MHz ITU simplex Ch.	2201 to 2253	22 MHz ITU duplex Ch.		

◇ Using the keypad

Direct channel selection via the keypad is available for quick channel selection.

- ① Enter the desired channel number via the keypad.
 - Pushing [CE] clears input digits and retrieves the channel.
 - A user channel is selected when channel 1–160 is input (max. number may be optionally restricted).
 - An ITU SSB channel is selected when channel numbers higher than 401 are input.
 - When selecting an ITU simplex channel, push [0 DIM] three times to input “– (dash).” (e.g. When selecting the channel 4-1; — push [4 SP^x], [0 DIM], [0 DIM], [0 DIM] then [1 NB].)
- ② Push [ENT] to select the channel.

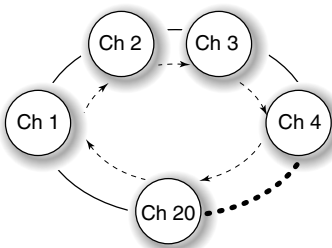
[EXAMPLE]: Selecting channel 158



◇ Using scan function

The transceiver has automatic channel or frequency change capability (scan function). There are 3 types of scan functions available to suit your needs.

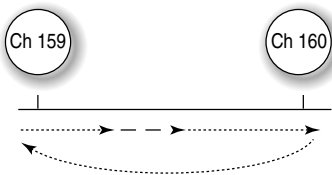
Channel scan/Channel resume scan



When resume OFF; scan does not pause even if a signal is received.

When resume ON; scan pauses for 10 sec., then resumes, or resumes after 2 sec. from when the signal disappears.

Programmed scan



Scans the frequency range between the programmed frequencies on channels 159 and 160. Scans fast when squelch is closed and slowly when squelch is open.

Channel scan and channel resume scan increase channels within a 20 channel range, such as Ch 1 to Ch 20, Ch 141 to Ch 160, etc., in user channels; or all channels in the group of ITU channels.

Programmed scan scans frequencies within the frequency range between user channels 159 and 160.

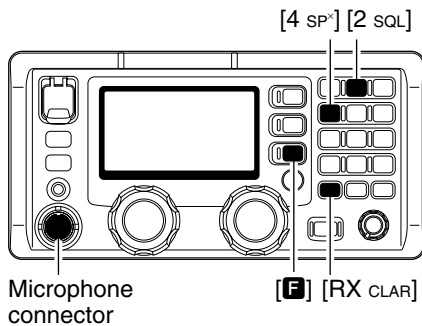
Scan type selection is available in initial set mode. See p. 46 for the selection.

SCAN OPERATION

- ① Rotate [GRP] and [CH], or use the keypad to select your desired channel group.
 - This operation is not necessary for programmed scan.
- ② Push [F] then [2 SQL] to turn OFF the squelch function, if programmed scan is selected.
- ③ Push [F] then [3 SCAN] to start the scan.
- ④ To stop the scan, repeat step ③ again.
 - [CH] rotation or pushing some other switches also stops the scan.

Basic voice transmit and receive

- ① Check the following in advance.
 - ➔ Handset or microphone is connected.
 - ➔ No "SQL" indication.
 - If "SQL" appears, push [F] then [2 SQL] to turn the squelch OFF.
 - ➔ No "SP" indication.
 - If "SP" appears, push [F] then [4 SP*] to activate the speaker.
 - ➔ The clarity function is not activated.
 - If the clarity function is activated, push [F] then [RX CLAR] to turn the function OFF.
- ② Rotate [GRP] and [CH] to select the desired channel to be received.
 - When receiving a signal, the S-meter shows the signal strength.
- ③ Adjust [VOL] to the desired audio level when receiving a signal.
- ④ Push [MODE SET] to select the desired operating mode.
- ⑤ Push [TUNE THRU] to tune the antenna tuner, if connected.
 - Skip this operation when the "AUTO TUNE" is set to ON in initial set mode (p. 46).
- ⑥ To transmit on the channel, push and hold the PTT switch on the handset or microphone.
 - "TUNE" blinks for 1 to 2 sec. for the first transmission on a channel when the automatic tuning function is activated.
- ⑦ Speak into the handset or microphone at your normal voice level.
 - The RF meter shows the output power according to your voice level.
 - If "SUR" appears, check your antenna system.
- ⑧ Release the PTT switch to return to receive.



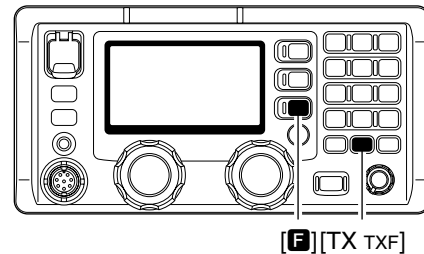
Function for transmit

◆ Transmit frequency check

When "DUF" appears in the display such as for a ship-to-ship channel, the transmit frequency differs from the receive frequency.

In such cases, the transmit frequency should be monitored before transmitting to prevent interference to other stations.

- ➔ Push [F] then push and hold [TX TXF] to monitor the transmit frequency.



- "TX" blinks and the display shows the transmit frequency.

■ Functions for receive

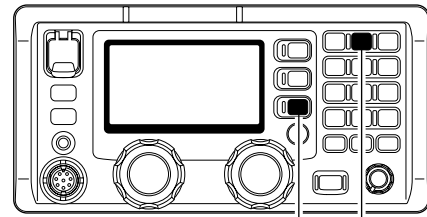
◇ Squelch function

The squelch function detects signals with voice components and squelches (mutes) unwanted signals such as unmodulated beat signals. This provides quiet stand-by.

When you need to receive weak signals, the squelch should be turned OFF.

➔ Push [**F**] then [2 SQL] to switch the function ON and OFF.

- See page 45 for the squelch level adjustment.



[**F**] [2 SQL]

- "SQL" appears when the squelch function is turned ON.

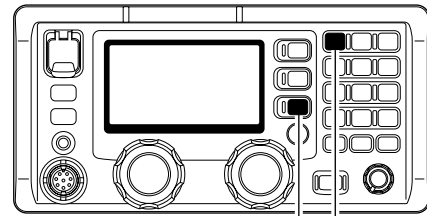
◇ Noise blanker

The noise blanker function reduces pulse type noise such as that coming from engine ignitions, etc.

The noise blanker may distort reception of strong signals. In such cases, the noise blanker should be turned OFF.

➔ Push [**F**] then [1 NB] to switch the function ON and OFF.

- See page 45 for the noise blanker level adjustment.



[**F**] [1 NB]

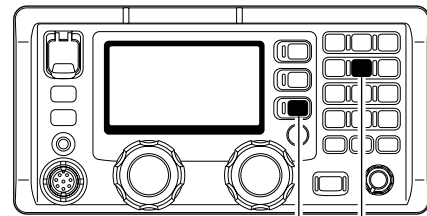
- "NB" appears when the NB function is turned ON.

◇ AGC OFF function

The receive gain is automatically adjusted according to received signal strength with the AGC (Automatic Gain Control) function to prevent distortion from strong signals and to obtain a constant output level.

When receiving weak signals with adjacent strong signals or noise, the AGC function may reduce the sensitivity. In this situation, the AGC function should be deactivated.

➔ Push [**F**] then [5 AGC*] to switch the function ON and OFF.



[**F**] [5 AGC*]

- "AGC*" appears when the AGC function is turned OFF.

◇ RF gain setting

The receiver gain can be reduced with the RF gain setting. This may help to remove undesired weak signals while monitoring strong signals.

Usually, the AGC function reduces the RF gain according to the receive signal strength and these weak signals are removed. However, during no signal reception, these weak signals may not be heard.

In such cases, the RF gain may be useful for setting a minimum level at which to hear signals.

- ➊ Push [**F**] then [6 RF-G] to select the RF gain set mode, as shown below.



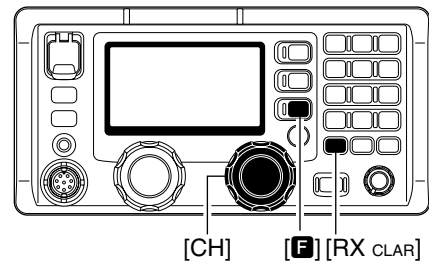
- ➋ Rotate [CH] to set the desired minimum cutting level.
 - "0 (low sensitivity)" to "9 (max. sensitivity)" are available.
 - S-meter shows the minimum permitted level.
- ➌ Push any key to exit the RF gain set mode.

■ Functions for receive (continued)

◇ Clarity control

Voice signals received from other stations may be difficult to receive. This may sometimes happen if a station is transmitting slightly off frequency. In such cases, you can compensate by using the clarity control.

- ① Push [F] then [RX CLAR] to switch the function ON and OFF.
 - “CLAR” and shifting value with direction appear.
- ② Rotate [CH] to improve the audio readability.
 - Adjustable between ± 150 Hz in 10 Hz steps.

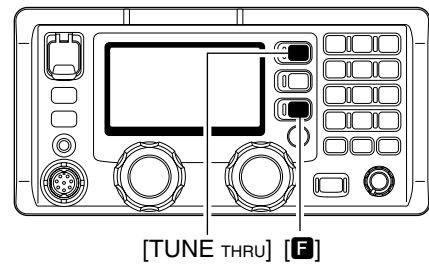


◇ Tuner through function

In the combination with IC-M801GMDSS and optional AT-141, the tuner through function can be used.

By bypassing the tuner unit, the receiver gain in particular frequency band may be improved depending on your antenna element length.

- ➔ While “TUNE” is displayed, push [F] then [TUNE THRU] to tuner through function ON.
- “THRU” appears instead of “TUNE” indicator.
 - Push [TUNE THRU] to turn the function OFF.



■ FSK operation

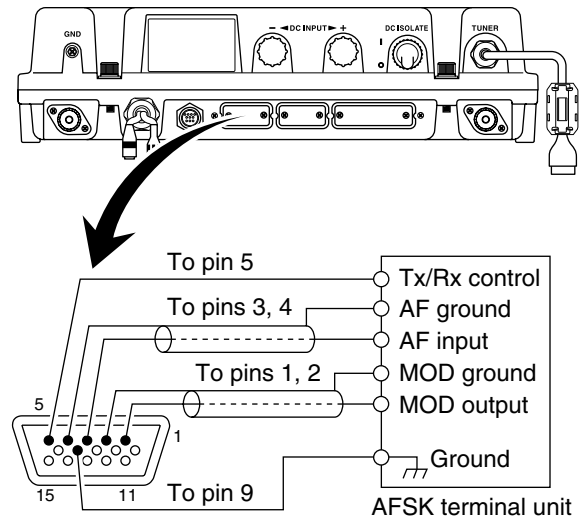
The transceiver has AFSK operation capability when an AFSK terminal unit is connected— use J2B for AFSK operation.

- ① Connect an AFSK terminal unit to the [AF/MOD] socket as shown at right.
- ② Select the desired channel to operate AFSK mode.
- ③ Push [MODE SET] several times to select J2B.
- ④ Operate the AFSK terminal unit.

NOTE:

Some transceivers may operate 1.7 kHz higher than the IC-M801GMDSS's J2B mode even when the same displayed frequencies are in use.

AFSK terminal unit connection

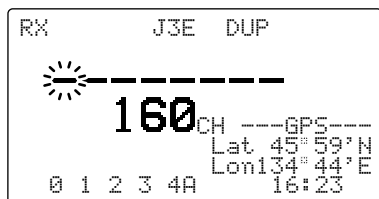


Up to 8-character channel names can be assigned for each user and ITU channel. This may be helpful for indicating the frequency usage, ship name, etc.

NOTE: The display type must be set to “CH-NAME” to display/program the channel names in initial set mode. (p. 47).

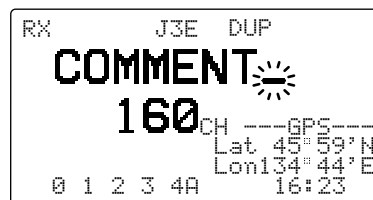
◇ Programming

- ① Select the desired channel to be programmed.
- ② Push [FREQ/CH] to select channel indication mode, if desired.
- ③ Push [F] then [FREQ/CH].
 - The 1st character for the channel names blinks.

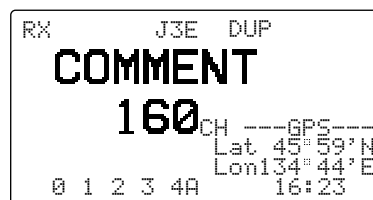


- ④ Rotate [CH] selector to select the character for channel names.
 - See the table below for available characters.

- ⑤ Push the keypad several times to enter that character.



- ⑥ Repeat steps ④ and ⑤ to enter the channel name.
- ⑦ Push [ENT] for 1 sec. to program the channel name.



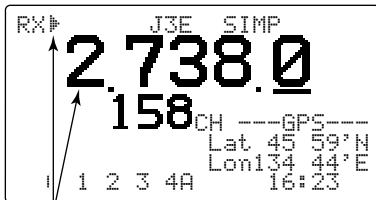
• Available characters

KEY	CHARACTERS	KEY	CHARACTERS
1 NB QZ	1 Q Z q z (space)	6 RF-G MNO	6 M N O m n o
2 SQL ABC	2 A B C a b c	7 Lo PRS	7 P R S p r s
3 SCAN DEF	3 D E F d e f	8 Mid TUV	8 T U V t u v
4 SP* GHI	4 G H I g h i	9 Hi WXY	9 W X Y w x y
5 AGC* JKL	5 J K L j k l	0 DIM - /	0 - / . ' () * + < = > @

Frequency selection

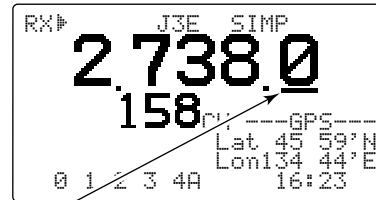
Using the channel selector

- ① Select a channel which is programmed near the frequency you want to receive.
- ② Push [RX CLAR] to select the frequency selection mode.
 - “▶” appears in the display.



“▶” and frequency show that the frequency can be changed.

- ③ Rotate [GRP] to select the digit for tuning.
 - Under-bar shows the selected digit.



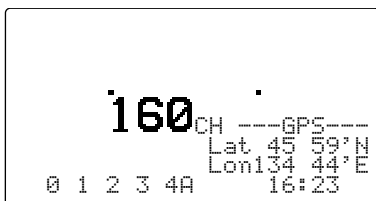
The under-bar is moved by rotating [GRP].

- ④ Rotate [CH] to tune the frequency.
 - Pushing [▲]/[▼] on the microphone also tunes the frequency.
- ⑤ Repeat steps ③ and ④ to complete the frequency selection.
- ⑥ To return to the previous frequency, push [RX CLAR].
 - “▶” disappears.

Using the keypad

CAUTION: A frequency can be programmed into a user or e-mail channel by pushing and holding [ENT] for 1 sec. after entering a frequency. An ITU simplex frequency can only be programmed on a temporary basis. Keypad entry should be used only on spare (or blank) channels.

- ① Rotate [GRP] and [CH], or enter a 1 to 4 digit number via the keypad, then push [ENT] to select the memory channel to be used for general coverage use.



When a blank channel is selected, operating frequency, mode and channel name do not appear.

- ② Push [RX CLAR] to select the frequency selection mode.
 - “▶” appears in the display.
- ③ Enter 4 to 6 digits of the desired frequency via the keypad.
- ④ Push [ENT] momentarily to input the frequency.
 - **DO NOT hold** [ENT] for more than 1 sec., otherwise the frequency will be programmed into the channel.

[EXAMPLE]: Setting 12.3450 MHz

Select blank channel.

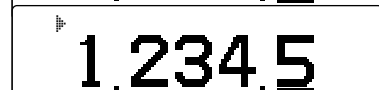
Push [RX CLAR]



[1 NB]



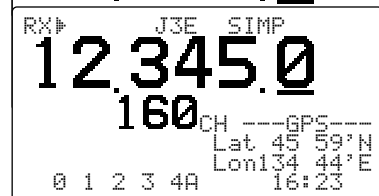
[2 SQL], [3 SCAN],
[4 SP-], [5 AGC]



[0 DIM]



[ENT]

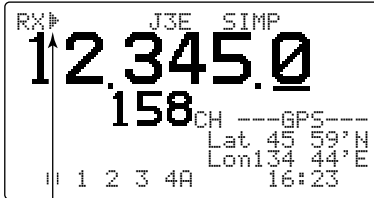


- The set frequency can be cleared when [RX CLAR] is pushed while setting.

■ Programming a frequency

◆ Receive frequency

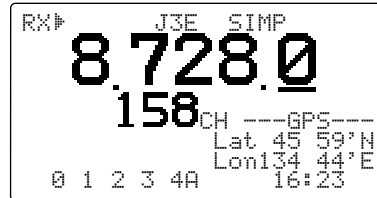
- ① Select the desired channel to be programmed.
 - Channel 1 to 160 (maximum) are programmable.
- ② Push [RX CLAR] to select the frequency selection mode.



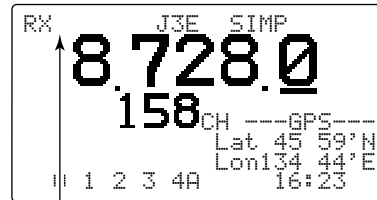
"RX" indicator appears.

- ③ Enter 4 to 6 digits of the desired frequency via the keypad.
 - Or rotate [GRP] and [CH] to change the frequency.
 - Pushing [▲]/[▼] on the microphone also tunes the frequency.

- ④ Push [MODE SET] several times to select the desired operating mode (type of emission).



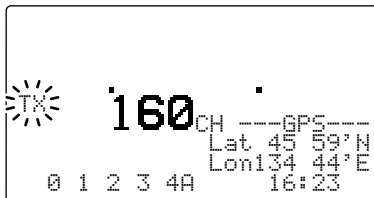
- ⑤ Push [ENT] for 1 sec. to program the user channel.
 - 3 beeps sound and "RX" disappears.



"RX" indicator disappears when programming is completed.

◆ Transmit frequency

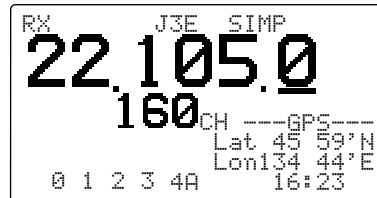
- ① Select the desired channel to be programmed.
- ② Push [TX TXF].



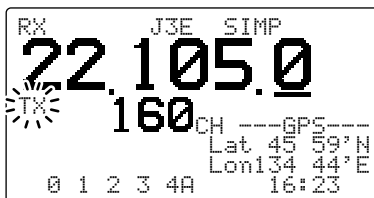
"TX" indicator blinks.

- ③ Enter the desired 5 or 6 digit frequency via the keypad.
 - [GRP] and [CH], as well as [▲]/[▼] on the microphone cannot be used.

- ④ Push and hold [ENT] for 1 sec. to program the user channel.
 - 3 beeps sound.



"TX" indicator disappears.

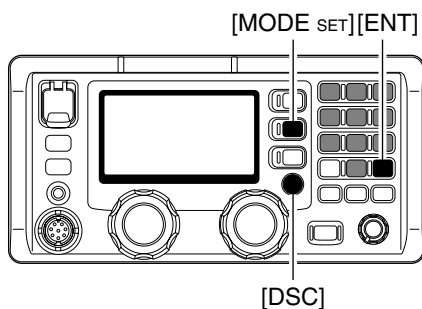


■ MMSI code programming

The 9-digit MMSI (Maritime Mobile Service Identity: DSC self ID) code can be programmed.

This operation is not available when the MMSI code has been programmed by your dealer. The code re-programming cannot be performed. This code is displayed during DSC watch mode.

◇ Programming



- ① The following screen will be displayed briefly at power ON when no MMSI code is programmed.



- ② Push [DSC] to select MMSI code programming condition.



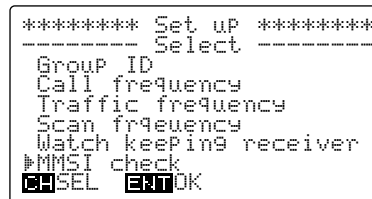
- ③ Enter the specified 9-digit MMSI code via the keypad.

- Make sure the correct code is entered.
- Rotate [CH] to move the cursor.



- ④ Push [ENT] to program the code.

- After pushing [ENT], DSC menu is displayed as below.



- ⑤ Push [MODE SET] to exit the DSC menu.

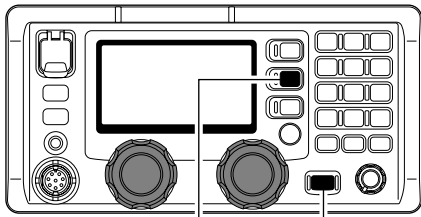
Position and time programming

When no position and the UTC (Universal Time Coordinated) time data in IEC61162-1 format, such as from a GPS receiver, etc., is applied to [GPS] connector, your position and the UTC time should be input for DSC operation.

IMPORTANT!

Manually programmed position and time data will be held for 23.5 hours only, and “?” symbol is displayed for all digits instead of the programmed data after 4 hours from programming. They are never renewed during the voyage when the position is set manually.

- While pushing and holding [MODE SET] push [POWER] to enter initial set mode.
 - Turn the power OFF in advance.



[MODE SET] [POWER]

- Rotate [GRP] to select the “GPS DISPLAY” then rotate [CH] to select the desired position indication type from simple and detail.



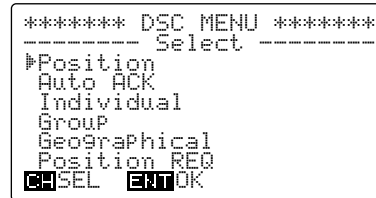
- Rotate [GRP] to select the “OFFSET TIME” then rotate [CH] to set the time difference between local and the UTC times within -12 to +12 hours in 10 minute steps.



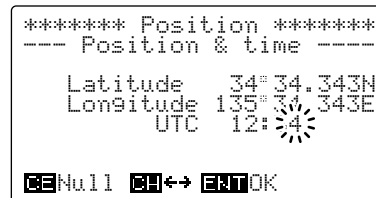
- Turn the power OFF once, then ON again to exit quick set mode.

When a position and the UTC time data (IEC61162-1 format) is applied to [GPS], the following steps are not necessary.

- Push [DSC] to select DSC watch mode.
- Push [MODE SET] to enter the DSC menu.
 - DSC menu is displayed as below.
- Rotate [CH] to select “Position” then push [ENT].

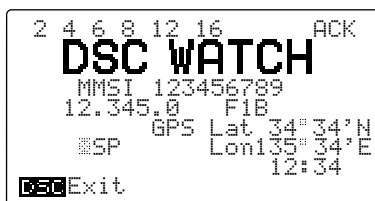


- Enter your position and the UTC time via the keypad, then push [ENT].
 - Push [3 SCAN] for the ‘East,’ [9] for the ‘West,’ [6 RF-G] for the ‘North’ and [7] for the ‘South’ setting.
 - Rotate [CH] to move the cursor.



- Push [ENT] to program the position and time.
 - Return to the “DSC MENU” indication as in step ⑦.
- Push [MODE SET] to exit the DSC menu.
 - Rotate [CH] to select “Exit” then push [ENT] also exits set mode.
 - “MNL” appears instead of “GPS.”

