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SECTION I INTRODUCTION

SYNTHESIZED HAND HELD TRANSCEIVER

The ICOM IC-M12 is a very compact VHF synthesized hand held transceiver. Using the latest in electronic design, the IC-M12 offers diode programming for frequency selection, eliminating the need, expense and delay in changing the channel configuration. Channels are easily installed or changed, any time, at your marine dealer, by changing diode positions on the matrix board. Offering rugged construction, extreme stability and frequency accuracy, the IC-M12 will give you years of troublefree operation.

VARIOUS POWER PACKS AVAILABLE

The Power Pack is slipped on the bottom of the radio very easily, and various power packs are available to suit your needs, for minimum size or longer use.

HIGHLY EFFICIENT FLEXIBLE ANTENNA

A highly efficient flexible antenna is supplied with the set. When the antenna is removed, its connector can be used for an external antenna connector.

SECTION II SPECIFICATIONS

GENERAL

Number of Semiconductors Transistors 41

FET 3

IC 5

Diodes 15 (not including diodes on the matrix board)

Number of Channels 12 programmable channels

Operation Simplex, Semi-duplex

Channel Spacing 25 KHz

Frequency Stability 0.0005 Percent

Usable Temperature —20 Degrees C to 60 Degrees C

(-4 Degrees F to 140 Degrees F)

Antenna Impedance 50 ohms unbalanced

Power Supply Requirement DC 8.4V; with attendant power pack IC-CM3, DC 6 to 12V

negative ground is acceptable

Current Drain at 8.4V Transmitting

At 1 watt output Approx. 350mA

Receiving

At max audio output Approx. 130mA

Squelched Approx. 25mA

Dimensions 116.5mm(H) x 65mm(W) x 45mm(D) without power pack

Attendant power pack, IC-CM3: 49mm(H) x 65mm(W) x 35mm(D)

Weight 510g including power pack, IC-CM3 and flexible antenna

RECEIVER

Frequency Range $156.3 \sim 157.425 \text{MHz}$ and $160.875 \sim 162.550 \text{MHz}$

Receiving System Double-conversion superheterodyne

Modulation Acceptance 16F₃ ±7.5KHz Intermediate Frequency 1st: 10.695MHz

2nd: 455KHz

Sensitivity Less than $0.5\mu V$ for 20dB Noise quieting

Less than $0.4\mu V$ for 12dB SINAD

Squelch Sensitivity Less than $0.4\mu V$ Spurious response rejection ratio More than 50dB

Selectivity More than 65dB at adjacent channel

Intermodulation Rejection Ratio More than 60dB

Audio Output Power More than 300mW at 10% distortion

Audio Output Impedance 8 ohms

TRANSMITTER

Frequency Range 156.3 \sim 157.425MHz

Output Power 1 Watt Emission Mode 16F₃

Modulation System Variable reactance frequency modulation

Max. Frequency Deviation ±5KHz

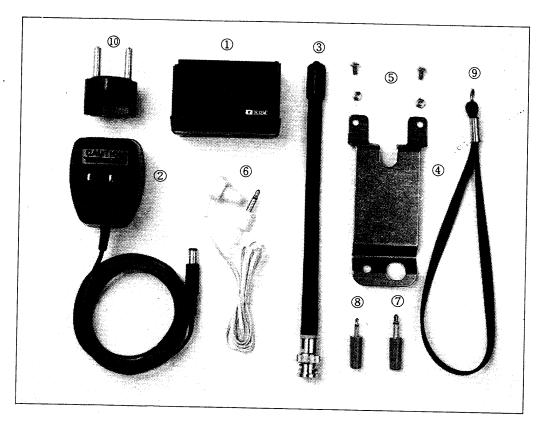
Spurious Emission More than 57dB below carrier

Microphone Built-in Electret condenser microphone

Optional Speaker-microphone (IC-CM9) can be used

SECTION III ACCESSORIES

Carefully remove your transceiver from the packing carton and examine it for signs of shipping damage. Should any be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. It is recommended that you keep the shipping cartons. In the event storage, moving, or reshipment becomes necessary, they come in handy. Various accessories are packed with the transceiver. Make sure you have not overlooked anything.