Simple position indication



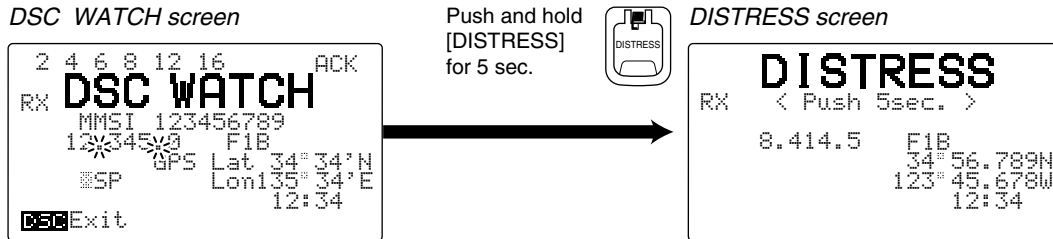
Detail position indication



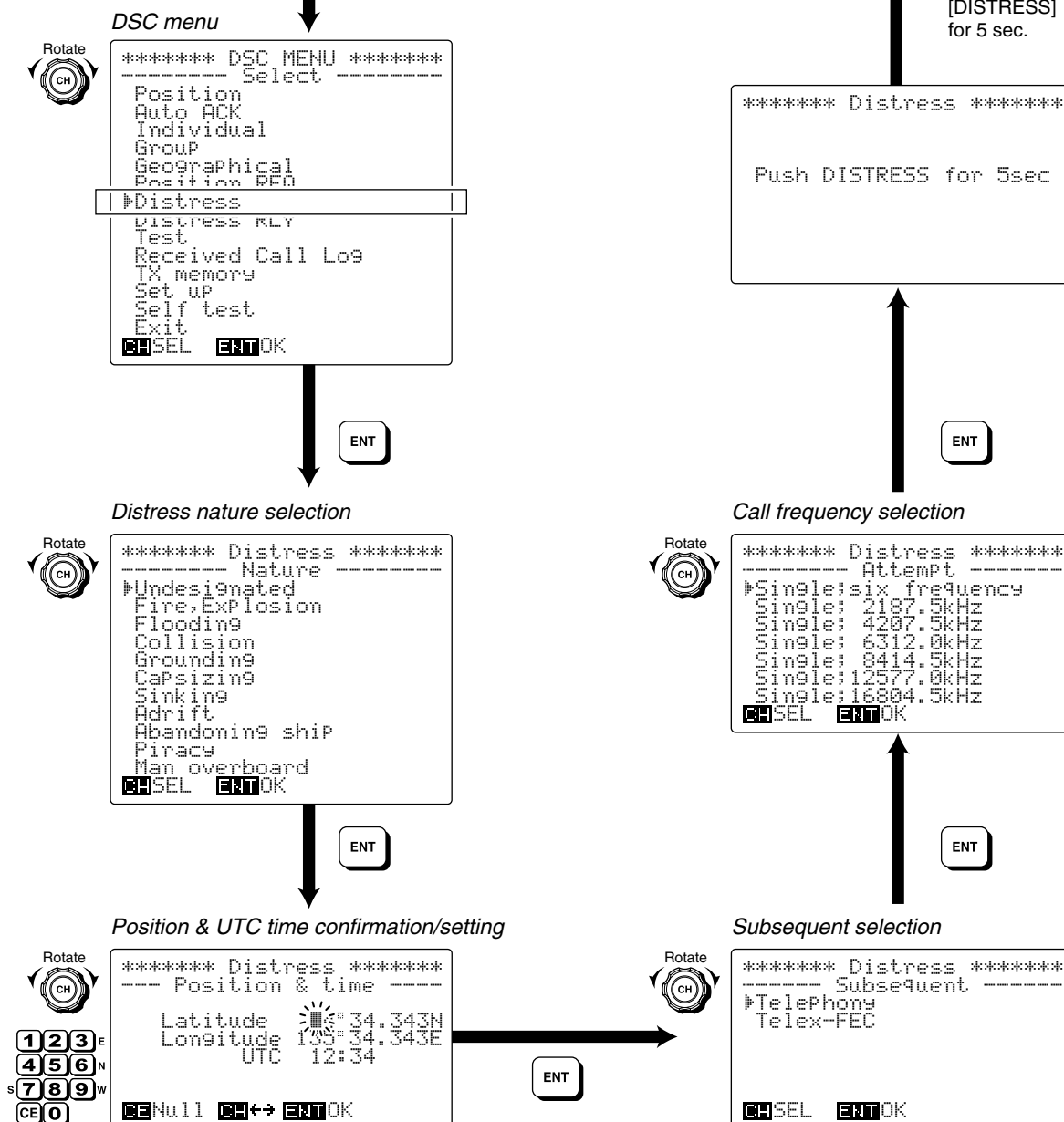
Distress call

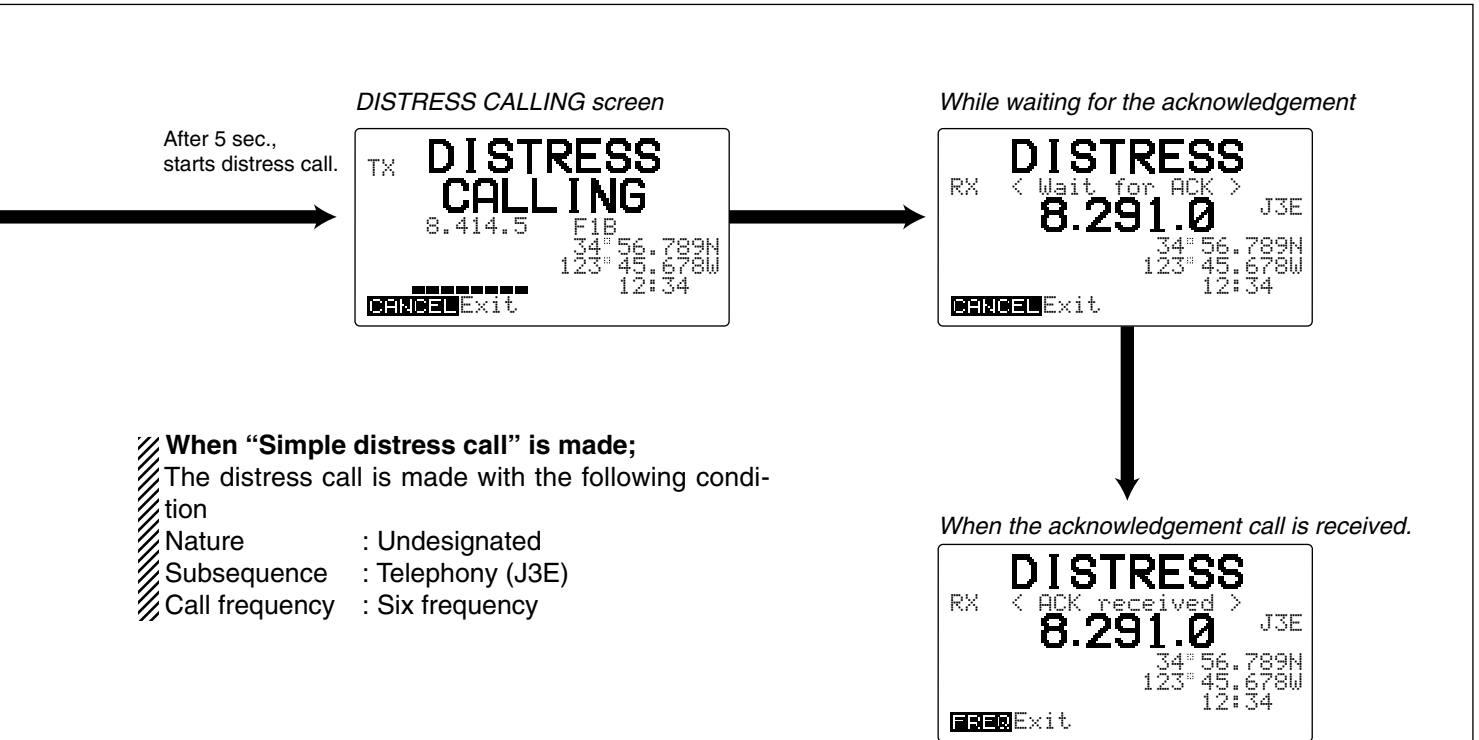
NEVER USE THE DISTRESS CALL WHEN YOUR SHIP OR A PERSON IS NOT IN AN EMERGENCY. DISTRESS CALLS CAN BE USED ONLY WHEN IMMEDIATE HELP IS NEEDED.

Simple distress call



Regular distress call





◆ When no acknowledgement is received

If no acknowledgement is received, the IC-M801GMDSS automatically transmits the distress call again every 3.5 to 4.5 minutes.

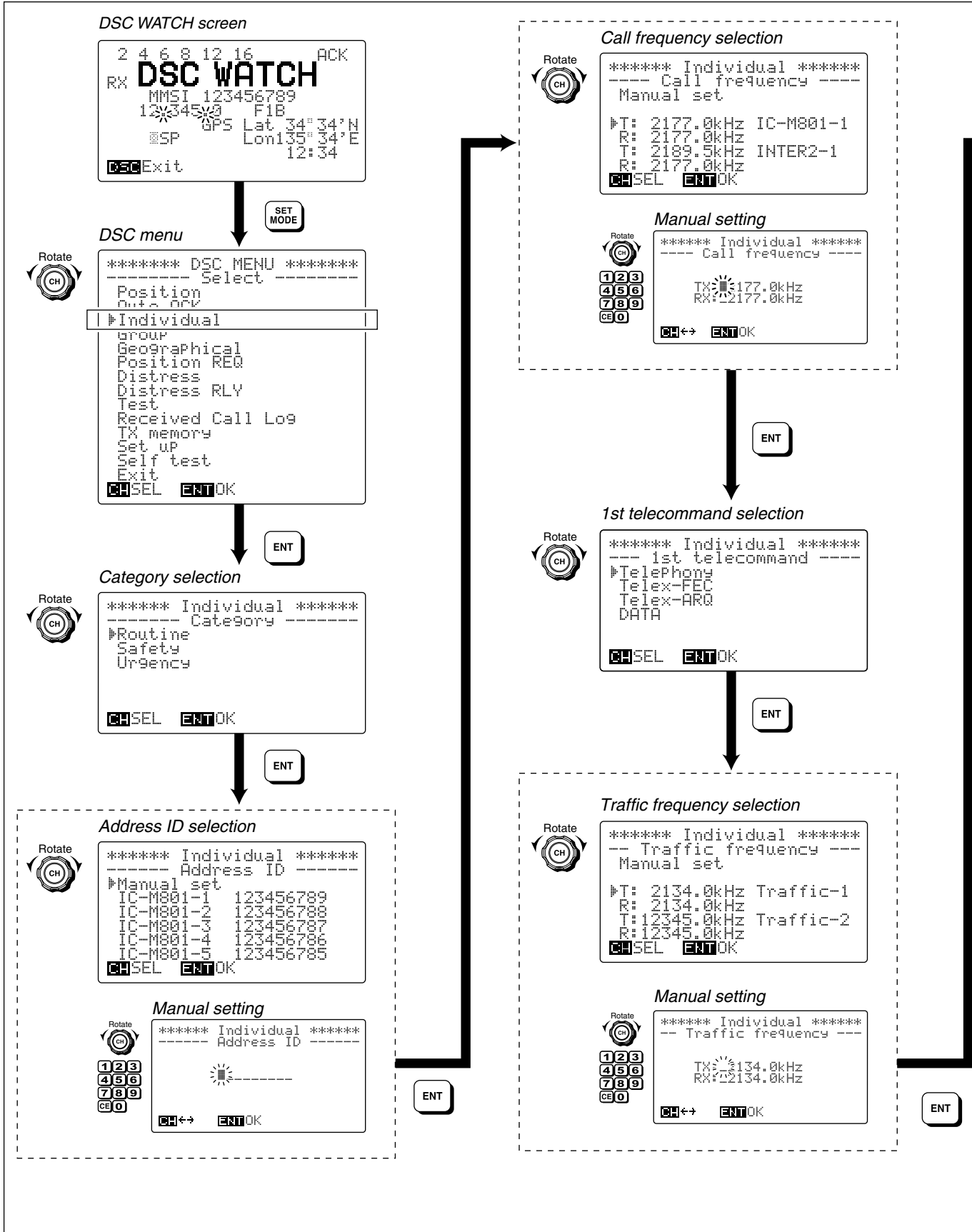
CAUTION!

DO NOT push [CANCEL] while waiting for an acknowledgement, otherwise the distress call repeat is cancelled.

Push [CANCEL] only when you want to cancel repeated transmission.

Individual call

When you use DSC for general selective calling, perform as follows.



Confirmation screen

```
***** Individual *****
----- Call -----
To:IC-M801.1
Category:Routine
Call Freq:TX 2177.0kHz
          RX 2177.0kHz
Traffic:TelePhony
          TX 2134.0kHz
          RX 2134.0kHz
[CALL]Call [ENT]Write-Menu
```

Push and hold for 1 sec.



Push and hold for 1 sec.



TX memory channel

See p. 23 for details.

✓ INFORMATION
The IC-M801GMDSS will not transmit the DSC call (except emergency call) even [CALL] is pushed and held when the set calling frequency is in busy. The transceiver waits the DSC call transmission until the calling frequency becomes clear in this case.

Start calling

```
TX Individual
  < Calling >
  2.177.0 F1B
  GPS Lat 34° 34'N
  Lon135° 34'E
  12:34
```

After the call

```
RX Individual
  < Wait for ACK >
  2.177.0 F1B
  GPS Lat 34° 34'N
  Lon135° 34'E
  12:34
[FREQ]Exit
```

When receiving an acknowledgement, the display shows the received ID code, or the called station name.

```
*****
* Individual ACK *
* IC-M801 *
* Able to comply *
*****
[FREQ]Exit
```



When the called station is unable to comply to the call, the reason may be displayed.

```
*****
* Individual ACK *
* IC-M801 *
* Unable to comply *
* Operator unavailable *
*****
[FREQ]Exit
```

When no acknowledgement is received;
1 Wait for 5 min., then call again on the same or a different frequency.
2 If no acknowledgement is received after a 2nd call, wait for at least 15 min. before repeating the call.

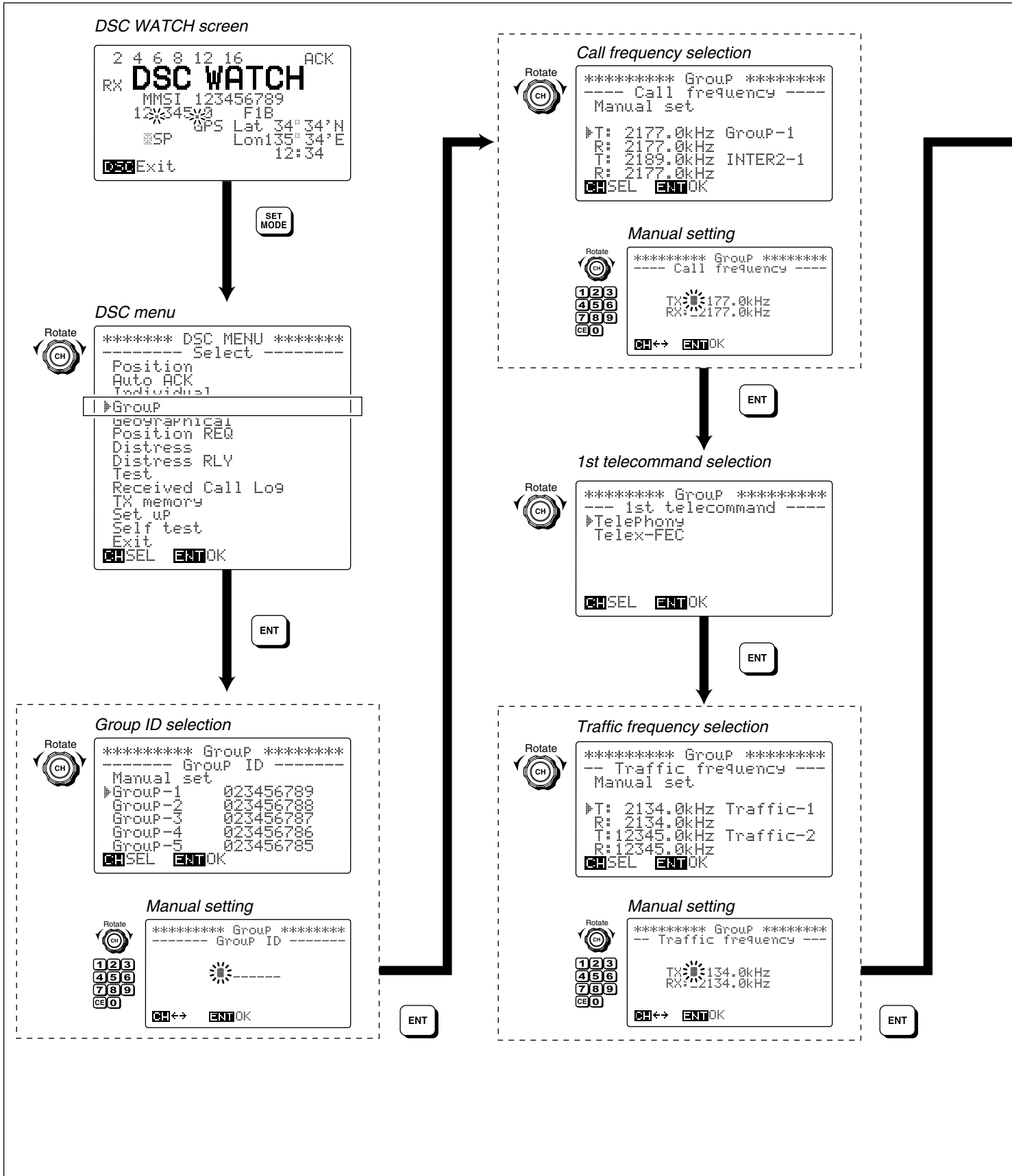
When receiving an acknowledgement with “New traffic” selection, the display shows as the brand new individual call reception.

```
*****
* Individual *
* ICOM M801 *
*****
[FREQ]Exit [ENT]ACK
```

✓ For your information
When an acknowledgement call with “New traffic” selection is received, the voice communication cannot be started until the communication frequency (=traffic frequency) is decided between both stations.

■ Group call

When you use DSC for calling the desired ship's group, use "Group" menu.



Confirmation screen

```

***** Group *****
----- Call -----
To:Group-1
Category:Routine
Call Freq:TX 2177.0kHz
          RX 2177.0kHz
Traffic:Telephony
          TX 2134.0kHz
          RX 2134.0kHz
CALL Call  ENT Write-Menu
    
```

Push and hold for 1 sec.



Push and hold for 1 sec.



TX memory channel

See right for details.

Start calling...

```

      Group
TX  < Calline >
    2.177.0  J3E
      GPS Lat 34°34'N
      Lon135°34'E
      12:34
    
```

```

      < Traffic >
RX   2.134.0  J3E
      GPS Lat 34°34'N
      Lon135°34'E
      12:34
FREQ Exit
    
```

Announce the information

✓ CONVENIENT!

The IC-M801GMDSS has DSC TX memory. You can store often used DSC calling conditions for quick and simple re-call. Up to 10 conditions can be stored into the memory with the following instructions.

TX memory write channel selection



```

***** Group *****
--- TX memory write ---
#0:
#1:
#2:
#3:
#4:
#5:
CHSEL  ENT Write
    
```

Push and hold for 1 sec.



TX memory channel selection



```

***** TX memory *****
----- Select -----
| #0:Group      Group-1 |
#1:
#2:
#3:
#4:
#5:
CHSEL  ENT DK
    
```

Push and hold for 1 sec.



Confirmation screen

```

***** TX memory *****
----- Group -----
To:Group-1
Category:Routine
Call Freq:TX 2177.0kHz
          RX 2177.0kHz
Traffic:Telephony
          TX 2134.0kHz
          RX 2134.0kHz
CALL Call  ENT DEL
    
```

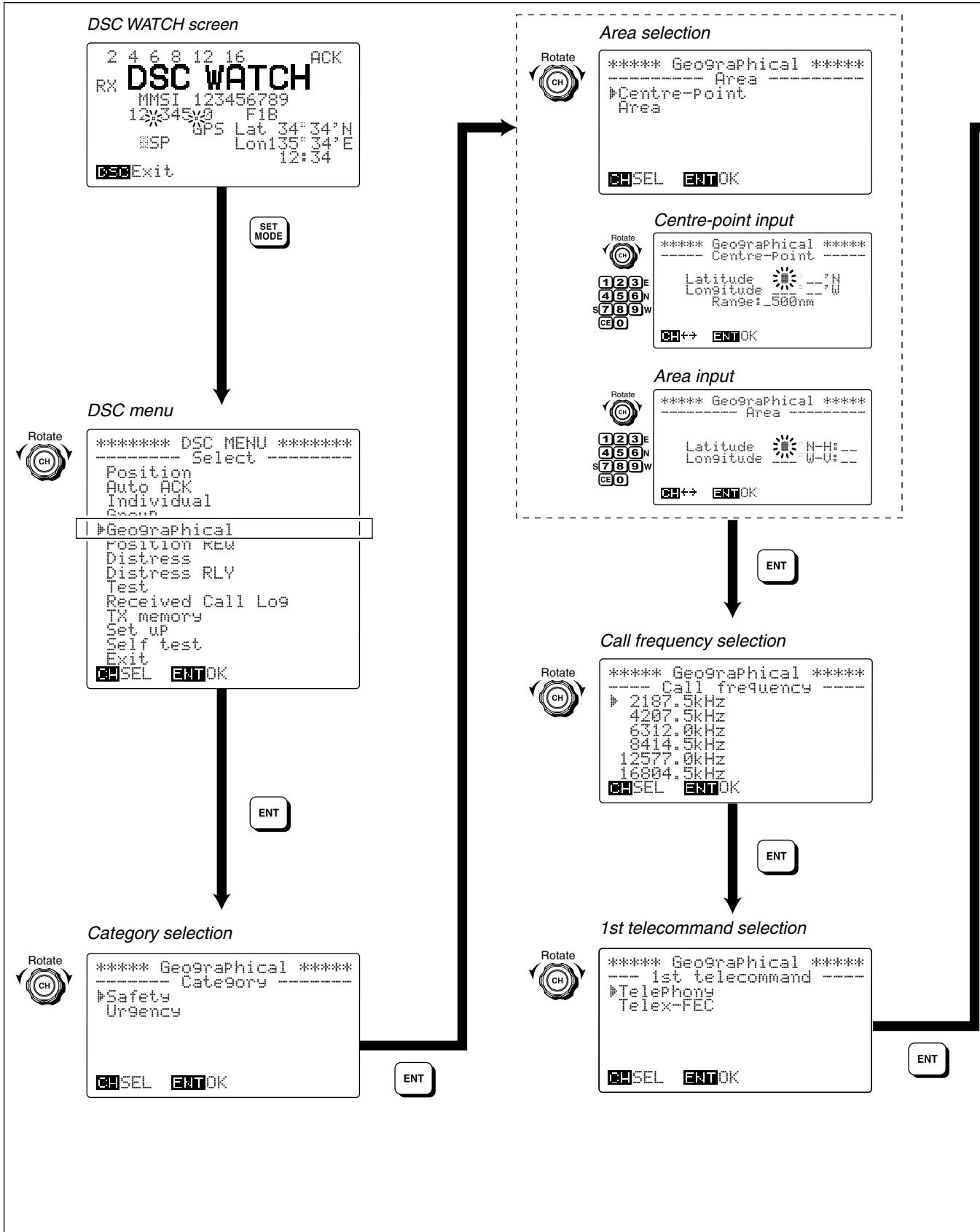
Push and hold for 1 sec.



Start calling...

■ Geographical call

Use the geographical call when urgency or safety message announcement is necessary to the ships in the particular area.



Traffic frequency selection

```

***** Geo9raPhical *****
--- Traffic frequency ---
Manual set
PT: 2134.0kHz Traffic-1
R: 2134.0kHz
T:12345.0kHz Traffic-2
R:12345.0kHz
CHSEL  ENTOK
    
```

Maual setting

```

***** Geo9raPhical *****
--- Traffic frequency ---
TX: 182.0kHz
RX: 2182.0kHz
CH++  ENTOK
    
```

Confirmation screen

```

***** Geo9raPhical *****
----- Call -----
To area: 14°N-H: 3
         125°W-U: 3
Category: Safety
Call Freq: TX 2187.5kHz
          RX 2187.5kHz
Traffic: Telephony
          TX 2182.0kHz
          RX 2182.0kHz
CALL Call  ENT Write-Menu
    
```

Push and hold for 1 sec. **CALL** → TX memory channel
 Push and hold for 1 sec. **ENT** → See p. 23 for details.

Start calling...

```

TX Geo9raPhical
  < Calline >
  2.187.5 F1B
  GPS Lat 34°34'N
  Lon135°34'E
  12:34
    
```

```

RX < Traffic >
  2.182.0 J3E
  GPS Lat 34°34'N
  Lon135°34'E
  12:34
  FREQ Exit
    
```

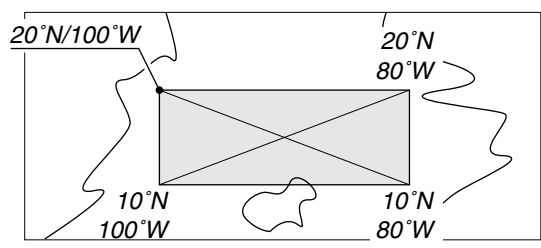
Announce the safety or urgency information

✓ For your information 1— Area input

When using the 'Geographical' call with "Area" selection, your original position is always the upper left corner in the world map as in the following illustration.

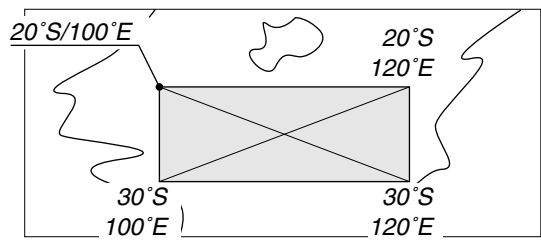
• Area setting example 1

Latitude 20°N-H:10
 Longitude 100°W-U:20



• Area setting example 2

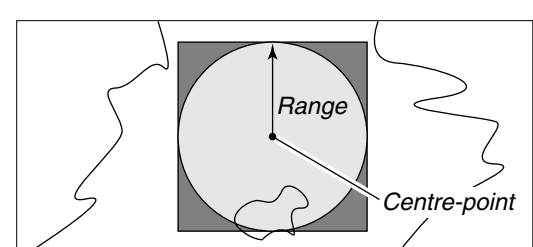
Latitude 20°S-H:10
 Longitude 100°E-U:20



✓ For your information 2— Centre-point input

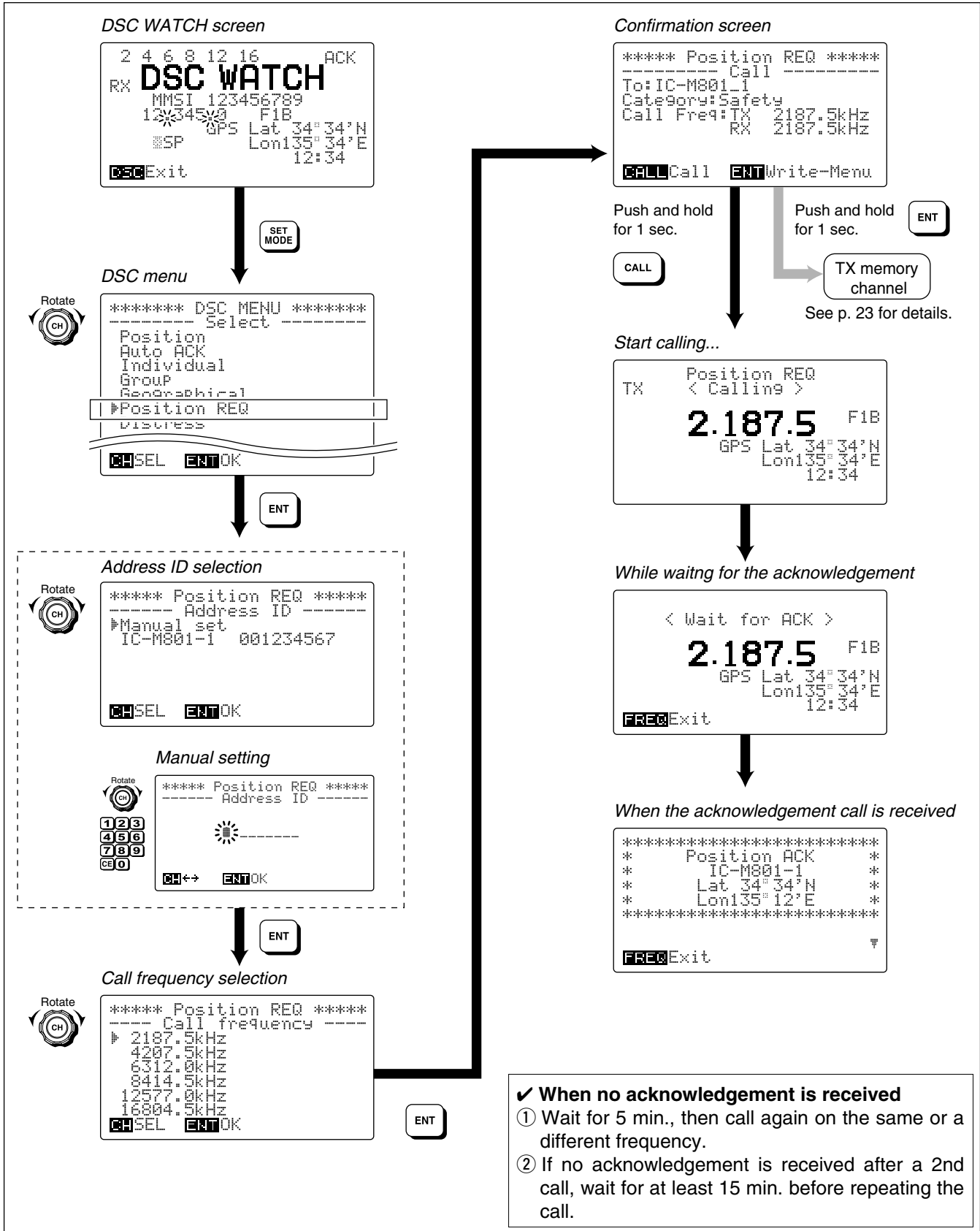
When using the 'Geographical' call with "Centre-point" selection, calls vessels in the square area ("■" area; not only round; "○" area) are called.

• Centre-point setting example



Position request call

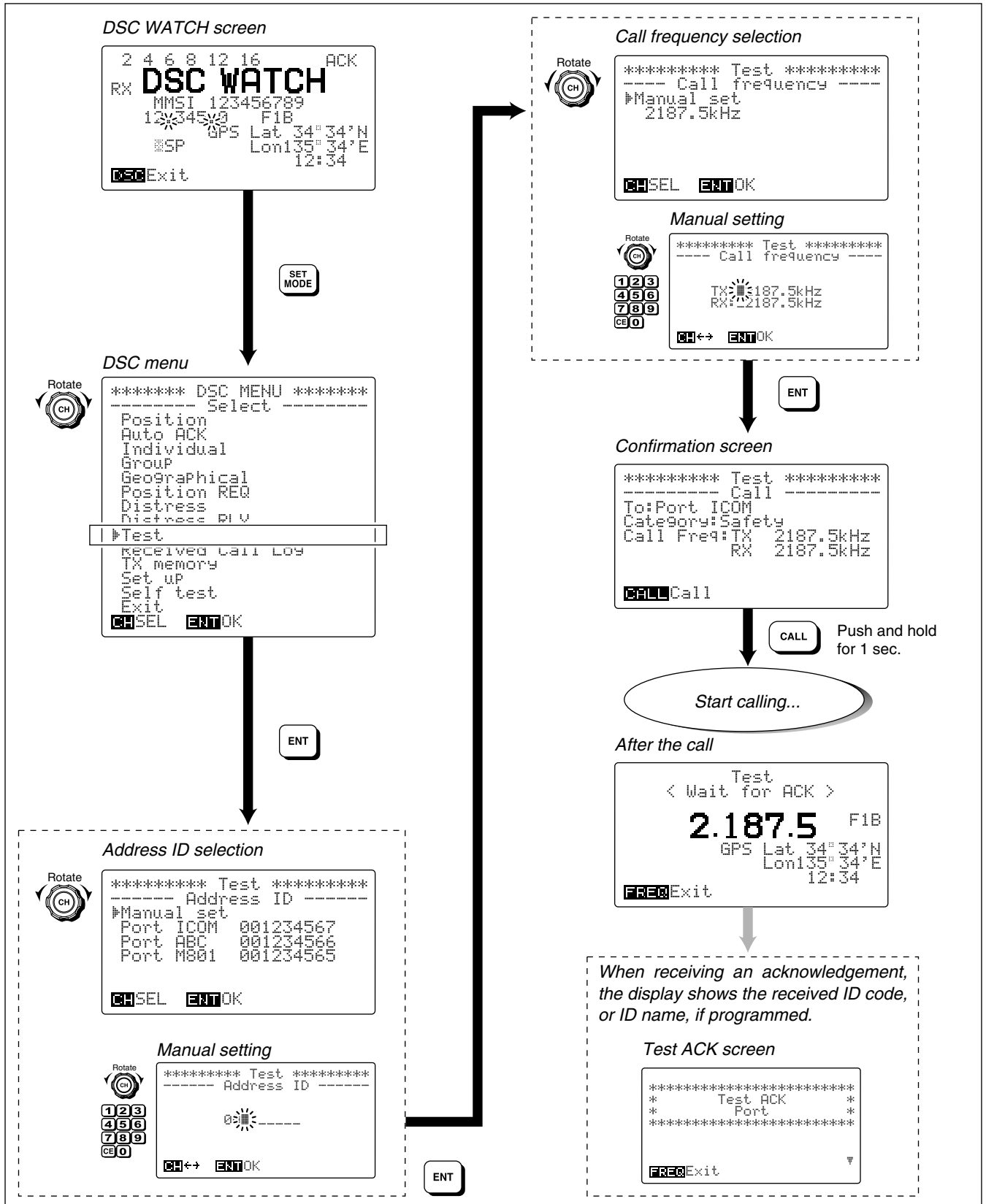
The position request call is used to confirm the specified ship's position. This calling system uses digital signals only, therefore a voice reply is not necessary.



Test call

Testing on the exclusive DSC distress and safety calling frequencies (such as 2187.5 kHz) should be avoided as much as possible by using other methods. When testing on the distress/safety frequency is unavoidable, it should be indicated that these are test transmissions.

Normally the test call would require no further communications between the two stations involved.



■ To receive a DSC call

The independent built-in DSC receiver circuit in the IC-M801GMDSS scans all distress/safety frequencies, therefore, the “distress,” “urgency” and “safety” calls on those frequencies can be decoded at all times.

However, “routine” and “group” calls on the other frequencies are received via the transceiver’s receiver circuit. Therefore, the transceiver must set to DSC watch mode by pushing [DSC] to decode these calls.

◇ When receiving a DSC call

One of the following actions should be performed when a DSC call is received depending on the received DSC format (or category):

- Wait for a voice transmission on the traffic frequency.
- Transmit an acknowledgement with DSC or voice.

◇ Display example and operation

• Monitoring the traffic frequency

Monitor the communication between the calling ship and a coast station, or the calling station transmission via voice on the traffic frequency.

- Emergency alarm sounds until pushing some key, or beeps sound, depending on the calling format or category.

```

*****
*   Distress ACK   *
*   001234567     *
*****

*****
*   Distress RLV  *
*   123456789     *
*****

*****
*   Distress      *
*   123456789     *
*****

*****
*   Group         *
*   ICOM M801     *
*****

*****
*   Geographical  *
*   123456789     *
*****

FREQExit ENTTraffic
    
```

• Transmit an acknowledgement

When the following DSC is received, an acknowledgement must be sent back to the calling station.

- Beeps, or an emergency alarm sounds until pushing some key, depending on the category.

```

*****
*   Individual    *
*   ICOM M801     *
*****

*****
*   Position REQ  *
*   ICOM M801     *
*****

*****
*   Polling REQ   *
*   001234567     *
*****

FREQExit ENTACK
    
```

✓ For your information

By rotating [CH], the received information can be read (not all contents in some calling category) without entering DSC memory screen as described in the next page.

Received information

When receiving a DSC call, the received format specifier and its contents are memorized into the received call log. Distress calls (including other calls with a distress category) are stored separately from other calls.

Up to 20 distress and up to 20 other calls can be memorized.

- ① During DSC watch mode, push [RX CLAR] to enter the received DSC memory select screen.

- Or, push [MODE SET], rotate [CH] to select "Received Call Log" then push [ENT].

- ② Rotate [CH] to select the desired category from "Distress" and "Others" then push [ENT].

- "Unread message" is displayed beside category when a message have not been read is available in the category.

- "<No data>" is displayed beside category when no received message is stored in the category.

```

** Received Call Log ***
----- Select -----
#Distress Unread message
Others    Unread message

[FREQ]SEL [ENT]OK
  
```

- ③ Rotate [CH] to select the desired DSC message.

- "*" means the DSC messages have not been read.

- "DTRS RLY" stands for distress relay.

- **Distress memory screen**

```

** Received Call Log ***
----- Select -----
#*Distress      123456789
*DTRS ACK      111111111
*DTRS RLY      123123123
*Distress      123123123
DTRS ACK      123123123
Distress      123234234

[FREQ]SEL [ENT]OK
  
```

- **Others memory screen**

```

** Received Call Log ***
----- Select -----
#*Individual    123456789
*Individual     111111111
GeograPhic     123123123
Individual      123456788

[FREQ]SEL [ENT]OK
  
```

- ④ Push [ENT] to indicate the contents.

- Rotate [CH] to scroll text to see hidden lines information.

```

** Received Call Log ***
----- Distress -----
Distress ID:123456789
Undesignated
Position:Lat 34° 34'N
          Lon134° 34'W
          UTC 12:34
Angle:123°
Distance:1234nm
RX Freq:TX 2187.5kHz
          RX 2187.5kHz
Traffic:TelePhony
          TX 2182.0kHz
          RX 2182.0kHz

[FREQ]DEL [FREQ]Cancel [ENT]OK
  
```

- ⑤ Push [ENT] to selects the traffic screen and monitor the traffic frequency.

```

DISTRESS
RX <Traffic > J3E
2.182.0
GPS Lat 34° 34'N
   Lon135° 34'E
   12:34
[FREQ]Exit [RX]MSG
  
```

- ⑥ Push [RX CLAR] to display the DSC message under the traffic frequency indication.

- Rotate [CH] to scroll text to see hidden lines information.

- Push [RX CLAR] to return to the indication as step ⑤.

```

DISTRESS
RX <Traffic > J3E
2.182.0
----- Distress -----
Distress ID:123456789
Undesignated
Position:Lat 34° 34'N
          Lon134° 34'W
          UTC 12:34
RX Freq:TX 2187.5kHz
          RX 2187.5kHz
Traffic:TelePhony
          TX 2182.0kHz
          RX 2182.0kHz
[FREQ]Exit [RX]Traffic
  
```

- ⑦ Push [FREQ/CH] to return to DSC watch mode.

NOTE:

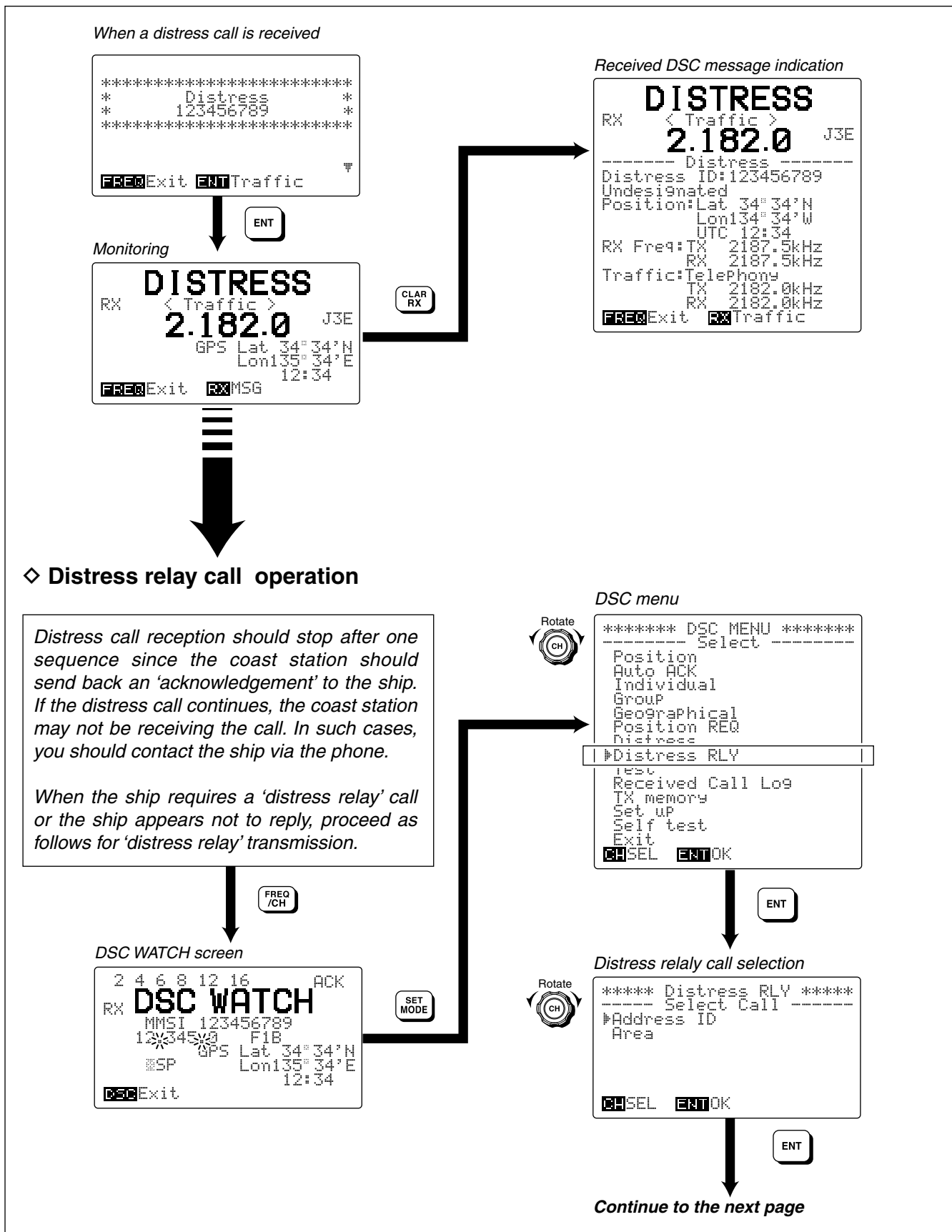
When the DSC message with "?" symbol is selected in step ③, the message "DATA ERROR" is displayed at the bottom of the line in memory contents screen in step ④.

■ Deleting a memory

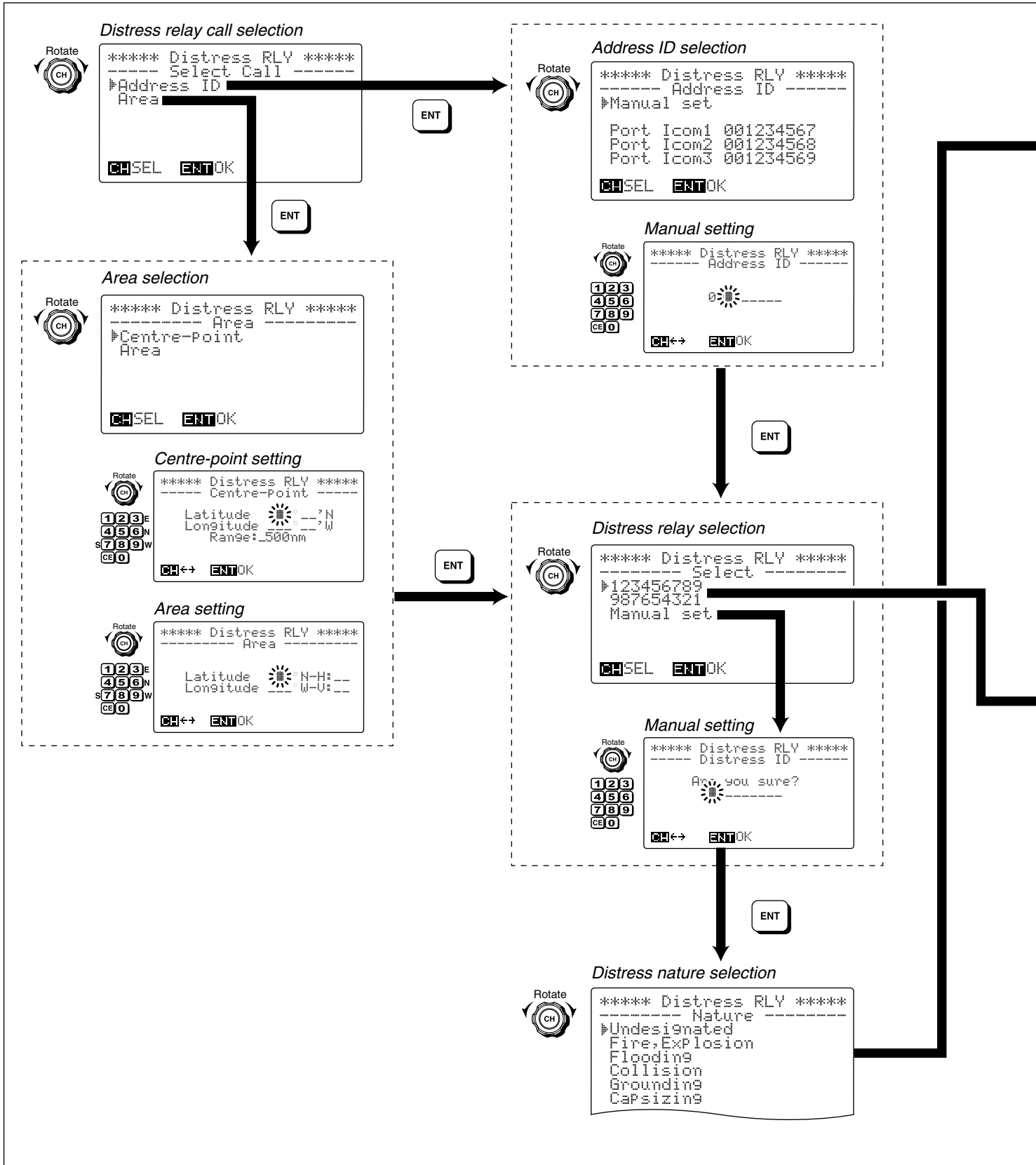
- ➔ When the desired memory contents to be deleted are displayed as at right, push and hold [CE] for 1 sec.
 - After erasing, the receive memory select screen, as in step ③ of "■ Received information," is selected automatically.
 - The DSC memory, which 48 hours or more have been passed from received, can only be deleted.

```
** Received Call Log ***
----- Distress -----
Distress ID:123456789
Undesignated
Position:Lat 34° 34'N
          Lon134° 34'W
          UTC 12:34
Angle:123°
Distance:1234nm
RX Freq:TX 2187.5kHz
          RX 2187.5kHz
Traffic:Telephony
          TX 2182.0kHz
          RX 2182.0kHz
[CE]DEL [FREQ]Cancel [EXIT]OK
```

Distress call



◆ Distress relay call operation— continued



Position & UTC time confirmation/setting



```

***** Distress RLY *****
----- Position & time -----

Latitude 34.343N
Longitude 105.34.343E
UTC 12:34

[CE]Null [CH]↔ [ENT]OK

```



Subsequent selection



```

***** Distress RLY *****
----- Subsequent -----

TelePhony
Telex-FEC

[CH]SEL [ENT]OK

```



Call frequency selection



```

***** Distress RLY *****
----- Call frequency -----

2187.5kHz
4207.5kHz
6312.0kHz
8414.5kHz
12577.0kHz
16804.5kHz

[CH]SEL [ENT]OK

```



Confirmation screen

```

***** Distress RLY *****
----- Call -----

Selected distress
call is received
11H 34min
before
To:001234567
Distress ID:123456789
Undesignated
Position:Lat 34° 34.000N
Lon134° 34.000W
UTC 12:34
Call Freq:TX 2187.5kHz
RX 2187.5kHz
Traffic:TelePhony
TX 2182.0kHz
RX 2182.0kHz

[CALL]Call

```



Push and hold for 1 sec.