Power pack IC-CM3	
(attached to the set)	
Wall charger CM-25U/E	•
	1
	1
* CM-25U for 117V AC	•
CM-25E for 240V AC	
** 117V AC version is not included	
	(attached to the set) Wall charger CM-25U/E Flexible antenna Belt clip. Belt clip retaining screws. Earphone. Earphone plug Microphone plug. Hand-strap. AC conversion plug** * CM-25U for 117V AC CM-25E for 240V AC

SECTION IV PRE-OPERATION

BATTERY INSTALLATION

When using Nickel-Cadmium power pack IC-CM3:

The IC-CM3 is a rechargeable Nickel-Cadmium power pack, and it can be slipped onto or off of the set very easily. It has a connector for a charger charger-current control circuit, reverse polarity protection circuit and charge indicator LED in its own pack. You can use the supplied CM-25U/E wall charger or similar simple wall charger, or a 12V battery by using optional cable IC-CM1 for recharging. Before use, the power pack should be charged about 15 hours, because the battery may have discharged.

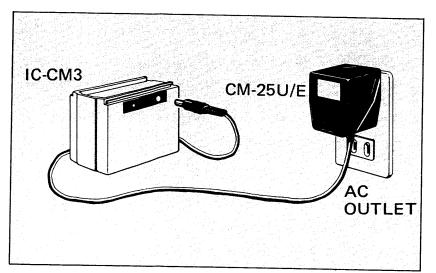
After charging is completed, the batteries can be used in the same manner as dry cells. However, the voltage of Nickel-Cadmium batteries drops rapidly just before they are exhausted, so when the Transmit Indicator LED of the transceiver goes out, be sure to immediately stop using it, and recharge the batteries again.

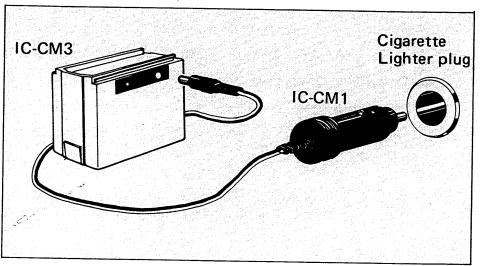
HOW TO CHARGE (When using Nickel-Cadmium power pack IC-CM3)

- 1. Use the supplied wall charger CM-25U/E or a stable power source with an output voltage of 13.8V DC and current capacity over 50mA, or use a 12V battery with optional charger cable IC-CM1. (Output voltage of $12\sim15V$ can be used, but output voltage near the specified voltage should be used.)
- 2. The power switch of the transceiver must be OFF, or remove the power pack from the transceiver.

3. Connect the output plug of the wall charger (CM-25U/E), or other power source, to the charger socket of the power pack. (When charging Nickel-Cadmium batteries in the IC-CM4 power pack, you should use the CM-30 charger only.)

The charge indicator LED of the power pack is lit, which shows that the charger is working.





4. It takes about 15 hours to charge the batteries completely. This charger is designed for 0.1C (10-hour rate current), but charge for 15 hours in order to compensate for any unbalance of the batteries.

You should charge the batteries for 15 hours when you have not used them for a long time or after buying them.

- 5. Charge between 0°C and 40°C.
- 6. Avoid continuing charging as much as possible after full charging, (15 hours). If excess charging is repeated, efficiency of the power pack is reduced.
- 7. After charging, unplug the power source from the charger socket of the power pack. The transceiver and the power pack are now ready for operation.

PRECAUTIONS FOR USE OF THE NICKEL-CADMIUM BATTERIES (from the JIS C8705 MANUAL)

General Cautions

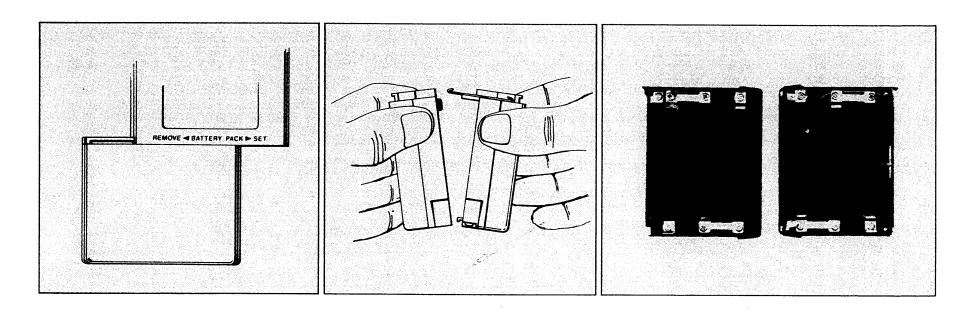
- 1. Never short the power pack.
 - Since internal resistance is low, excess shorted current flows away, causing the batteries or conductors to burn. Avoid shorts! A label showing polarity is on the power pack.
- 2. Never solder the batteries directly.
 - If the batteries are soldered directly, the separator or insulator may become melted and damaged. Accordingly, the terminal must be spot-welded first and then soldered.
- 3. Confirm polarities in order to prevent reverse charging.