Start calling...

```

TX Distress RLY
< Calling >

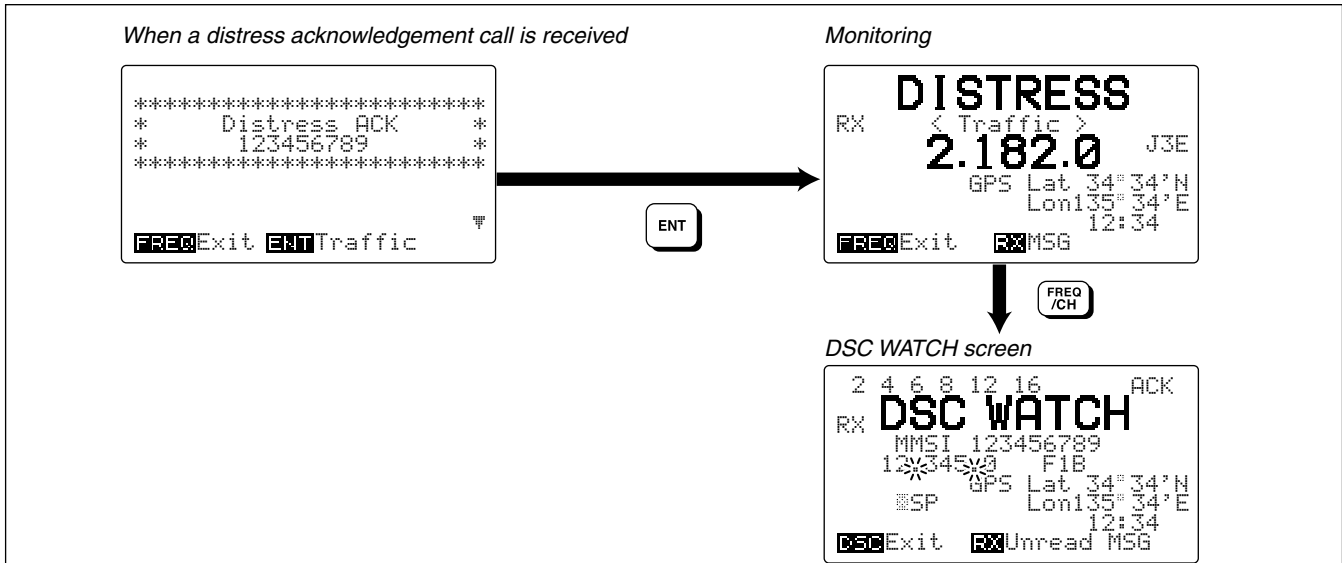
RX < Traffic >

2.182.0 J3E
GPS Lat 34° 34' N
Lon135° 34' E
12:34

[FREQ]Exit

```

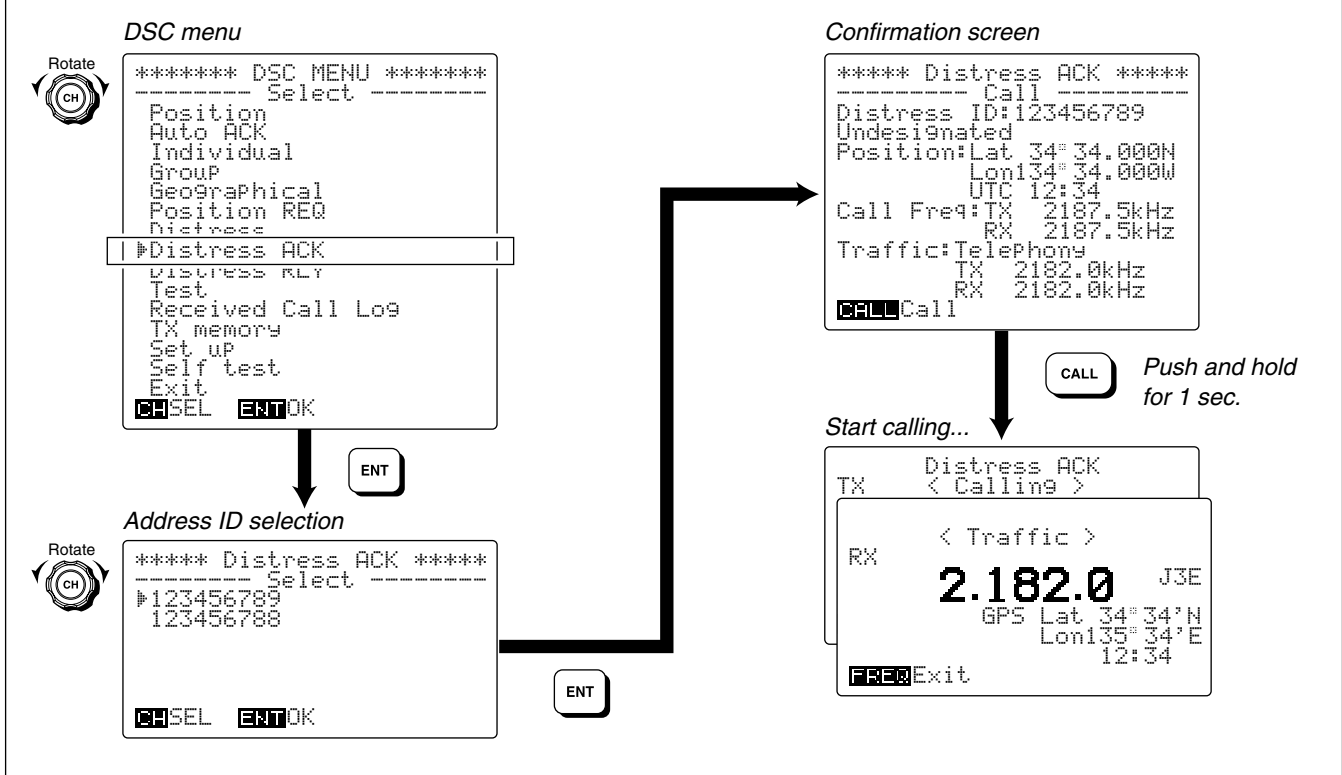
■ Distress acknowledgement call



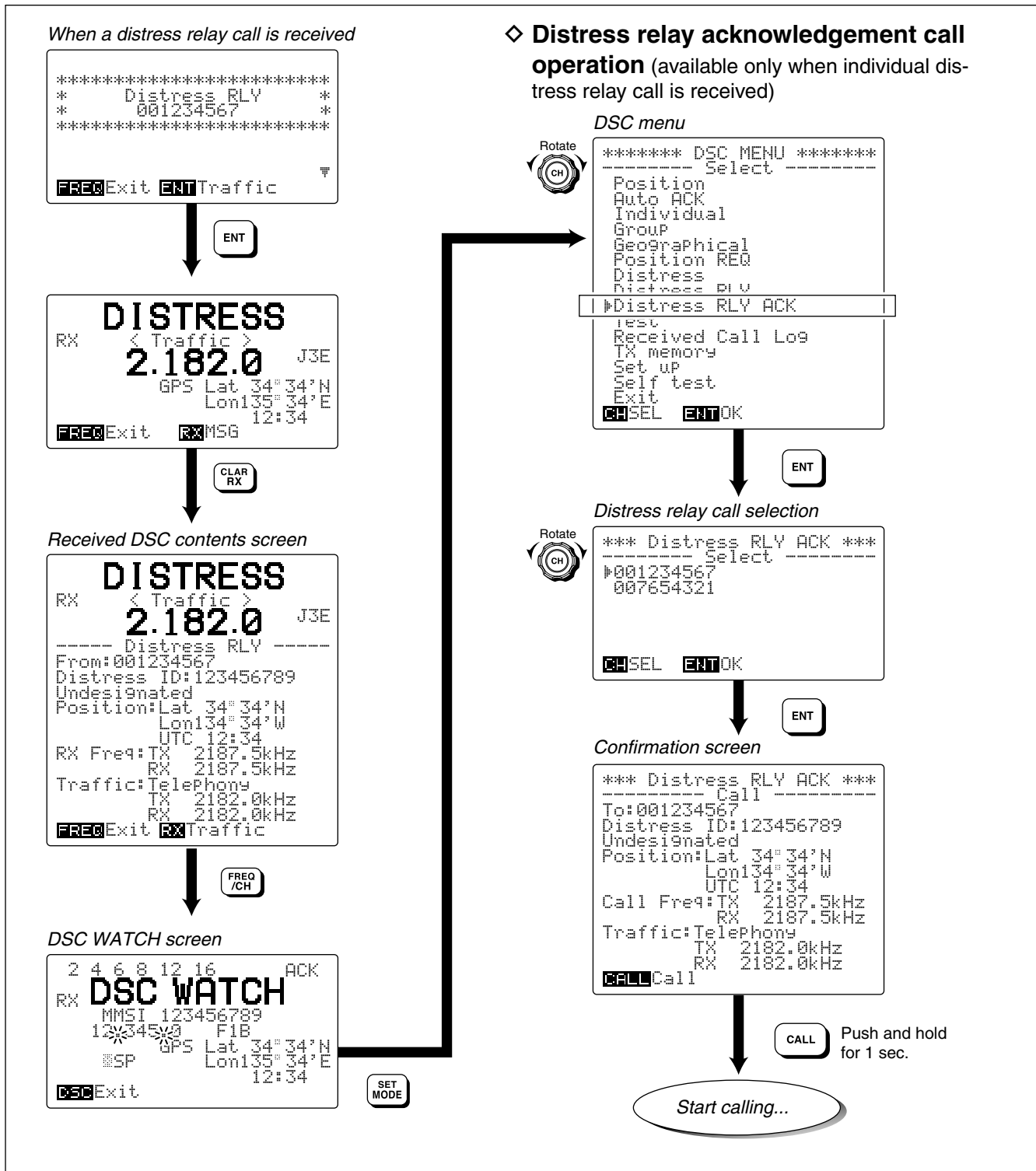
◇ Distress acknowledgement call operation

Distress call reception should stop after one sequence since the coast station should send back an 'acknowledgement' to the ship. If the distress call continues even the coast station send back an 'acknowledgement,' the ship in distress may not be receiving the call. In such cases, you should contact the coast station via the phone and send back an 'acknowledgement' on behalf of the coast station if the coast station requires.

NOTE: The distress acknowledgement call can be made for the distress call received on 2187.5 MHz only. The "Distress ACK" selection in DSC menu screen will not be displayed when a distress call on another frequency, such as 8414.5 MHz, is received.

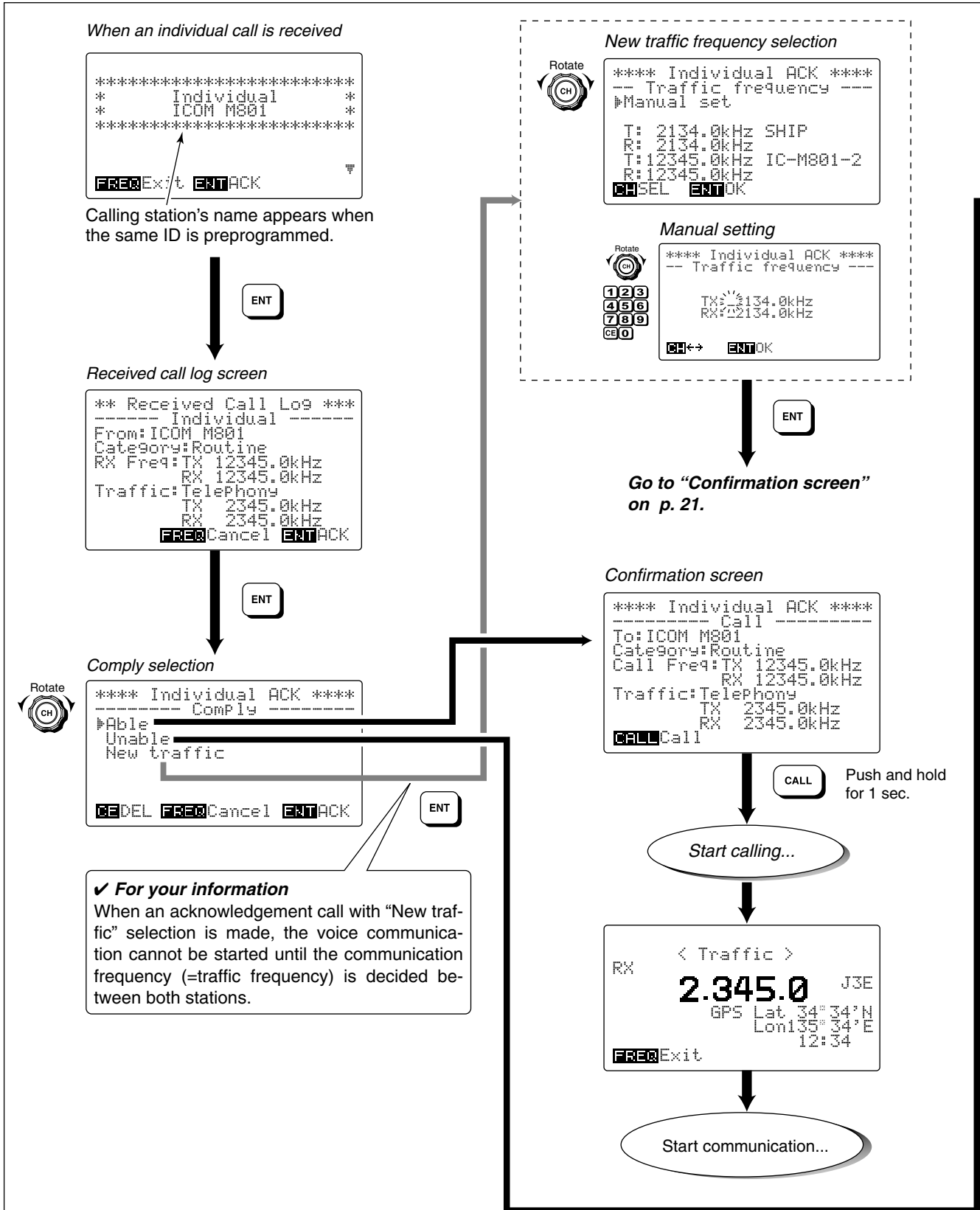


Distress relay call



Individual call

When receiving an Individual call, beeps may sound (or the emergency alarm depending on the category) and the display below appears.



✓ For your information
When an acknowledgement call with "New traffic" selection is made, the voice communication cannot be started until the communication frequency (=traffic frequency) is decided between both stations.

“Unable” reason selection



```

**** Individual ACK ****
----- Comply -----
▶No reason given
  Busy
  Channel unable
  Mode unable
  Operator unavailable
  No operator
  Station barred
  Equipment disable
  Congestion
  Queue indication
CHSEL ENT OK
    
```



Confirmation screen

```

**** Individual ACK ****
----- Call -----
To: ICOM M801
Category: Routine
Unable to comply
Reason:
  Operator unavailable
Call Freq: TX 12345.0kHz
          RX 12345.0kHz
CALL Call
    
```



Push and hold for 1 sec.

Start calling...

DSC WATCH screen

```

 2 4 6 8 12 16 ACK
RX DSC WATCH
  MMSI 123456789
 12345 F1B
  GPS Lat 34° 34' N
  SP Lon 135° 34' E
  12:34
DSC Exit
    
```

✓ About “Auto ACK” setting

When “Able to comply” or “Unable to comply” is selected with Auto ACK setting as at right, the acknowledgement call is made automatically— no acknowledgement call operation is necessary.

When “Manual set” is selected, acknowledgement call operation is necessary, however, the acknowledgement call with the reason “No operator” is made automatically when no operation is performed for 25 sec. from the call reception.

◇ Auto ACK setting

DSC WATCH screen

```

 2 4 6 8 12 16 ACK
RX DSC WATCH
  MMSI 123456789
 12345 F1B
  GPS Lat 34° 34' N
  SP Lon 135° 34' E
  12:34
DSC Exit
    
```



DSC menu



```

***** DSC MENU *****
----- Select -----
Position
▶Auto ACK
  Individual
  Group
  Geographical
  Position REQ
  Distress
  Distress RLY
  Test
  Received Call Log
  TX memory
  Set up
  Self test
  Exit
CHSEL ENT OK
    
```



ACK selection



```

***** Auto ACK *****
----- Select -----
Manual set
Able to comply
▶Unable to comply
CHSEL ENT OK
    
```

“Unable” reason selection

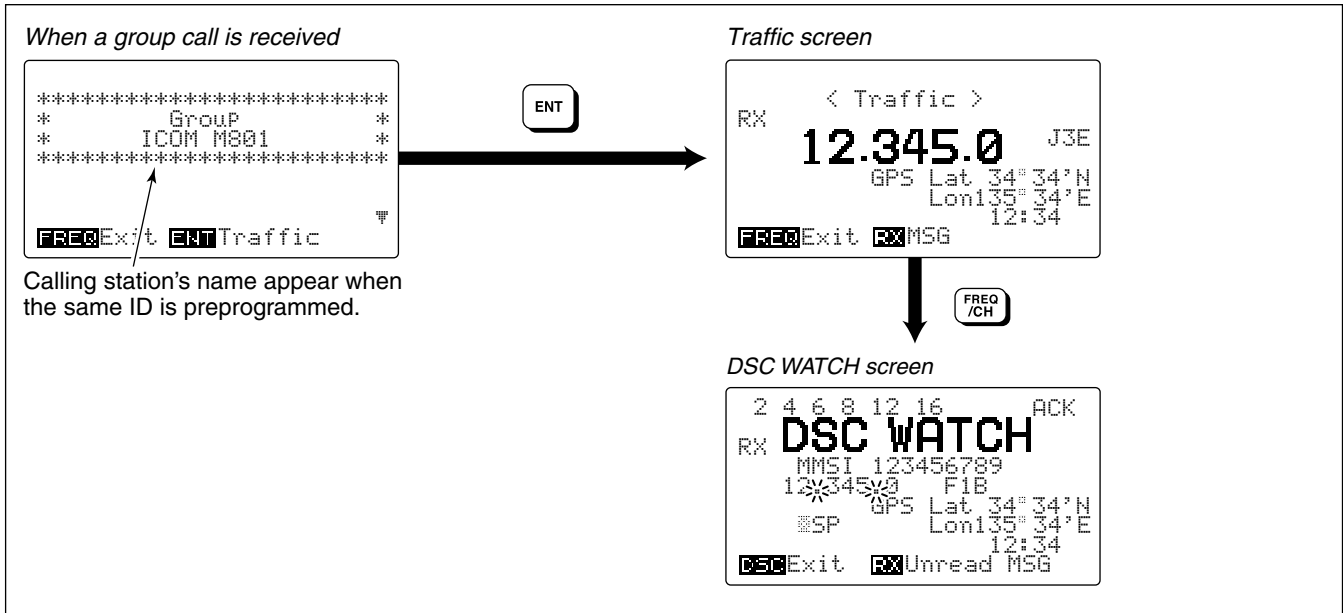


```

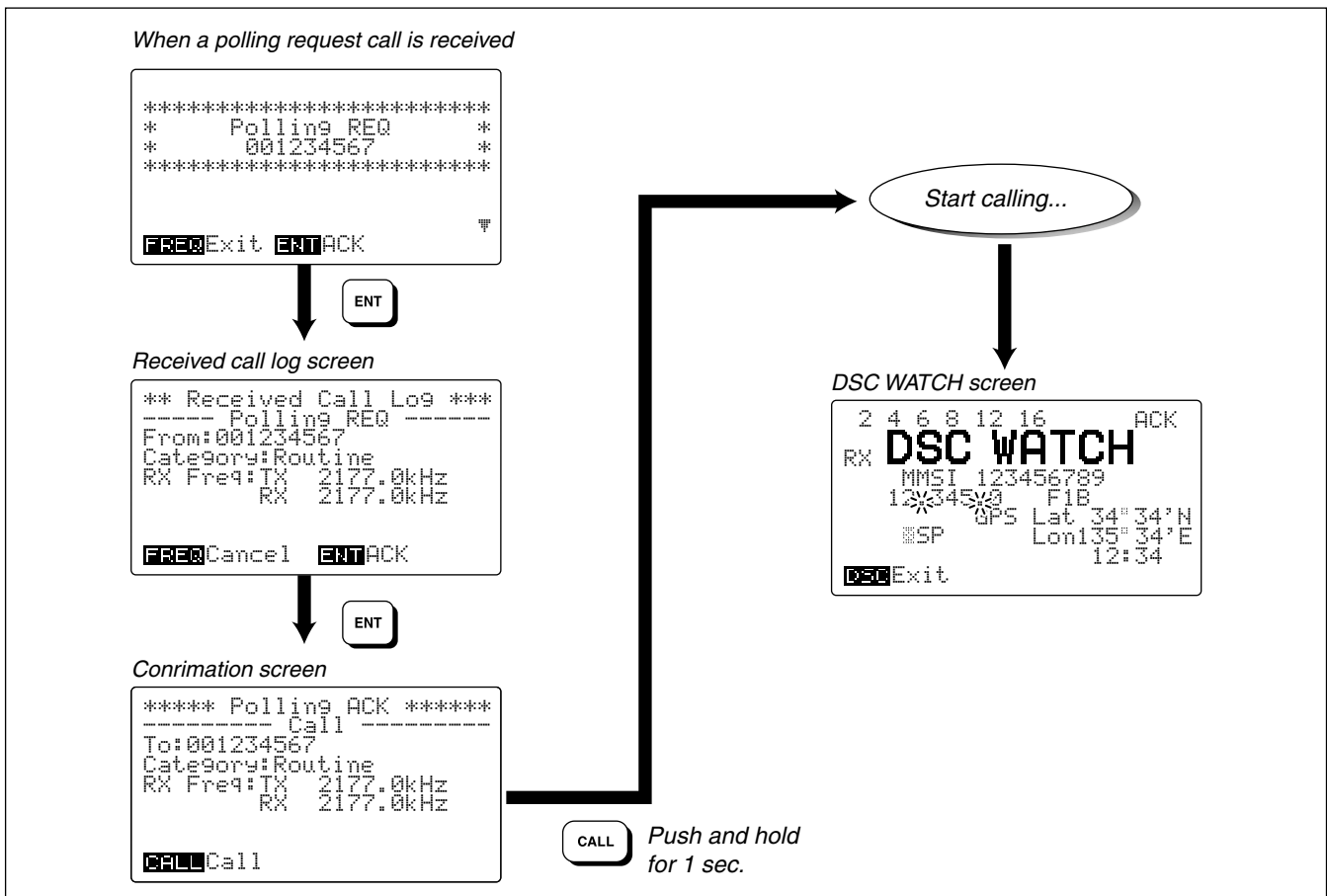
***** Auto ACK *****
----- Reason -----
No reason given
  Busy
▶Channel unable
  Mode unable
  Operator unavailable
  No operator
  Station barred
  Equipment disable
  Congestion
  Queue indication
CHSEL ENT OK
    
```



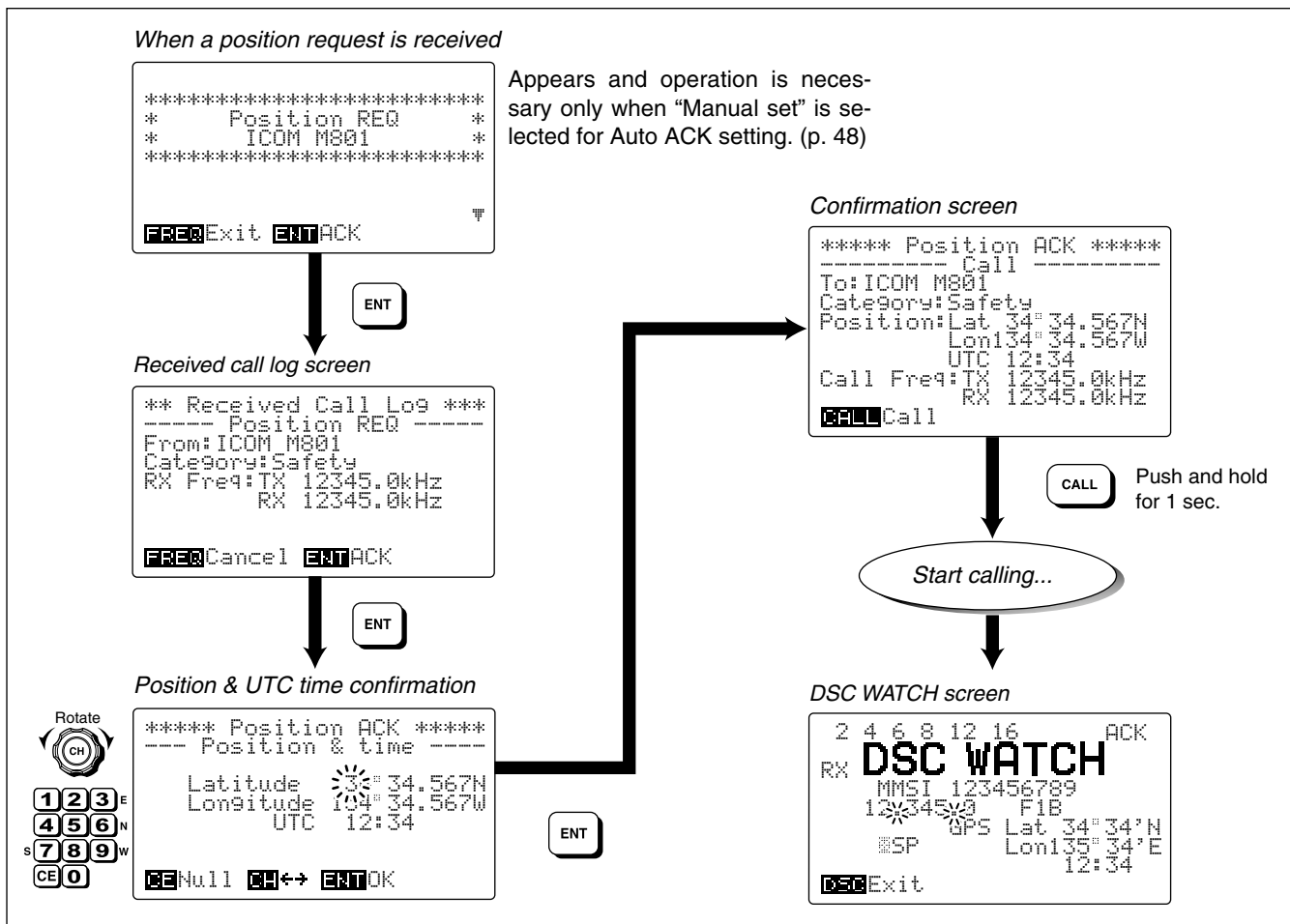
■ Group call



■ Polling call

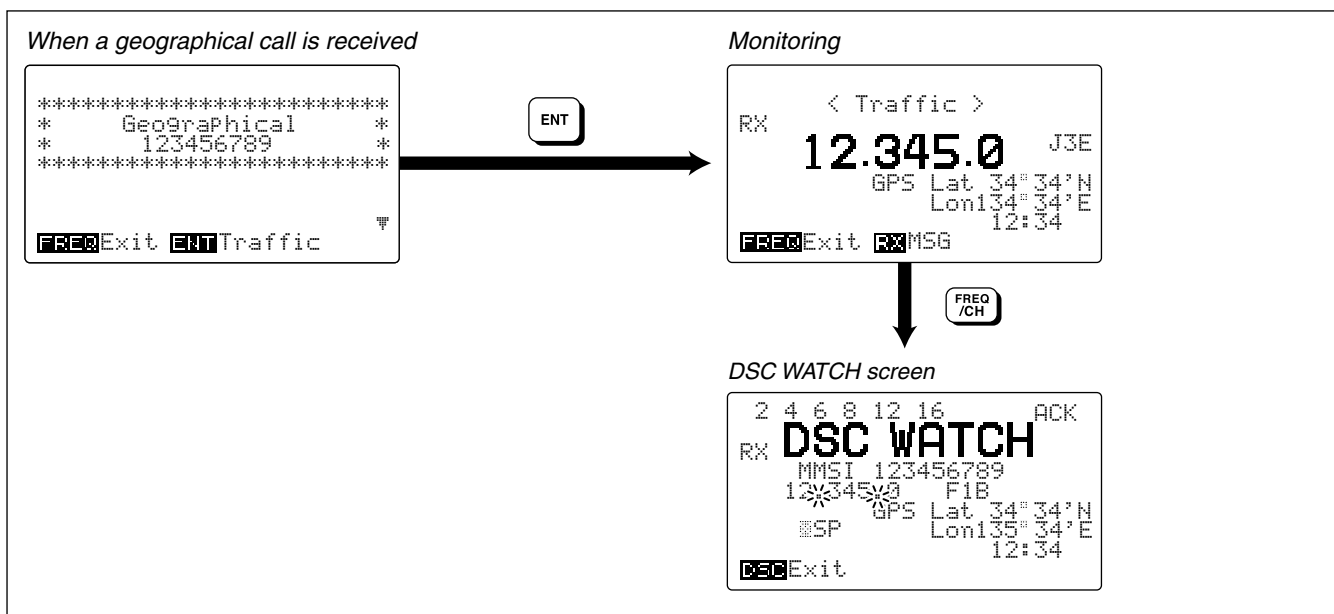


Position request call



Geographical area call

NOTE: The IC-M801GMDSS will not function for the geographical call when your position is out of the specified area.



10 MEMORY OPERATION

Memory description

The IC-M801GMDSS has several kinds of memories as follows:

- Address and group ID code memories (p. 41)
- Call, traffic and scan frequency memories (p. 42)
- DSC transmission memory (described in this section)
- Received message memory (p. 29)

10 DSC transmission memory channels allow you to set often used format specifiers and contents such as for routine calls, group calls, etc.

Memory writing

- ① During DSC watch mode, select the desired format category (except distress and test), and set the message, call and traffic frequencies until the call stand-by screen is displayed as described in the CALL PROCEDURE section (pgs. 18–27).
- ② Push and hold [ENT] for 1 sec. to select the TX memory write condition.
- ③ Rotate [CH] to select the desired memory channel.

```
--- TX memory write ---
#0: Individual 987654321
1:
2:
3:
4:
5:
[CH]SEL [ENT]Write
```

- ④ Push and hold [ENT] for 1 sec. again to store the condition into the selected memory channel.
 - The set DSC format and calling station ID/name appear.

```
--- TX memory write ---
#0: Individual 987654321
1:
2:
3:
4:
5:
[CH]SEL [ENT]OK
```

- ⑤ Push [ENT] to return to the calling stand-by condition, or push [MODE SET] to return to DSC watch mode.

Memory reading/transmitting/deleting

- ① Push [DSC] to select DSC watch mode, if necessary.
- ② Push [TX TXF] to enter the DSC transmit memory screen.
 - Or, push [MODE SET], rotate [CH] to select "TX memory" then push [ENT], also selects the transmit memory screen.
- ③ Rotate [CH] to select the selected memory channel to be read.

```
***** TX memory *****
----- Select -----
#0: Individual 987654321
1:
2:
3:
4:
5:
[CH]SEL [ENT]OK
```

- ④ Push [ENT] to display the memory contents.

```
***** TX memory *****
----- Individual -----
To: 987654321
Category: Routine
Call Freq: TX 2187.5kHz
RX 2187.5kHz
Traffic: TelePhony
TX 2134.0kHz
RX 2134.0kHz
[CALL]Call [CE]DEL
```

- ⑤ Operate as follows:
 - ➔ **When reading the memory contents only;**
 - Push [MODE SET] to return to DSC watch mode.
 - ➔ **When transmitting the memory contents;**
 - Push and hold [CALL] for 1 sec.
 - ➔ **When clearing the memory contents;**
 - Push and hold [CE] for 1 sec.

■ General

Up to 100 ID codes with frequency and name can be programmed in MENU mode for easy recall during DSC call setting.

■ ID input

A total of 100 ID codes can be programmed as “Address ID” (for ships and coast stations) and “Group ID” (for group stations).

In addition, the following settings/operation are available in DSC setup menu.

- Manual position/time setting (p. 17)
- Self-ID (MMSI code) indication (described in this section; p. 43)

A pair of frequencies (both transmit and receive) and ID name are also programmed together with the ID code which are used as call frequencies when using the ID code.

◇ SETTING PROCEDURES:

- ① During DSC menu indication, rotate [CH] to select “Set up” then push [ENT] to select setup menu.

• The select screen is displayed as below.

```

***** Set up *****
----- Select -----
▶Address ID
  Group ID
  Call fr9uency
  Traffic fr9uency
  Scan fr9uency
  Watch keepin9 receiver
  MMSI check
  CHSEL  ENTOK
    
```

- ② Rotate [CH] to select the “Address ID” or “Group ID,” then push [ENT].

• The address/group ID list screen is displayed.

```

***** Set up *****
----- Address ID -----

***** Set up *****
----- Group ID -----
▶<add>

  CHSEL  FREQ  Cancel  ENTOK
    
```

When the memory is full:

“Memory full” is displayed beside “<add>” indication when 100 ID codes have been programmed.

Delete any unnecessary IDs in such cases (see p. 44 for delete).

- ③ Rotate [CH] to select “<add>” then push [ENT].

• The address/group ID setup screen is displayed.

```

***** Set up *****
----- Address ID -----

***** Set up *****
----- Group ID -----

  Name  ☀
  ID: 0
  TX: 0.0 kHz
  RX: 0.0 kHz

  CH↔  FREQ  Cancel  ENTOK
    
```

- ④ Push the numeral keys to input the desired 10-digit ID name, 9-digit code and both transmit and receive frequencies, then push [ENT].

• Rotate [CH] to move the cursor.

• When entering group code, enter “0 (zero)” for the first digit.

• The frequencies entered should be within the marine frequency ranges as follows.

1.6– 2.9999 MHz	4.0– 4.9999 MHz
6.0– 6.9999 MHz	8.0– 8.9999 MHz
12.0–13.9999 MHz	16.0–17.9999 MHz
18.0–19.9999 MHz	22.0–22.9999 MHz
25.0–27.5000 MHz	

```

***** Set up *****
----- Address ID -----

***** Set up *****
----- Group ID -----

  Name: ICOM_M801_
  ID: 012345678
  TX: 2345.0 kHz
  RX: 2345.0 kHz

  CH↔  FREQ  Cancel  ENTOK
    
```

- ⑤ Push [ENT] to program the contents into the address or group ID.

• Returns to the address/group ID list screen automatically.

• The ID list is displayed in alphabetical order for ID name, so [CH] rotation may be necessary for the programmed ID confirmation.

```

***** Set up *****
----- Address ID -----

***** Set up *****
----- Group ID -----

▶<add>
  ICOM M801  012345678

  CHSEL  FREQ  Cancel  ENTOK
    
```

- ⑥ Push [MODE SET] to return to DSC watch mode, or push [FREQ/CH] to return to the select screen.

Frequency input

A total of 50 frequency pairs can be programmed as “Call frequency,” “Traffic frequency” or “Scan frequency.” The frequency usage and frequency name are also programmed together with the frequency.

NOTE: Up to 6 pairs of frequencies only can be assigned as a scan frequency. They are scanned during DSC watch mode only. (Different from the distress/safety frequencies.)

SETTING PROCEDURES:

- ① During DSC menu indication, rotate [CH] to select “Set up” then push [ENT] to select setup menu.
 - The select screen is displayed.
- ② Rotate [CH] to select the “Call frequency,” “Traffic frequency” or “Scan frequency,” then push [ENT].
 - The call/traffic/scan frequency list screen is displayed.

```

***** Set up *****
---- Call frequency ----

***** Set up *****
-- Traffic frequency --

***** Set up *****
---- Scan frequency ----
▶<add>

[CH]SEL [FREQ]Cancel [ENT]OK
    
```

When the memory is full:

“Memory full” is displayed beside “<add>” indication when a total of 50 pairs of frequencies (6 pairs for scan frequency) have been programmed.

Delete any unnecessary frequency in such cases (see p. 44 for delete).

- ③ Rotate [CH] to select “<add>” then push [ENT].
 - The call/traffic/scan frequency setup screen is displayed.

```

***** Set up *****
---- Call frequency ----

***** Set up *****
-- Traffic frequency --

***** Set up *****
---- Scan frequency ----

Comment: [sun]
TX: [sun] kHz
RX: [sun] kHz

[CH]↔ [FREQ]Cancel [ENT]OK
    
```

- ④ Push the numeral keys to input the desired 10-character frequency name, and both transmit and receive frequencies, then push [ENT].
 - Rotate [CH] to move the cursor.
 - The frequencies entered should be within the marine frequency ranges as follows.

- | | |
|------------------|------------------|
| 1.6– 2.9999 MHz | 4.0– 4.9999 MHz |
| 6.0– 6.9999 MHz | 8.0– 8.9999 MHz |
| 12.0–13.9999 MHz | 16.0–17.9999 MHz |
| 18.0–19.9999 MHz | 22.0–22.9999 MHz |
| 25.0–27.5000 MHz | |

```

***** Set up *****
---- Call frequency ----

***** Set up *****
-- Traffic frequency --

***** Set up *****
---- Scan frequency ----

Comment: ICOM_Group
TX: 4567.0kHz
RX: 4567.0kHz

[CH]↔ [FREQ]Cancel [ENT]OK
    
```

- ⑤ Push [ENT] to program the contents into a call, traffic or scan frequency.
 - Returns to the call/traffic/scan frequency list screen.
 - The programmed frequency is displayed at the bottom line, so [CH] rotation is necessary for the programmed frequency confirmation.

```

***** Set up *****
---- Call frequency ----

***** Set up *****
-- Traffic frequency --

***** Set up *****
---- Scan frequency ----
▶<add>

T: 4567.0kHz ICOM Group
R: 4567.0kHz

[CH]SEL [FREQ]Cancel [ENT]OK
    
```

- ⑥ Push [MODE SET] to return to DSC watch mode, or push [FREQ/CH] to return to the select screen.

■ Verifying self-ID

- ➔ During setup select menu indication, rotate [CH] to select "MMSI check" then push [ENT] to display the programmed MMSI ID (self-ID).
- ➔ Push [DSC] to select DSC watch mode.
- ➔ Push [MODE SET] to select DSC menu.
- ➔ Rotate [CH] to select "Set up" then push [ENT].
- Push [MODE SET] to return to DSC watch mode, or push [FREQ/CH] to return to the select screen.

```
***** Set up *****
----- MMSI check -----

ID:123456789
1.00

[FREQ]Cancel [ENT]OK
```

■ Self testing

According to regulations, the IC-M801GMDSS has a self testing capability to check the internal AFSK encoder and decoder circuits without signal transmission via the transceiver.

- ① During DSC watch mode, push [MODE set] to select DSC menu.
- ② Rotate [CH] to select "Self test" then push [ENT] to start the self test.

```
***** Self test *****

Testin9...

[FREQ]Cancel [ENT]OK
```

- ③ "OK" is displayed when both encoder and decoder functioning correctly.

```
***** Self test *****

OK

[FREQ]Cancel [ENT]OK
```

If the circuit has a problem, the following message is displayed.

- Both or either message is/are displayed depending on problem.

```
DSC-RX NG : DSC receiver's decoder circuit has a
            problem.
TRANSC NG  : Transceiver's encoder or decoder
            circuit has a problem.
```

```
***** Self test *****

DSC-RX NG
TRANSC NG

[FREQ]Cancel [ENT]OK
```

■ Scanning distress frequency selection

- ① During DSC menu indication, rotate [CH] to select "Set up" then push [ENT] to select setup menu.
 - The select screen is displayed.
- ② Rotate [CH] to select the "Watch keeping receiver," then push [ENT].
 - Six distress frequencies for DSC operation are displayed.
- ③ Rotate [CH] to select the desired distress frequency then push [ENT].
- ④ Rotate [CH] to turn the selected frequency then push [ENT].
 - "2187.5 kHz" and "8414.5 kHz" cannot be turned OFF.

```
***** Set up *****
-Watch keepin9 receiver-
▶2187.5kHz
 4207.5kHz
 6312.0kHz
 8414.5kHz
12577.0kHz
16804.5kHz
[CH]SEL [ENT]OK
```

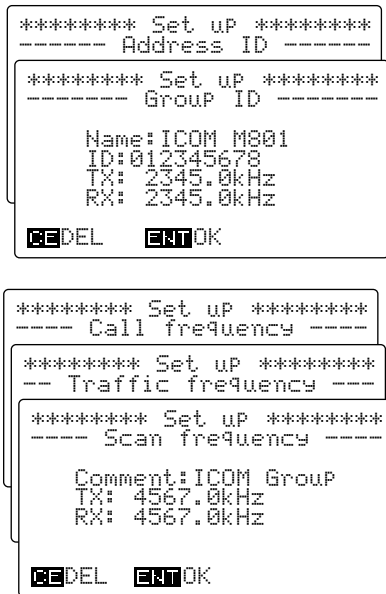
```
*Watch keepin9 receiver*
----- 4207.5kHz -----
OFF
▶ON

[CH]SEL [ENT]OK
```

- ⑤ Push [MODE SET] to return to DSC watch mode, or push [FREQ/CH] to return to the select screen.

Memory reading/deleting

- ① During setup select menu indication, rotate [CH] to select the desired memory item then push [ENT].
 - Push [DSC] to select DSC watch mode.
 - Push [MODE SET] to select DSC menu.
 - Rotate [CH] to select "Set up" then push [ENT].
- ② Rotate [CH] to select the desired memory, then push [ENT].



- ③ Operate as follows:
 - ➔ **When reading the memory contents only;**
 - Push [ENT] to return to the appropriate memory list screen.
 - ➔ **When deleting the memory contents;**
 - Push and hold [CE] for 1 sec.
 - After deleting, the appropriate memory list screen is displayed automatically.

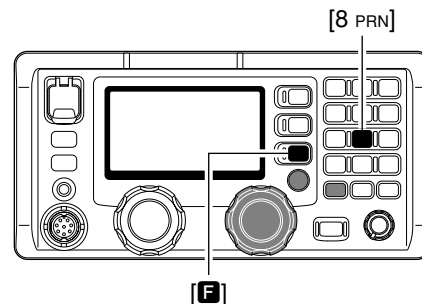
Printing out the DSC memory contents

The received DSC call contents can be printed out when a printer (IBM® centronics or compatible) is connected to the transceiver.

The automatic print out capability when a DSC call is received is available in initial set mode. (p. 48)

- ① Select the desired received DSC memory as described in "Received information" (p. 29).
 - ➔ During DSC watch mode, push [RX CLAR] to enter the received DSC memory select screen.
 - Or, push [MODE SET], rotate [CH] to select "Received Call Log" then push [ENT].
 - ➔ Rotate [CH] to select the desired category from "Distress" and "Others" then push [ENT].
 - "Unread message" is displayed beside category when an unread message is stored in the category.
 - "<No data>" is displayed beside category when no received message is stored in the category.
 - ➔ Rotate [CH] to select the desired DSC message.
 - "*" means the DSC messages have not been read.
 - "DTRS RLY" stands for distress relay.

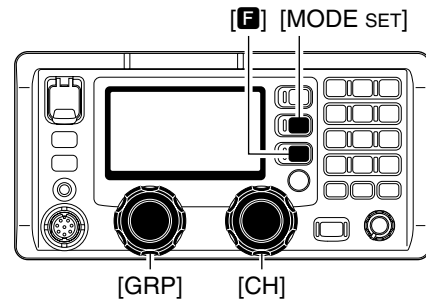
- ② Push [ENT] to indicate the contents.
- ③ After pushing [F], push [8 PRN] for 1 sec. to print out the selected DSC memory contents.



■ Quick set mode

◇ Entering quick set mode

- ① Push [F] then [MODE SET] to enter quick set mode.
 - Select voice or e-mail operation mode in advance.
- ② Rotate [GRP] to select the desired item.
- ③ Rotate [CH] to set the values or conditions for the selected item.
- ④ Push any key to exit quick set mode.



◇ Quick set mode items

Noise blanker level

This item adjusts the noise blanker level to protect a signal from various pulse-type noises from 1 to 10.
(default: 5)

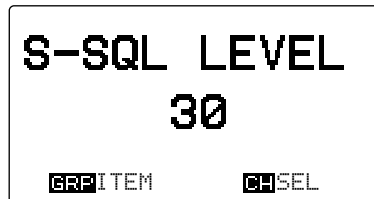
The set level is effective when the noise blanker is activated.



Squelch level

This item adjusts the squelch threshold level from 1 to 100.
(default: 30)

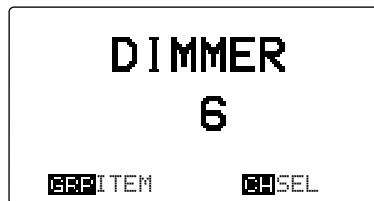
When the squelch is activated, signals stronger than this set level only are received.



Dimmer

This item sets the LCD backlight brightness for dimmer selection from 0 (dark) to 10 (bright).

By pushing [F] then [0 DIM], the set brightness is selected to provide easy visibility during night time operation, etc.
(default: 6)



LCD contrast

This item sets the LCD contrast from 1 to 10.
(default: 7)



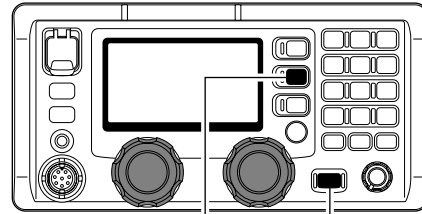
■ Initial set mode

Initial set mode operation is used for programming infrequently changed values, conditions or functions.

◆ Entering set mode

- ① Turn the power OFF, if the transceiver is powered ON.
- ② While pushing [MODE SET], push [POWER] to turn the power ON to enter initial set mode.
- ③ Rotate [GRP] to select the desired item.
- ④ Rotate [CH] to set the values or conditions for the selected item.
- ⑤ Turn the power OFF and ON again to exit set mode.

NOTE: Selection of some of the set mode items described here are not available on some transceiver versions.

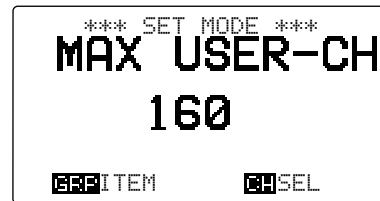


[MODE SET] [POWER]

◆ Initial set mode items

Number of user channels

This item sets the number of user channels. Up to 160 channels can be set. (default: 160)



FSK ITU channel selection

This item sets the capability of the ITU channels for FSK from ON and OFF. This item will not appear when ITU channels are inhibited. (default: OFF)



Automatic tune

When an optional automatic antenna tuner is connected, tuning can be started automatically without pushing [TUNE THRU], for instant operation.

If manual tuning is required, this automatic operation can be deactivated. (default: OFF)

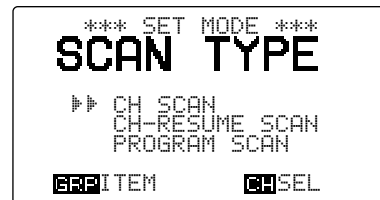


Scan type

This item selects one of the following scan functions.

Programmed scan searches signals within the frequency range and activates slowly while squelch is open and fast while squelch is closed.

Channel scan and channel resume scan searches 20 channels around a user selected channel, or searches all ITU channels in the band when an ITU channel is selected. (default: CH SCAN)



◇ Initial set mode items (continued)

Scan speed

This item adjusts the scan speed (rate at which channels are searched). The scan speed can be set from 1 to 10 with “1” being the fastest and “10” being the slowest. (default: 4)

```

*** SET MODE ***
SCAN SPEED
4
GRP ITEM    CHSEL
  
```

Display type

The upper half of the display can be set to display a programmable channel name or a receive frequency according to your needs. (default: CH-FREQUENCY)

```

*** SET MODE ***
CH-NAME DISP
▶▶ CH-FREQUENCY
   CH-NAME
GRP ITEM    CHSEL
  
```

Microphone keys

This item activates/deactivates the keys on the optional HM-135 HAND MICROPHONE ([P], [▲] and [▼]). Refer below on how to program the [P] key. (default: OFF)

```

*** SET MODE ***
MIC KEY
▶▶ OFF
   ON
GRP ITEM    CHSEL
  
```

[P] key function

✓ This item appears only when “ON” is selected in MIC KEY setting as above.

This item assigns a function to the [P] key on the optional HM-135 HAND MICROPHONE to activate it the same as if making the key operation for [TUNE THRU], [MODE SET], [F]+[1 NB], [F]+[2 SQL], [F]+[3 SCAN], [F]+[4 SP^x] or [F]+[5 AGC^x]. (default: MODE)

```

*** SET MODE ***
P KEY
▶▶ TUNE
   MODE
   NB
   SQL
GRP ITEM    CHSEL
  
```

Voice squelch

This item turns the voice squelch function ON and OFF when operating in J3E and H3E modes. When the function is set to OFF, the squelch acts as an S-meter squelch for J3E and H3E modes. (default: ON)

```

*** SET MODE ***
VOICE SQL
▶▶ OFF
   ON
GRP ITEM    CHSEL
  
```

REMOTE ID

This item selects the ID for the transceiver from 1 to 99. (default: 11)

```

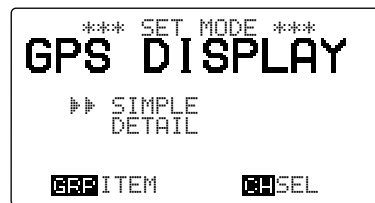
*** SET MODE ***
REMOTE ID
11
GRP ITEM    CHSEL
  
```

◆ Initial set mode items (continued)

Position indication type

Select the position indicating type from simple and detail.

- **SIMPLE** : Hides second digits (default)
- **DETAIL** : Shows second digits



Offset time

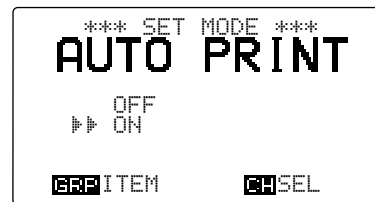
Set the offset time between the UTC and local time within -12:00 to +12:00 in 10 minutes steps.
 (default: 0:00)



Automatic print out

This item turns the automatic print out function ON and OFF when receiving a DSC call.

- **OFF** : Prints out the received DSC contents manually.
- **ON** : Prints out the received DSC contents automatically. (default)



Automatic acknowledgement

This item turns the automatic acknowledgement function ON and OFF when receiving a DSC call.

- **OFF** : Sends back an acknowledgement call manually.
- **ON** : Sends back an acknowledgement call automatically when a DSC call is received. (default)



Medical transport

This item enables medical transport call.

- **OFF** : No medical transport call is available. (default)
- **ON** : Medical transport call is available.



Neutral ship

This item enables neutral ship call.

- **OFF** : No neutral ship call is available. (default)
- **ON** : Neutral ship call is available.



DSC data out

This item selects the DSC and DSE data output to the connected external unit, such as plotter, to [REMOTE] when receiving a DSC call.

- **OFF** : No data is output even when a DSC call is received. (default)
- **ADDRESS ID** : DSC and DSE data is output when the DSC call includes the stored address ID or group code is received.
- **ALL** : DSC and DSE data is output when a DSC call is received, even the call for other stations.

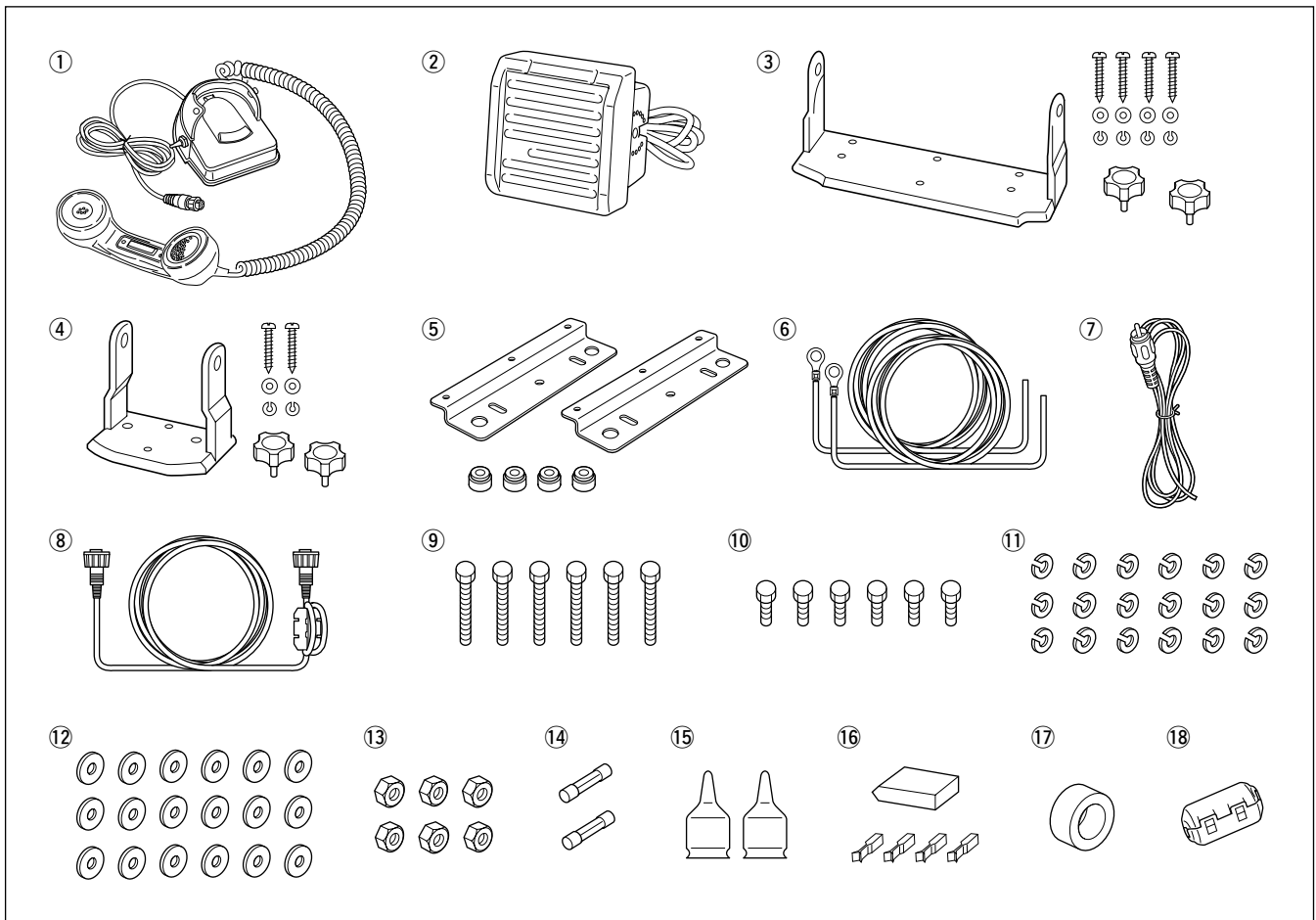
```
*** SET MODE ***
DSC DATA OUT
▶ OFF
ADDRESS ID
ALL
ERR ITEM      CHSEL
```

13 CONNECTION AND INSTALLATION

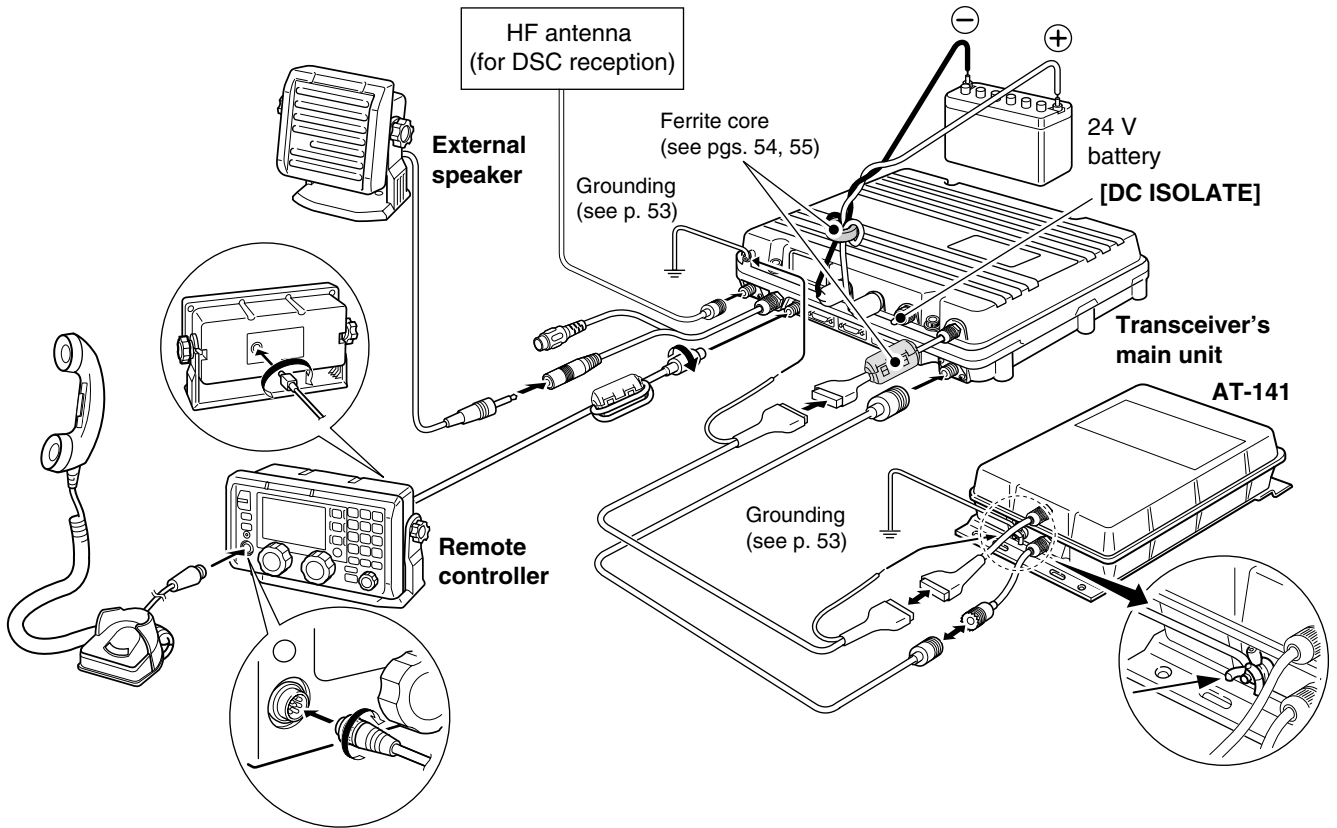
■ Supplied accessories

The following accessories are supplied with IC-M801GMDSS.

① Handset	1	⑩ Hex head bolts (M6×15)	6
② External speaker	1	⑪ Spring washers (M6)	18
③ Mounting bracket kit for remote controller ...	1 set	⑫ Flat washers (M6)	18
④ Mounting bracket kit for speaker	1 set	⑬ Hex nuts (M6)	6
⑤ Mounting angles for main unit	1 set	⑭ Spare fuses (FGB 5 A)	2
⑥ DC power cable (Red and Black)	1 pair	⑮ Weatherproof caps	2
⑦ RCA cable (for GPS connection)	1	⑯ Tuner connector kit	1 set
⑧ Remote control cable (OPC-1466)	1	⑰ Ferrite core (for power cable)	1
⑨ Hex head bolts (M6×50)	6	⑱ Ferrite core (for antenna tuner receptacle)	1

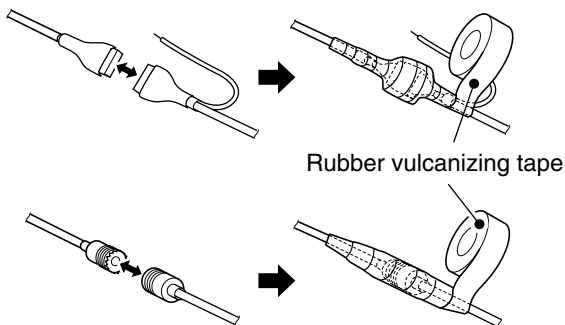


Basic connections



CAUTION:

- After connecting the external speaker, antenna and tuner control cables, cover the connectors with a rubber vulcanizing tape, etc., as shown below, to prevent water seeping into the connector.

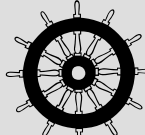


- **DO NOT** pull the antenna and control cable receptacles. This may cause cable disconnection (in the tuner unit), inside connector damaged or a bad connection.

NOTE:

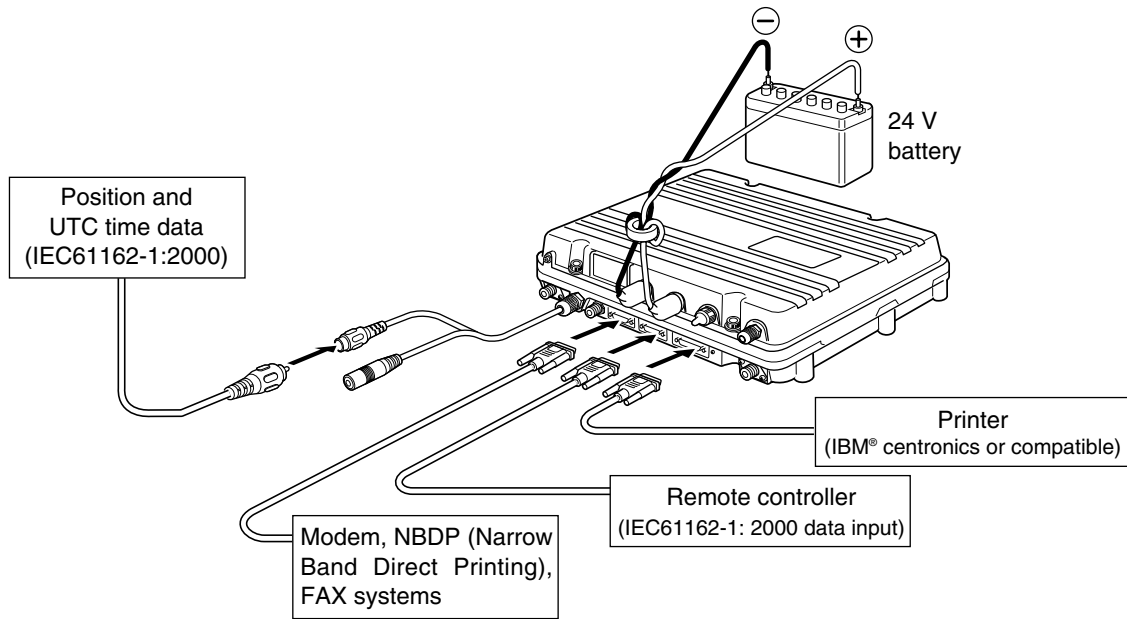
Turn [DC ISOLATE] (on the IC-M801GMDSS main unit) OFF, or charge the battery during anchor, otherwise the battery may be exhausted. The IC-M801GMDSS has a high-stability oven-heater type crystal oscillator, and the oscillator's heater is connected to the DC power terminals directly, it keeps its temperature to at the specified level even if the transceiver power with the remote controller has turned OFF.

IMPORTANT!: Antenna for DSC reception should be connected, otherwise no DSC call can be received.



IC-M801GMDSS
NOTE: MUST BE USED WITH ICOM AT-141.

■ Advanced connections



CAUTION: Any connected external unit, such as printer, etc., must be properly grounded. We suggest using a wide copper strap. (p. 53)

■ Ground connection

The transceiver and antenna tuner MUST have an adequate RF ground connection. Otherwise, the overall efficiency of the transceiver and antenna tuner installation will be reduced. Electrolysis, electrical shocks and interference from other equipment could also occur.

For best results, use 50 or 75 mm (2 or 3 inches) wide copper strap and make the connection as short as possible. Ground the transceiver and antenna tuner to one ground point, otherwise the voltage difference (in RF level) between 2 ground points may cause electrolysis.

⚠ WARNING— When grounding to a metal hull
 Use Zinc anodes to protect the hull from electrolysis.
 Ask your technical dealer, installer or refer to a technical book, etc., for RF grounding details.

⚠ CAUTION: NEVER connect the transceiver to a “positive-grounded ship,” otherwise the transceiver will not function.

Best ground points

- External ground plate
- Copper screen
- Copper foil

Acceptable ground point

- Stainless steel stanchion
- Through mast
- Through hull
- Metal water tank

Undesirable ground points

- Engine block
- Ship’s DC battery ground

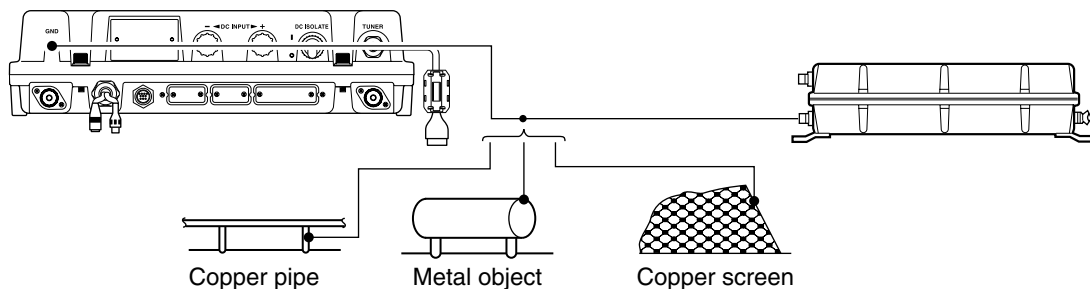
Un-usable ground points

(these connections may cause an explosion or electrical shock)

- Gas or electrical pipe
- Fuel tank or oil-catch pan

See antenna and grounding considerations section (pgs. 71–73) for more details.

Ground system example



Power source

The transceiver requires a regulated DC power of 26.4 V and at least 30 A.

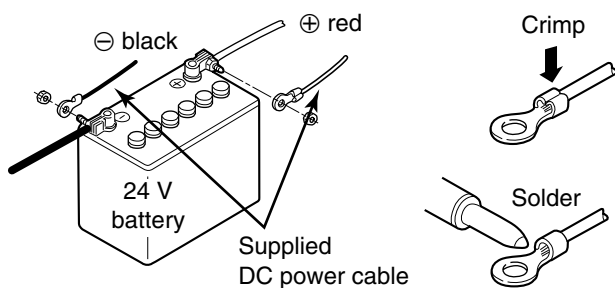
- Direct connection to 24 V battery in your ship through the supplied DC power cable.

WARNING! NEVER connect the transceiver to a battery using reverse polarity. This will damage the transceiver.

CATION: Before connecting the transceiver main unit to a battery, make sure the transceiver input voltage suits to the battery voltage.

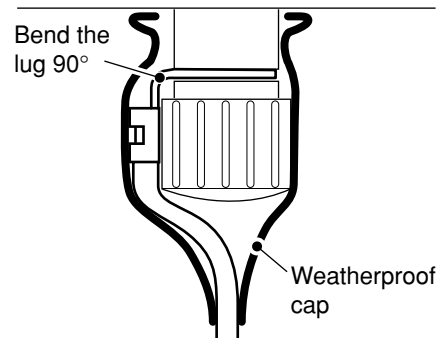
DC power cable connection

NOTE: Use terminals for the cable connection.



Weatherproof cap attachment

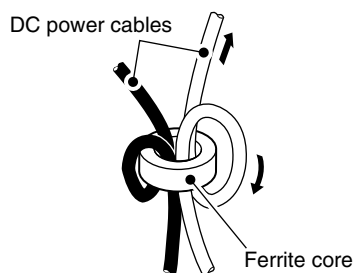
Attach the supplied weatherproof cap for each positive and negative line at the DC power terminal as shown below.



Ferrite core attachment

The DC power cables should be connected to the transceiver's main unit through the supplied ferrite core as described below.

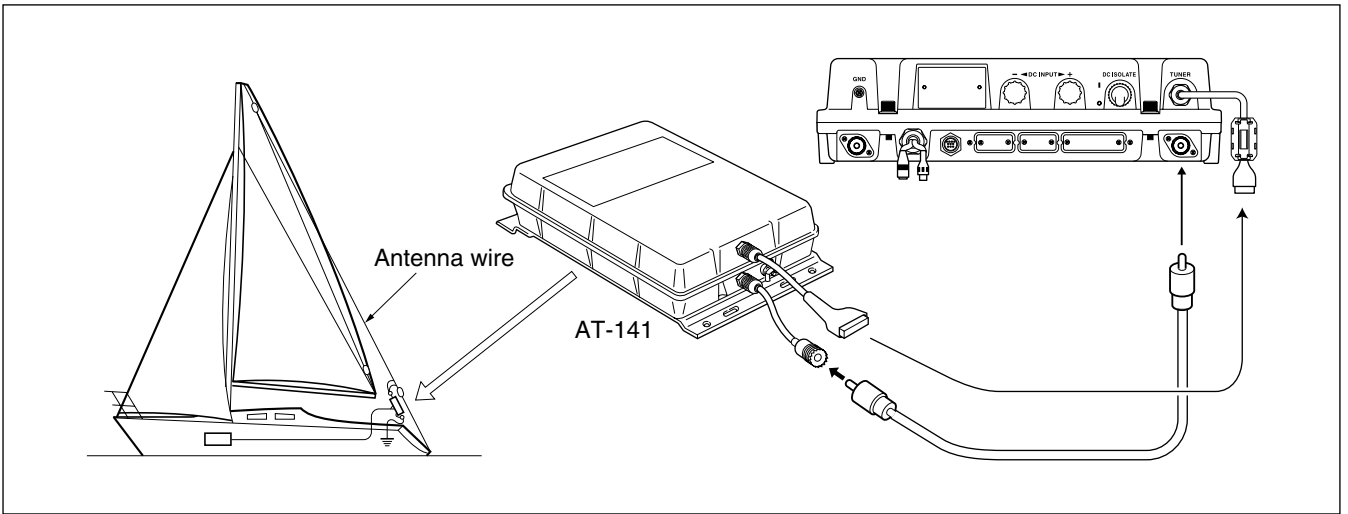
And the ferrite core must be placed as near as possible to the main unit.



■ Antenna

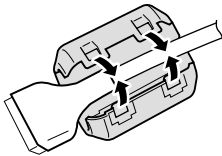
Most stations operate with a whip or long wire (insulated backstay) antenna. However, these antennas cannot be connected directly to the transceiver since their impedance will not be matched with the transceiver antenna connector.

⚠ DANGER: HIGH VOLTAGE!
NEVER touch the antenna element/wire while tuning or transmitting.



• Ferrite core attachment

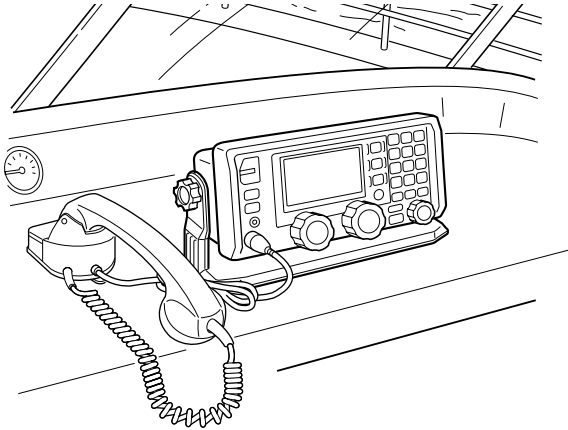
Attach the supplied ferrite core to the antenna tuner receptacle as the illustration below.



■ Mounting

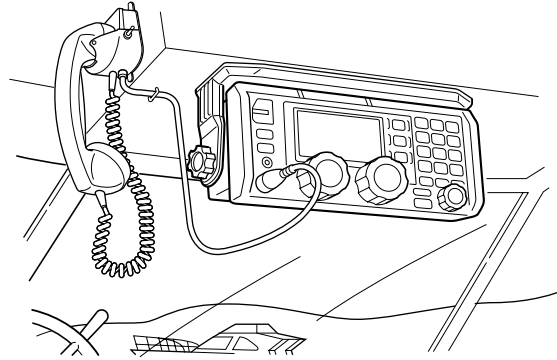
◇ Mounting location

Select a location that provides easy access to the controller for navigation safety, has good ventilation and is not subject to sea spray. The controller should be at 90 degrees to your line of sight when operating it.

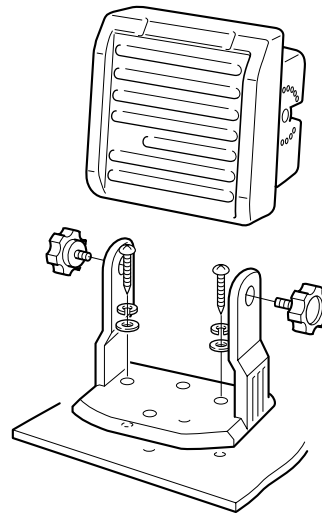
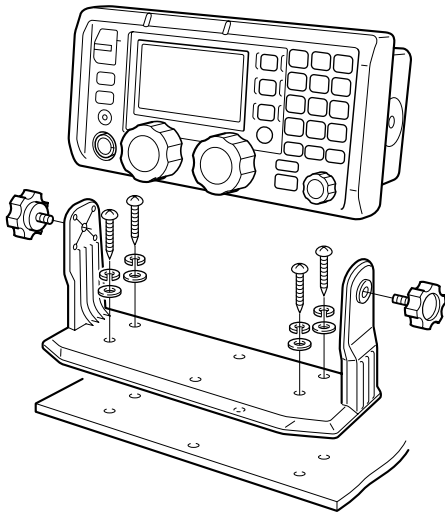


CAUTION: KEEP the transceiver and handset or microphone at least 1 meter away from your ship's magnetic navigation compass.

Check the installation angle; the display may not be easy to read at some angles.

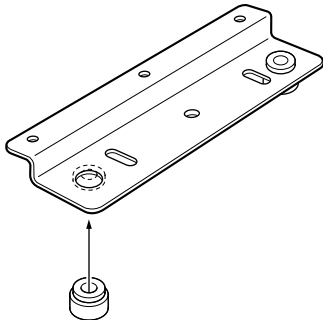


◇ Mounting the controller/speaker

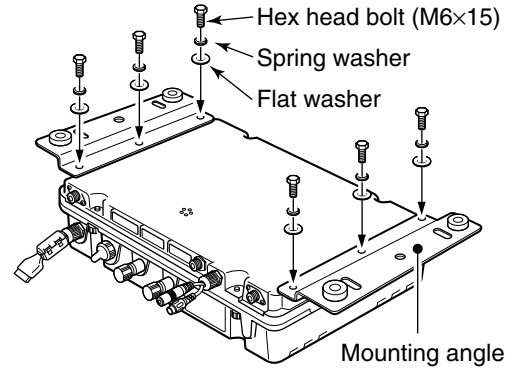


◆ **Mounting angle attachment**

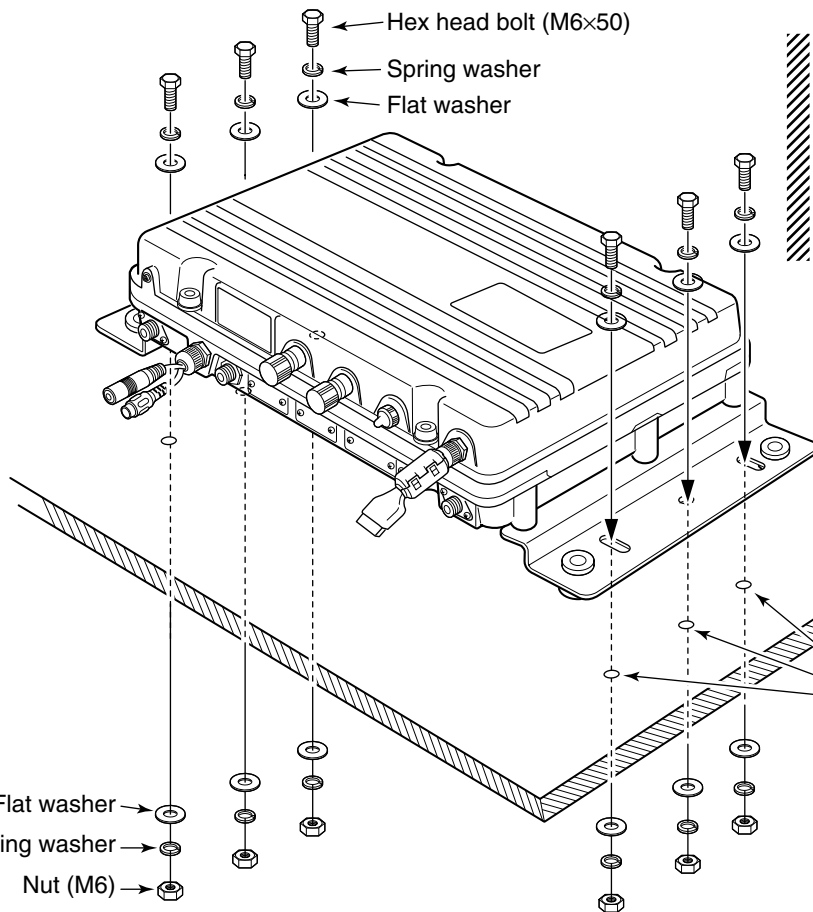
① Attach the supplied rubber feet to the mounting angle, if desired.



② Attach the mounting angles using with the supplied hex head bolts (M6×15), flat and spring washers as illustrated below.



◆ **Mounting the main unit**



⚠ WARNING! NEVER mount the transceiver main unit overhead. The weight of the unit is approximately 8.5 kg, but its apparent weight will increase several fold due to wave shocks or vibration. The unit must be mounted on a flat hard surface only.

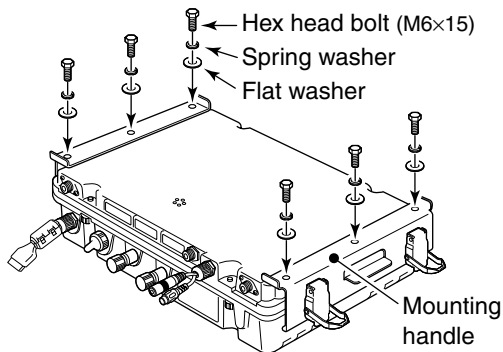
Drill six holes of 6 mm (¼ in) in diameter.

■ Using the optional MB-108

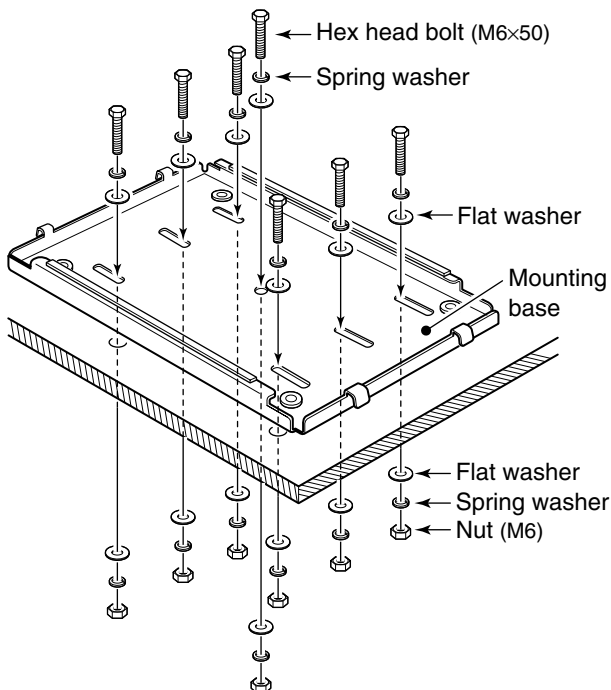
The optional MB-108 mounting bracket is available for mounting the transceiver's main unit. The MB-108 allows you to one-touch attachment/detachment capabilities.

CAUTION! WEAR GLOVES when installing the MB-108.
Edges of the MB-108 may be sharp and may easily cut your fingers, hands, etc.

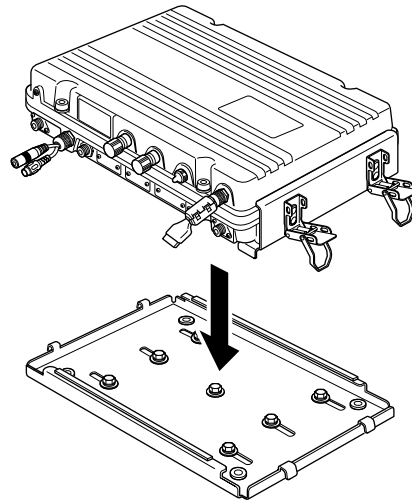
- ① Attach the mounting handles with the supplied hex head bolts (M6×15), spring and flat washers as below.



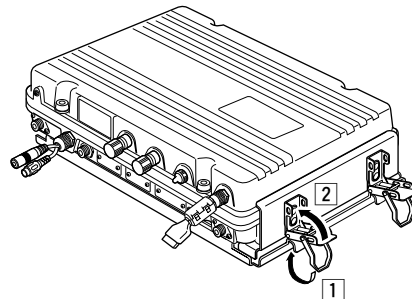
- ② Drill 7 holes of 6–8 mm ($\frac{1}{4}$ – $\frac{5}{16}$ in) in diameter, using the template supplied with the MB-108.
③ Attach the mounting base onto a flat surface using with the hex head bolts (M6×50), spring and flat washers, and nuts, supplied with the MB-108, as below.



- ④ Mount the transceiver main unit (mounting handles has attached) onto the mounting base.



- ⑤ Fix the main unit by locking 4 latches on the mounting handles.

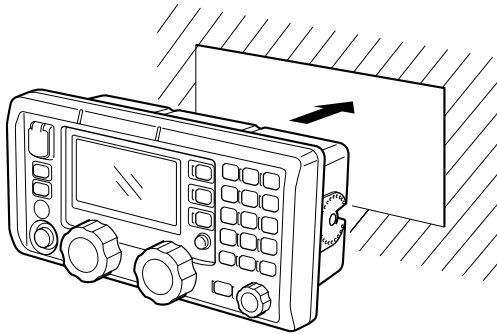


■ Using the optional MB-75

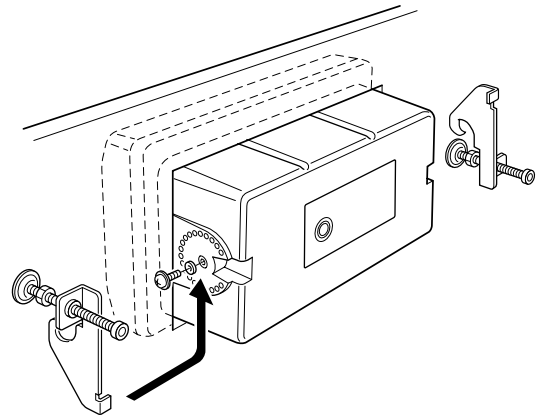
The optional MB-75 flush mount is available for mounting the controller and speaker to a flat surface such as an instrument panel.

CAUTION: KEEP the transceiver and handset or microphone at least 1 meter away from your ship's magnetic navigation compass.

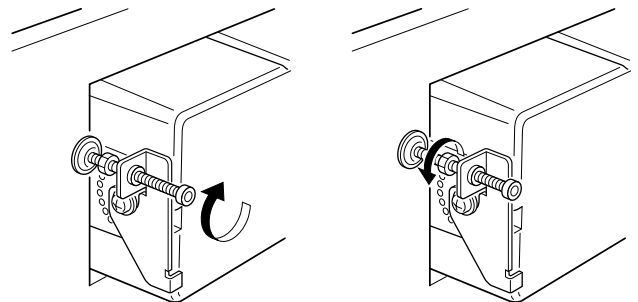
- ① Using the template on the page 67 for the remote controller (RC-25GMDSS), and page 69 for the speaker (SP-24E), carefully cut a hole into the instrument panel (or wherever you plan to mount the controller or the speaker).
- ② Slide the controller or the speaker through the hole as shown below.



- ③ Attach the supplied 2 screws (M5×8) and spacers on either side of the controller or speaker.
- ④ Attach the clamps on either side of the controller or speaker.
 - Make sure that the clamps align parallel to the body.

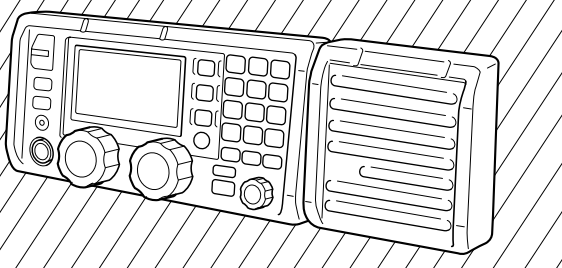


- ⑤ Tighten the end screws on the clamps (rotate clockwise) so that the clamps press firmly against the inside of the instrument control panel.
- ⑥ Tighten the locking nuts (rotate counterclockwise) so that the controller or speaker is securely mounted in position as below.
- ⑦ Connect the control cable then return the instrument control panel to its original place.



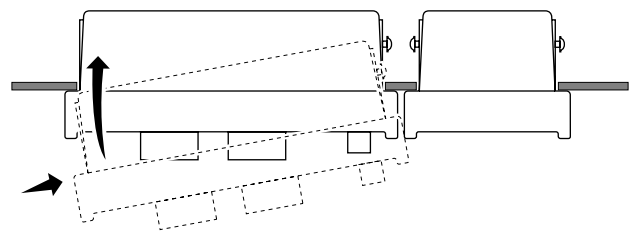
✓ For your reference

When flush mounting the controller and speaker side by side as below, screw and spacer attachment for the facing side will be impossible with the instructions above.



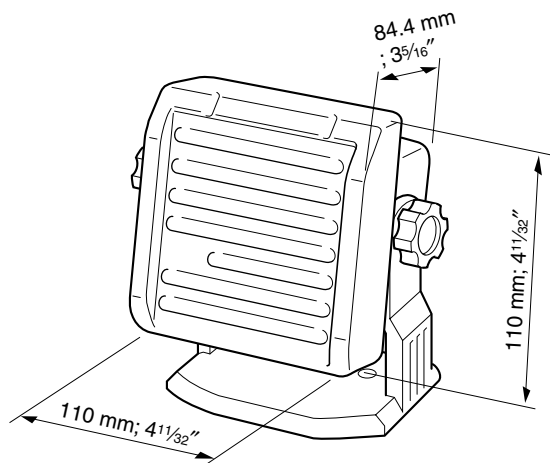
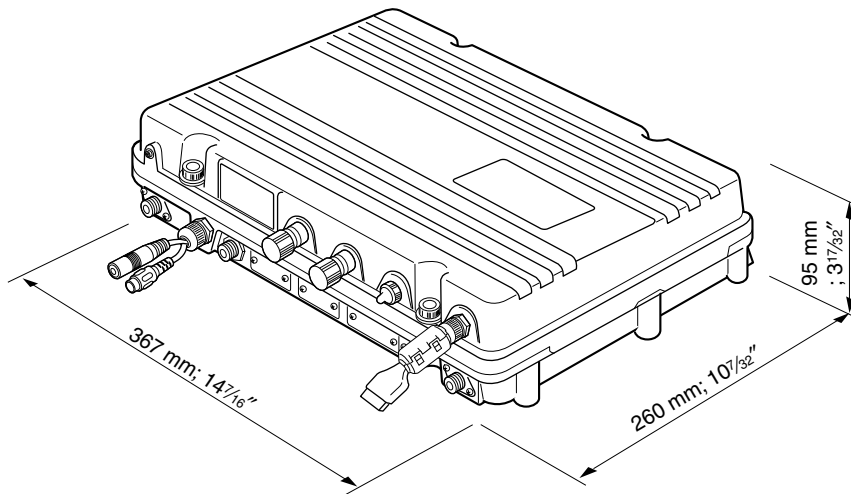
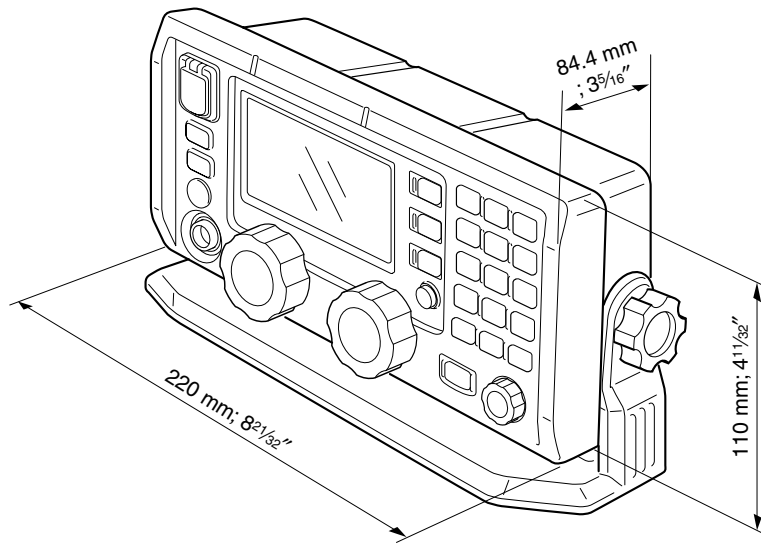
In this case, refer to the instructions at right for reference.

- ① Carefully cut the holes with at least 25 mm (1 in) space between them into the instrument panel.
- ② Install the speaker as instructed above, first.
- ③ Attach the screw and spacer on the speaker side of the controller.
- ④ Slide the controller through the hole as shown below.



- ⑤ Attach the screw and spacer on the other side of the controller, then attach the clamps and follow steps ⑤ to ⑦ as above.

■ Transceiver dimensions



■ Fuse replacement

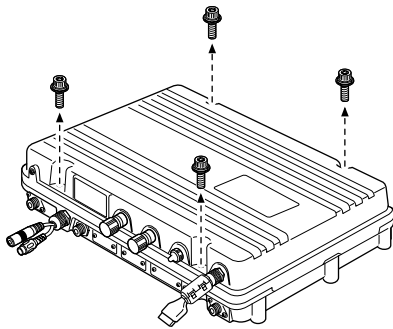
The transceiver has 2 fuses to protect internal circuitry. If the transceiver stops functioning, check the fuses below.

- DC-DC converter unit FGB 5 A
- PA unit FGB 5 A

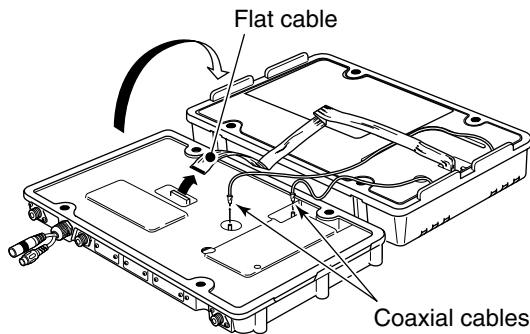
CAUTION: DISCONNECT the DC power cable from the transceiver when changing a fuse.

◇ Fuse replacement

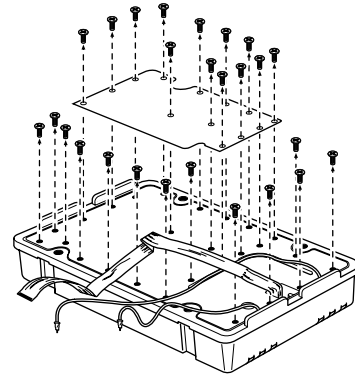
- ① Unscrew 4 cap-bolts from the top case.
 - Use 6 mm (1/4") allen wrench.



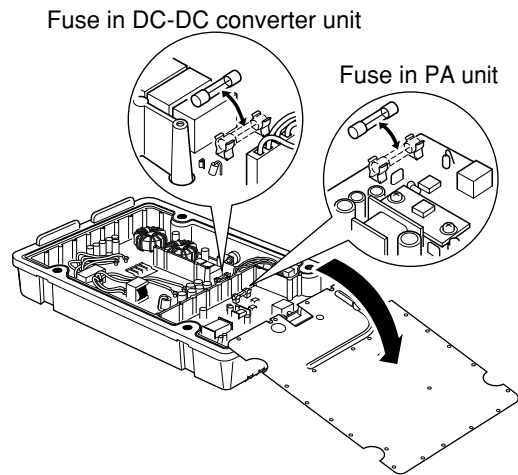
- ② Open the transceiver's main unit, then disconnect 1 flat and 2 coaxial cables as shown below.



- ③ Unscrew 32 screws from the shield covers, then open the covers.

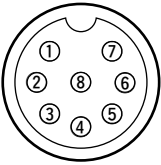


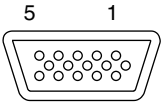
- ④ Replace the circuitry fuse as shown in the diagram below.
 - Use the supplied FGB 5 A fuse.



- ⑤ Attach the shield covers, flat cable, coaxial cables and top case to their original position.

■ Connector information

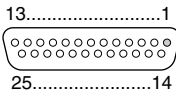
MICROPHONE	Pin	Pin name	Description	Specification
 <p>Front panel view</p>	1	MIC+	Audio input from the mic element.	Input impedance : 2.4 kΩ
	2	NC	No connection.	
	3	AF1	AF output controlled with [VOL].	
	4	AF2	Ground for AF1.	
	5	PTT	PTT switch input.	When grounded, transmits.
	6	GND	Connected to the ground.	
	7	MIC-	Coaxial ground for MIC+.	
	8	AF-	Coaxial ground for AF1 and AF2.	

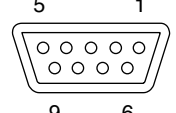
AF/MOD	Pin	Pin name	Description	Specification
 <p>Front panel view</p>	1†	MOD+	Modulation input from an NBDP. (J2B operation only)	Input impedance : 600 Ω Input level : Approx. 0.77 V rms.
	2†	MOD-	Coaxial ground for MOD+.	
	3*	AF+	AF detector output for an NBDP. (J2B operation only)	Output impedance: 600 Ω Output level : 0.25–2.5 V rms
	4*	AF-	Coaxial ground for AF+.	
	5	SEND	Transmission control line for an NBDP (transmits when grounded: J2B operation only).	Output level : –0.5 to 0.8 V Input level : Less than 20 mA
	6	NC	No connection.	
	7	13.6	Outputs 13.6 V DC.	
	8	NC	No connection.	
	9, 10	GND	Ground terminals.	
	11†	MOD+	Modulation input from an external terminal unit for SSB.	Input impedance : 600 Ω Input level : Approx. 0.77 V rms.
	12†	MOD-	Coaxial ground for MOD+.	
	13*	AF+	AF detector output for an external terminal unit for SSB.	Output impedance: 600 Ω Output level : 0.25–2.5 V rms
	14*	AF-	Coaxial ground for AF+.	
	15	SEND	Transmission control line for an external unit for SSB (transmits when grounded).	Output level : –0.5 to 0.8 V Input level : Less than 20 mA

***NOTE:** Output signal levels between pins 3/4 and 13/14, will influence each other because these pins are connected in parallel. When a 2nd 600 Ω impedance device is additionally connected, adjust the 2nd device to the specified signal levels for the output (pins 3/4 and 13/14) signal levels of the connected 600 Ω impedance device (reception).

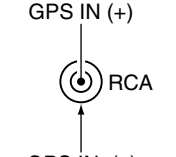
†Input signal from pins 1/2 or 11/12 are acceptable only when transmitted with the SEND signal from 5 or 15, respectively.

■ Connector information (continued)

PRINTER	Pin	Pin name	Description
 <p>13.....1 25.....14 Front panel view</p>	1	STROBE	Outputs a strobe pulse after data output.
	2-9	DATA1-8	Outputs 8-bit parallel data.
	10	ACKNLG	Input port for the connected printer. “Low” pulse signal is applied from the printer during the printer accepts data input.
	11	BUSY	Input port for the connected printer. “High” level signal is applied from the printer during the printer cannot accept data input, such as when off line.
	12-14	NC	No connection.
	15	ERROR	Input port for the connected printer. The printer output becomes “Low” when an printer error, such as no paper, occurs.
	16, 17	NC	No connection.
	18-25	GND	Ground terminals.

REMOTE	Pin	Pin name	Description	Specification
 <p>5 1 9 6 Front panel view</p>	1	DATA-OUT (-)	Ground (not transceiver’s ground) for DATA-OUT (+) terminal.	
	2	DATA-OUT (+)	IEC61162-1: 2000 data output.	Output level : 40 mA max. (as a talker)
	3	DATA-IN (+)	IEC61162-1: 2000 data input.	Input level : Less than 2 mA (when 2 V applied; as a listener)
	4	DATA-IN (-)	Ground (not transceiver’s ground) for DATA-IN (+) terminal.	
	5	GND	Connected to the ground.	
	6	NC	No connection.	
	7	NC	No connection.	
	8	NC	No connection.	
	9	NC	No connection.	

NOTE: The IC-M801GMDSS supports IEC61162-1: 2000 data with FSI, SFI DSC and DSE sentences only.

RCA	Pin name	Description	Specification
 <p>GPS IN (+) RCA GPS IN (-)</p>	GPS IN (+)	GPS data input in IEC61162-1: 2000 format.	Input level : Less than 2 mA (when 2 V applied; as a listener)
	GPS IN (-)	Ground (not transceiver’s ground) for GPS-IN (+) terminal.	

NOTE: The IC-M801GMDSS supports IEC61162-1: 2000 GPS data with GGA, GNS, GLL and RMC sentences, and UTC of position (excludes second unit or less), latitude and longitude information only.

14 SPECIFICATIONS

•General

- Frequency coverage : (Unit: MHz)
 - Receive 0.5–29.9999
 - Transmit 1.6–2.9999 4.0–4.9999
 - 6.0–6.9999 8.0–8.9999
 - 12.0–13.9999 16.0–17.9999
 - 18.0–19.9999 22.0–22.9999
 - 25.0–27.5000
- DSC channels : 2187.5 kHz, 4207.5 kHz,
6312.0 kHz, 8414.5 kHz,
12577.0 kHz, 16804.5 kHz
- Type of emission :
 - Transceiver J3E (USB/LSB*), H3E,* J2B (AFSK),
F1B (FSK; receive only), A1A* (CW)
 - DSC receiver F1B

*Receive only
- No. of memory Ch. : 1195 channels (max.)
160 user programmable, 249 ITU
SSB duplex, 124 ITU SSB
simplex and 662 ITU FSK duplex
channels
- Antenna connector : SO-239×2 (50 Ω)
- Usable temp. range : –15°C to +55°C
- Frequency stability : ±10 Hz
(Approx. 5 min. after [DC ISOLATE] is turned ON.)
- Power supply : 21.6–31.2 V DC (floating ground)
- Current drain :
 - Transmit at max. power 30 A
 - Receive at max. audio Less than 3.0 A
- Dimensions (projections not incl.):
 - Main unit 367(W)×95(H)×260(D) mm
 - Controller (RC-25GMDSS)
220(W)×110(H)×84.4(D) mm
 - Speaker (SP-24E)
110(W)×110(H)×84.4(D) mm
- Weight (approx.) :
 - Main unit 8.5 kg
 - Controller (RC-25GMDSS)
570 g
 - Speaker (SP-24E)
370 g
- CONTROLLER connector : 8-pin connector
- GPS connector : RCA (IEC61162-1: 2000)
- REMOTE connector : D-sub 9-pin (IEC61162-1: 2000)
- AF/MOD connector : D-sub 15-pin
- PRINTER connector : D-sub 25-pin

•Transmitter

- Output power :
 - 1.6–3.9999 MHz 85 W p-p
 - 4.0–27.5000 MHz 125 W p-p
- Spurious emission : 43 dB below peak output power
- Carrier suppression : 40 dB below peak output power
- Unwanted sideband : 55 dB below peak output power
suppression (w/1 kHz AF input; at max power)
- Mic. connector : 8-pin connector (2.4 kΩ)

•Receiver

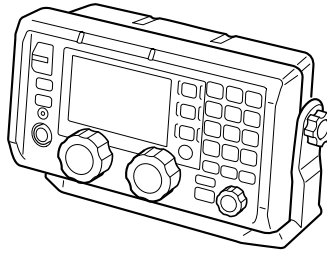
- Sensitivity :
 - Transceiver
 - J3E, A1A 30 dBμV emf (0.5–1.5999 MHz)
 - 13 dBμV emf (1.6–1.7999 MHz)
 - 8 dBμV emf (1.8–29.9999 MHz)
 - J2B, F1B 13 dBμV emf (1.6–1.7999 MHz)
 - 8 dBμV emf (1.8–29.9999 MHz)
 - H3E 44 dBμV emf (0.5–1.5999 MHz)
 - 30 dBμV emf (1.6–1.7999 MHz)
 - 24 dBμV emf (1.8–3.9999 MHz)
 - DSC receiver (J2B) 0 dBμV emf (all channels)
- Spurious response rejection ratio:
 - Transceiver More than 70 dB
(0.5–29.9999 MHz)
 - DSC receiver More than 60 dB (1st image)
More than 50 dB (except 1st image)
- AF output power : More than 4.0 W at 10% distortion
(at 24 V DC) with a 4 Ω load
- CLARITY variable range : ±150 Hz
- Headphone connector : 3-conductor 3.5 (d) mm (1/8")
- SP connector : 2-conductor 3.5 (d) mm (1/8")/4 Ω

AT-141 HF AUTOMATIC ANTENNA TUNER



Matches the transceiver to a long wire antenna with a minimum of insertion loss.

RC-25GMDSS REMOTE CONTROLLER



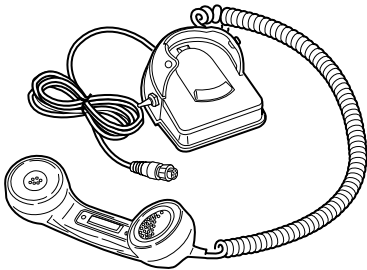
Same as that supplied remote with the transceiver. Mounting bracket, MB-81, is supplied with the controller.

SP-24E EXTERNAL SPEAKER



Same as that supplied with the transceiver. Mounting bracket, MB-82 is supplied with the speaker. Max. AF input/impedance: 5 W/4 Ω

HS-98 HANDSET



Same as that supplied with the IC-M801GMDSS.

HM-135 HAND MICROPHONE



Equipped with channel up/down and user-programmable keys.

MB-75 FLUSH MOUNT KIT



For mounting the remote controller (RC-25GMDSS) or the SP-24E to a panel.

MB-108 MOUNTING BRACKET



One-touch bracket. Transceiver main unit easily attached or removed.

OPC-1465 SHIELDED CONTROL CABLE

Shielded control cable protects the transceiver from RF feedback and extends the separation between AT-141 and transceiver up to 10 m .

OPC-1466 SEPARATION CABLE

Same as that supplied with the transceiver. Cable length: 5 m

OPC-1575 SEPARATION CABLE

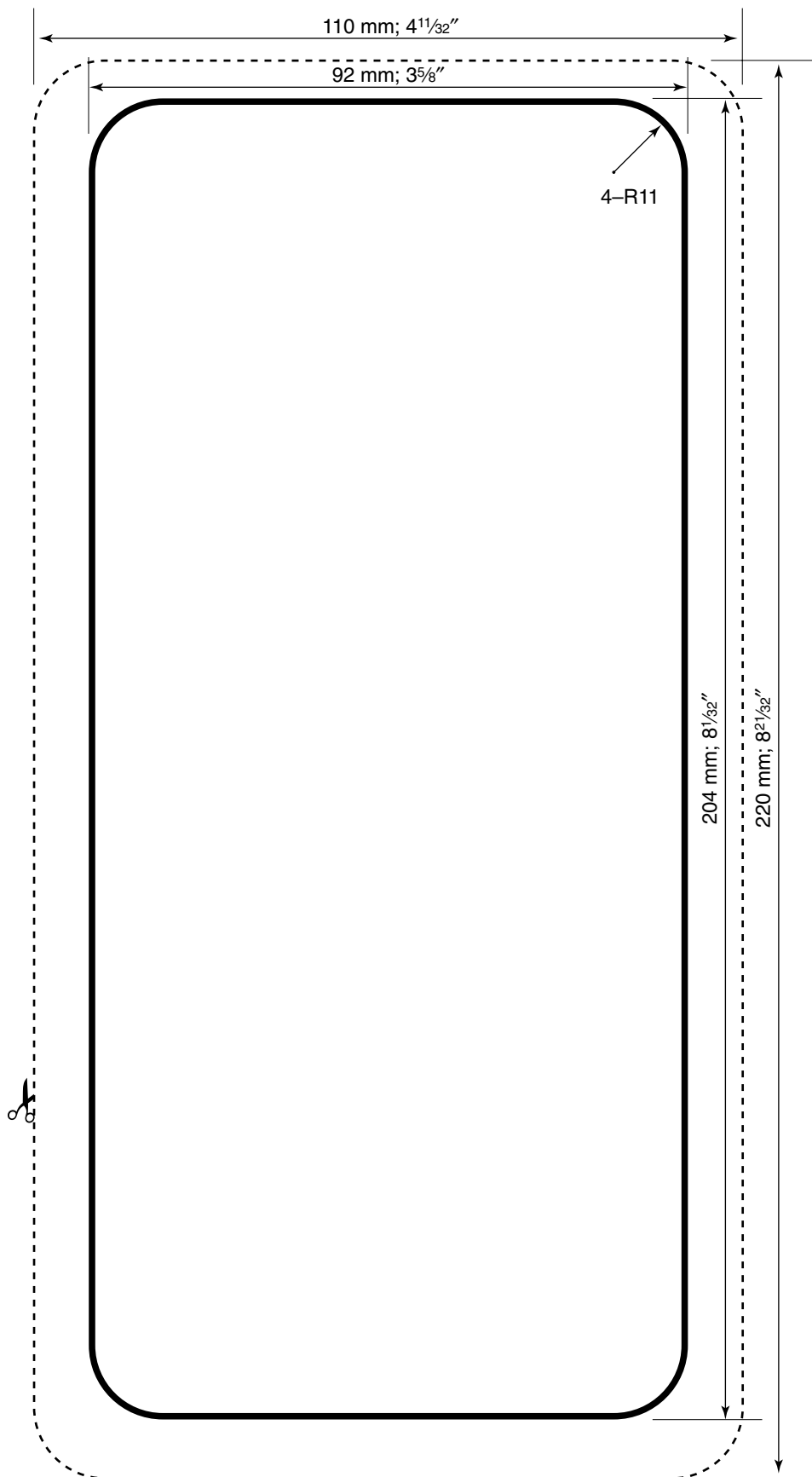
For extended remote controller installation. Cable length: 10 m

OPC-1610 SPEAKER EXTENSION CABLE

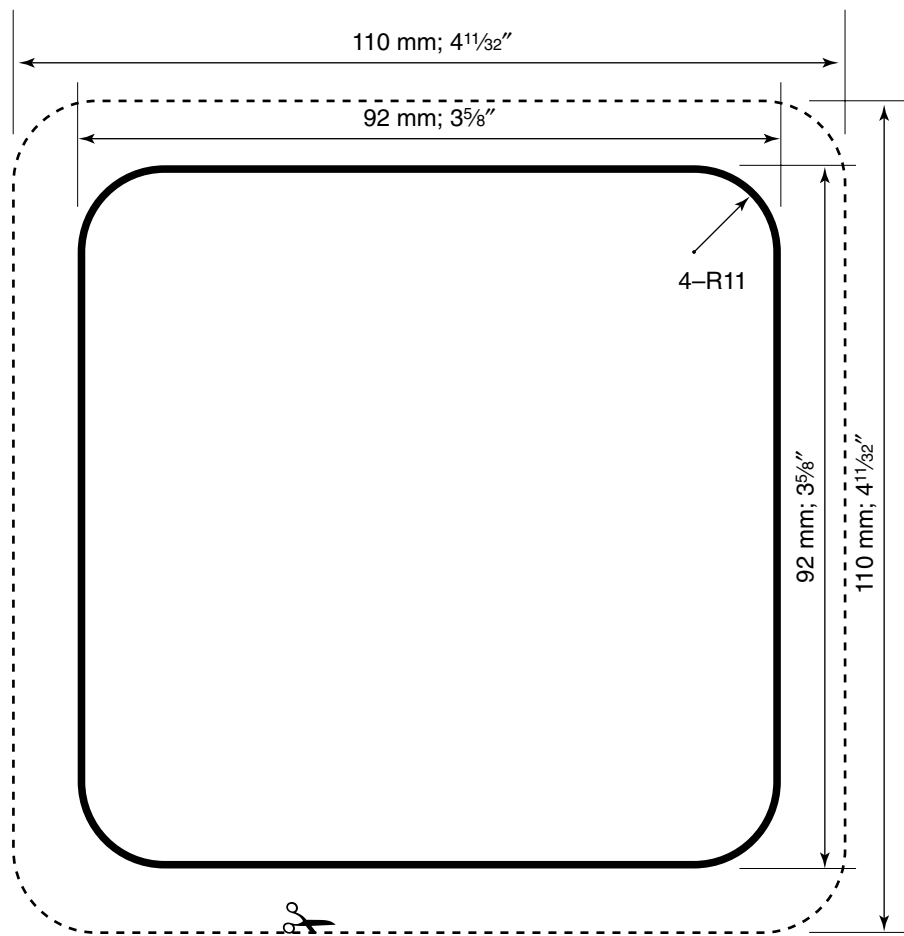
For extended speaker installation. Cable length: 5 m

■ Remote controller (RC-25GMDSS)

<Cut here>



■ Speaker (SP-24E)



ANTENNAS & TUNERS

If your Icom SSB transceiver is going aboard a sailboat, you may either use an insulated backstay an insulated sidestay, or a non-resonant white fiber glass whip antenna off the stern to make up your antenna system. Your best range will be from an insulated backstay because of the long length of the antenna “radiator” which is that portion within the top and bottom insulators. Have your rigger put the top insulator about at least 3 feet down from the tip of the mast. Have your rigger install the bottom insulator at about eye-level when you’re standing back aft. (This length between insulators should not exceed 120’ or be less than 23’.) If you decide to go for the non-resonant whip antenna, the antenna usually goes at the extreme stern and mounts either vertically or raked back at about a 45-degree angle.

These non-resonant antennas may be tuned by the ICOM automatic antenna tuner that matches the Icom SSB transceiver. The tuner goes back aft, in the lazarette, or as close to the antenna as possible. It is completely weather-protected and can easily take the punishment of being aft and below deck where you’re probably also going to store wet life preservers, foul weather gear and the like. The tuner interconnects with the Icom SSB. Full details are in the tuner instruction (installation) manual. We suggest you use “GTO-15” high voltage lead-in wire from the single wire output of the tuner to your insulated backstay or to your non-resonant whip. This high voltage wire won’t break down in wet weather or sunlight. Use stainless steel hose clamps to attach the wire to the insulated backstay. If you decide to use a non-resonant whip, attach the single wire with a lug to the feedpoint at the base of the whip.

More about the importance of grounding in a moment.

For those of you with a powerboat, a whip antenna approximately 16 to 20 feet long is what you’ll be using with your new Icom SSB. The most common set-up consists of the white fiber glass non-resonant whip antenna that is automatically tuned with the ICOM automatic antenna tuner. Similar to sailboat installations, the tuner is hidden out of the way in the flying bridge area or below deck near the base of the whip. GTO-15 wire interconnects the whip to the automatic tuner. The tuner is fed with coax (RG 213) and a control line from the back of the Icom SSB wherever you plan to hide the auto-tuner. Remember, the ICOM automatic tuner is fully automatic, so you can put it completely out of sight!

We suggest you check with the dealer that sold you your transceiver to purchase the ICOM automatic tuner as well as a resonant or non-resonant whip antenna assembly. Dealers that sell ICOM equipment usually have these accessories on hand.

THE IMPORTANCE OF GROUNDING

Please read this! If you are looking for “super range” with your new Icom SSB transceiver, we have some tricks that will give you the same kind of range as globe-circling cruise ships, super tankers, solo sailors, the Navy and the Coast Guard. Surface area to the sea water and the use of copper foil exclusively throughout your RF ground system is the combination that gives you commercial-type “super range.” The sea water acts like a diving board or side of a pool for a diver and a swimmer— it gives your signal a solid surface to

push off from. This is technically called a “counterpoise”, and it’s the absolute necessary “other-half” of your antenna system that must be achieved for your overall single sideband system to work well.

It’s not that hard to develop your own sideband RF ground system in just about a day’s time, and you may even find that most of the RF ground system is already installed so you have little to do but to tie everything together with copper foil. Read on, please, and let us show you how easy it can be.

NON-TECHNICALLY SPEAKING

If you plan to have a technician or a technical friend install your sideband system, have him skip this part and begin reading at “Antenna Ground Principles, Technically Speaking.” If you plan to do the installation yourself, and this is the first one you’ve done, read on!

The water that your boat sits in is the ultimate ground counterpoise. There’s none better. Commercial AM broadcast stations on the coast usually put their giant antenna system in the mud flats of a local bay for good range.

Some boat suppliers put ground foil and ground screen in the cabin overhead. This is true on expensive powerboats, and is sometimes found in a few sailboats. While this type of overhead RF ground system is better than nothing, it still lacks the capability of coupling with the ocean or lake as the ultimate water ground system. A far better RF ground system would be the following:

- 9.3 sq. meter; 100 sq. ft. area of foil below water line
- Metal water tanks
- Lead keel
- Foil radials
- Interconnected through-hull

The whole idea is surface area— and this is why a keel bolt, underwater tanks, through-hulls, and anything else flat and next to the water does such a good job. Now we know your next question, “But doesn’t a good ground actually have to be in contact with the water?” Not at all! At radio frequencies (RF), your underwater ground counterpoise sees the water in a capacitive way, which gives just as good a ground effect as if it were actually touching the water!

Now here’s another very important point, no round wires for RF ground! Even if you use welding wire the size of your thumb, you cannot achieve a good ground counterpoise with round wire. In our “Technically Speaking” section, we’ll tell you why, but, in non-technical terms, round wires tend to cancel out at radio frequencies, and they look invisible as a ground counterpoise interconnect. This is why copper foil must be used between the chassis of your transceiver to your ship’s RF ground, as the chassis of the automatic antenna tuner to ship’s RF ground.

Your better marine electronic stores that sell ICOM equipment will also sell three-inch wide, super-thin, copper foil for grounding. In a pinch, you can use one-inch wide copper plumber’s tape. Three-inch is better. Note: A three inch strip mounted three inches away from another three inch strip of copper foil looks like a nine inch strip to a radio wave.

It’s going to take you about a day to work this foil below decks and below the water line picking up anything and

everything of ground potential. If you can get at your keel bolt, or tap a screw into the keel, your grounding is done. Lead encapsulated keels are the ultimate in grounds, and you may need nothing further.

In powerboats, since there's no keel, you're going to need to come up with at least 100 square feet of RF ground surface below the water line. This means you must pick up as many ground potentials below the water line as possible. We usually use a stainless steel hose clamp to grab each underwater metal source.

Now let's take a look at grounding from a slightly more technical point of view. Don't worry, we won't get over-technical, and it's easy to read and understand. If you're letting a technical friend or technician put in your equipment, make sure they read over this section several times. The facts here are based on hundreds of hours of doing and undoing, different types of ground systems. In all cases, following these techniques will give you the results that you want and that's long range and the loudest signal on the band.

ANTENNA GROUND PRINCIPLES, TECHNICALLY SPEAKING

The marine antenna system for low, medium, and high frequency applications will utilize both the seawater as well as radiator for its entire operation. Like two kids on a teeter-totter, the system works well if there is a balance between the antenna radiator and the seawater ground. This balanced antenna system may electrically be compared to a dipole antenna system— one-half wavelength long on the frequency band of operation with voltage and current loops equally distributed throughout the half-wave length system. In marine applications where a vertical antenna is used, this system is more precisely referred to as a Hertz antenna set-up. The white fiber glass whip is tuned to an electrical one-quarter wavelength and the ground system will make up the other one-quarter wavelength. We technically call the RF ground system a “counterpoise,” and the antenna the “radiator.”

If either a one-quarter wavelength antenna or ground system is missing or inadequate, radio reception and transmission range will be severely reduced. How good was your car radio reception when someone broke off your whip antenna? The same degradation of range also takes place when there is little or no RF ground system for antenna to work against in a marine installation.

Imagine a swimmer making a flip turn, but not having the side of the pool to push off from. The same thing happens with radio wave transmissions on single sideband. The most powerful antenna will not radiate a signal if it has not counterpoise to push off the signal from.

In technical terms, the less RF ground, the higher the radiation resistance of the antenna system. This radiation resistance will lead to substantial power loss and single sideband equipment will not only perform poorly, but also get quite hot in the transmitter section. An inadequate single sideband RF ground will also lead to “hot mikes” where the operator actually receives a radio frequency burn each time the mike is held next to his mouth. Poor RF grounding will also lead to erratic movement of analogue dial instruments, bizarre behavior of automatic pilots while transmitting on the sideband

set, and may even cause burn-outs of tiny integrated circuits in companion marine electronic gear aboard. ISOLATING YOUR RF GROUNDING SYSTEM FROM YOUR DC GROUNDING SYSTEM WILL PREVENT THESE UNWANTED OCCURRENCES.

SURFACE AREA

For marine SSB radios a good radio frequency ground system will consist of a minimum of 100 square feet of metal below the waterline. Now we know you're going to jump out of your chairs when you read this, but don't be overwhelmed. There are plenty of underwater metals that we might attach to in order to obtain this amount of counterpoise below the waterline. Lead keels encapsulated within fiber glass will make excellent surface area grounds in sailboat applications. The tough part will be getting to the lead keel or the exposed keel bolt.

In other marine installations, stainless steel tanks, copper hydraulic lines, and through-hulls, will help make up the RF ground counterpoise system.

Boat manufacturers have the capabilities of adding a terrific RF ground system when the hull is being laid up. Lightweight copper screen is one of the best ways to provide a good surface area ground. Copper screen could be laminated inside the fiber glass layers as the hull is under construction. Thin sheets of copper foil could also be used in the manufacturing process of the hull. Even the conducting mesh that holds together cement hulls can be used quite nicely as a ground counterpoise system.

Copper foil and grounding screen is available from most marine electronic distributors as well as marine electronic dealers. Thickness of the screen and foil is not important, the most common foil is generally one to four mills thick and comes in three-inch wide rolls of just about any length you want. Copper window screen (if you can find it) is usable, thickness is not important. Radio frequency energy travels on the outside of this conducting surface called skin effect, eliminating the need for thick grounding materials.

Since grounding foil and screen is relatively expensive, most boat builders will simply leave out this grounding process and expect the customer to provide their own RF ground once the boat is finished. This is a shame— it's so easy to build in when the hull is under construction, and far more difficult to add after the vessel is fully completed.

The copper foil and screen does not actually need to contact seawater in order to create the ground system. Radio frequency energy passes through fiberglass, so an encapsulated ground system works just as well as one that is actually exposed to the seawater. Encapsulated lead keels with a half-inch of resin also work well. Any RF ground system that is capacitively coupled to the seawater is enhanced by the seawater itself.

Developing the ground system for radio frequency applications (as opposed to DC grounding systems) requires that all ground connections be interlaced using copper foil. Round ground wires are out! Wires actually look like inductive trap-circuits at certain radio frequencies, and will appear invisible as an effective way of coupling your set to your ground system. That's right, copper foil must be run from below the wa-

terline ground system and attached directly to each piece of low and high frequency radio gear.

While this may also seem to be an insurmountable problem in running foil, rather than wire, foil handles quite nicely, even in tight places. The foil is easily soldered to the below waterline ground system, and then routed up the side of the hull into the area of the NAV station. It may be glassed into the hull, painted over, glued in, or even left resting on the side of the hull. The foil may be bent in order to accomplish a 90-degree turn. If the foil must absolutely pass through a small hole, it may be rolled up in a not-so-tight configuration and squeezed through the orifice. Avoid a concentric type, for that type tends to cancel oscillating radio frequencies. Flat is best.

There are several sticky marine compounds that will allow the foil to adhere to the underside of a hatch, or to the side of a hull. Almost anything will work, and there is little danger of any substantial amounts of voltage developing on your ground foil run. The ground foil and your complete RF ground system, which run inside the hull, also will not substantially change your corrosion exposure to the seawater. Galvanic corrosion problems occur when dissimilar metals are immersed in seawater. The ground system is not actually immersed, its coupling is only capacitive.

Electrolysis is another form of corrosion where stray currents may begin to eat up underwater metals. Good wiring techniques for your 12-volt system independent of your RF ground system will eliminate electrolysis.

Now let's get back to finding a spot to terminate that three-inch wide copper foil that emanates from the below waterline ground system. Most manufacturers of Loran weather fax and marine single sideband sets don't provide an easy way of adding ground foil to the stern end of their electronics! The best method is to run the foil up to the back of the equipment and use existing sheet metal screws to make a firm connection. Where a ground post stud with nuts and a washer are provided, all the better—run the foil up to the stud, double it back on itself several times for strength, punch a hole in it, and then make the connection. Never negate all your hard work of running the foil by using a small jumper wire to interconnect the foil to the radio set-up. You will be putting a "weak link" in your ground system at radio frequencies.

We usually accordion up the excess foil in back of the equipment so that we might remove the equipment for servicing with the foil attached. If you put the bends in the right spot, the foil will resume its natural collapsed state when the equipment is put back in place. Watch out for the sharp corners on the ground foil, they are capable of piercing through the plastic protective covering on electrical wires. Make sure that red and black voltage carrying wires are not allowed to rub up against the side of the ground foil.

We usually ground everything with foil at the navigation station. This would include the casing of the wind and speed equipment, pilot control box, GPS, sideband, radar, VHF, and just about everything else that lights up. The more grounding you provide for your central electronics, the less problems you will have with stray RF.

The ground foil must also run to remote tuners. This includes the ICOM single sideband tuner that's usually several feet away from the equipment. These tuners may be all the way back aft, adding another dimension to your ground foil run.

It's best to run the foil from the RF ground source directly to your tuner, rather than stringing everything out in series like Christmas tree lights. Now picture one ground foil run from the keel bolt to the electronics, and a second ground foil run from the keel bolt back aft to the sideband tuner and your stern-mounted Loran whip. These tuner ground circuits are mandatory for any type of reliable operation. If you try to run an ICOM sideband set with a remote tuner that is under-grounded, you stand the chance of not only burning up your equipment, but also damaging other electronics onboard with stray RF. If it's not easy to run ground foil from your central below the waterline ground source back aft, then try to figure out another way to do it. It has to be done!

You can also pick up additional ground counterpoise surface area by adding substantial metals along the way in your copper foil run. Stainless steel hose clamps make it easy to pick up through-hull bronze fittings, water tanks, copper hydraulic lines, and anything else that may give you some additional underwater surface area.

Mariners with sailboats with poured incapsulated lead keels as well as metal hull vessels have the easiest time in obtaining a good ground counterpoise. If the keel is visible, a second nut on the exposed thread will anchor on the ground foil. We usually seal this connection to prevent deterioration from the bilge water. It may also be recommended by local experts to tie in the aluminum mast to this close proximity keel bolt for lightning protection. The run from the mast to the keel bolt must be smooth, direct, and without sharp turns in order to pass lightning energy effectively into the underwater lead. Again, consult local lightning experts.

Steel-hulled vessels are easily attached to with foil by scraping away any protective coating from the hull, and making a low resistant good surface area contact. Again, seal this connection well. Non-metal hull or keel boats require yards and yards of foil to be run below the waterline, anywhere you can, and picking up any other large below the waterline tanks and tubes.

SUMMARY

If you follow these steps, you will have an outstanding single sideband signal that can be heard around the world. The difference between a good and bad ground is easily noticed on transmission as well as reception. Since your ground counterpoise is actually a part of your complete antenna system, pay just as much attention to RF grounding as you did to putting up that white fiber glass whip or installing to your insulated backstay.

Count on us!

Icom America Inc.

<Corporate Headquarters>
2380 116th Avenue NE, Bellevue, WA 98004, U.S.A.
Phone: +1 (425) 454-8155 Fax: +1 (425) 454-1509
URL: <http://www.icomamerica.com>
E-mail: sales@icomamerica.com
<Customer service>
Phone: (425) 454-7619

Icom (Europe) GmbH

Communication Equipment
Himmelgeister Str. 100,
D-40225 Dusseldorf, Germany
Phone: +49 (0211) 346047 Fax: +49 (0211) 333639
URL: <http://www.icomeurope.com>
E-mail: info@icomeurope.com

Icom Canada

Glenwood Centre #1150-6165 Highway 17, Delta,
B.C., V4K 5B8, Canada
Phone: +1 (604) 952-4266 Fax: +1 (604) 952-0090
URL: <http://www.icomcanada.com>
E-mail: info@icomcanada.com

Icom Spain S.L.

Ctra. Rubi, No. 88 "Edificio Can Castanyer"
08190, Sant Cugat del Valles, Barcelona, Spain
Phone: +34 (93) 590 26 70 Fax: +34 (93) 589 04 46
URL: <http://www.icomspain.com>
E-mail: icom@icomspain.com

Icom (Australia) Pty. Ltd.

Unit 1/103 Garden Road, Clayton Victoria, 3168,
Australia
Phone: +61 (03) 9549 7500
Fax: +61 (03) 9549-7505
URL: <http://www.icom.net.au>
E-mail: sales@icom.net.au

Icom (UK) Ltd.

Unit 9, Sea St., Heme Bay, Kent, CT6 8LD, U.K.
Phone: +44 (01227) 741741
Fax: +44 (01227) 741742
URL: <http://www.icomuk.co.uk>
E-mail: info@icomuk.co.uk

Icom New Zealand

146A Harris Road, East Tamaki, Auckland,
New Zealand
Phone: +64 (09) 274-4062 Fax: +64 (09) 274-4708
URL: <http://www.icom.co.nz>
E-mail: inquiries@icom.co.nz

Icom France s.a.s.

Zac de la Plaine,
1 Rue Brindejonc des Moulinais, BP 45804,
31505 Toulouse Cedex 5, France
Phone: +33 (5) 61 36 03 03
Fax: +33 (5) 61 36 03 00
URL: <http://www.icom-france.com>
E-mail: icom@icom-france.com

Asia Icom Inc.

6F No. 68, Sec. 1 Cheng-Teh Road, Taipei, Taiwan,
R.O.C.
Phone: +886 (02) 2559 1899
Fax: +886 (02) 2559 1874
URL: <http://www.asia-icom.com>
E-mail: sales@asia-icom.com

Icom Polska

Sopot, 3 maja 54, Poland
Phone: +48 (58) 550 7135 Fax: +48 (58) 551 0484
URL: <http://www.icompolska.com.pl>
E-mail: icompolska@icompolska.com.pl

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