 If they are charged in reverse, batteries may be damaged. Therefore confirmation of correct polarity is essential, to proper operation.
- 4. Never charge with excess charging current.
 - If an excess charging rate is employed, gas consumption speed cannot keep up with gas generating speed at the time of charging. Batteries may be damaged by increasing internal pressure. Accordingly, the charging must be kept regulated.
- 5. Avoid charging under 0°C or over 40°C.

 Under 0°C, since gas consumption speed becomes lower at the charging time, inside pressure increases and hydrogen is generated. Since charging efficiency is reduced over 40°C, it is rather difficult to charge. Accordingly, charging must be done between 0°C and 40°C.
- 6. Never put batteries into fire.
 - Since there may be a little gas left in the batteries, internal pressure increases suddenly and the batteries explode if thrown into a fire. Also, battery electrolyte is ejected and can cause damage to skin and clothes.

When using the alkaline power pack IC-CM 4:

Place the power switch in the OFF position. Remove the power pack from the bottom of the set by pushing the pack in the indicated direction. Separate the pack into two parts (cases) as follows:



Each case holds three AA type batteries. Install batteries into each case, according to indicated polarity. With the batteries properly in place, carefully replace the pack and slip it onto the set with the reverse procedure.

Also, AA type Nickel-Cadmium, rechargeable, batteries can be used. But the charger for them should be the optional CM-30 charger.

WHEN TO REPLACE BATTERIES (When using alkaline batteries)

When the Transmit Indicator LED does not light up during transmission, the batteries are exhausted. Use batteries of the same type, for mixed types might cause leakage. Replace worn batteries with a complete new set. If used with old batteries, the life of new ones might be shortened. Battery life is shortened more by transmitting than by receiving, since several times more current is drawn during transmission. To prolong battery life, therefore, practice the following:

- * Try to minimize the transmit period.
- * Reduce volume during reception.
- * Be sure to cut off power source when set is not used.

More working hours are available if high-performance batteries are employed.

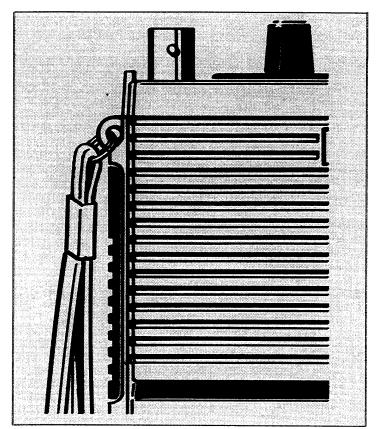
FOR USE

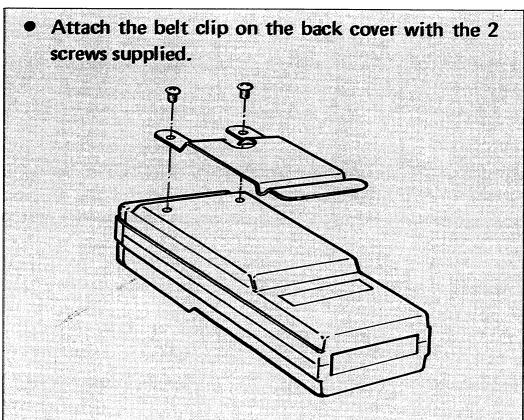
- 1. Attach the supplied power pack. (Refer to "BATTERY INSTALLATION")
- 2. Attach the supplied hand strap and belt clip through the fixture on the body (as shown in the drawings on page 10.)
- 3. Attach the flexible rubber antenna or connect an external antenna.

EXTERNAL ANTENNA

- 1. Select a high performance antenna and set it up in the highest possible position.
- 2. Use a 50 ohm antenna and coaxial cable.
- 3. On VHF, the power loss in the antenna cable is large, so use a cable with the lowest possible loss and make it as short as possible.
- 4. Use a BNC plug for connection to the unit.

ATTACHMENT OF HAND STRAP AND BELT CLIP





CHANGE OR ADDITION OF CHANNELS

The design of your ICOM Marine Radiotelephone provides an inexpensive means for expanding channel capability. The services of a dealers technician is required for installation and alignment. The additional channel(s) you require may be placed anywhere on the dial you choose. Additional weather channels can also be installed on the channels G, H, I and WX.

LICENSES REQUIRED

1. Ship Station License

Your craft, when equipped with VHF/FM equipment, has a radio station on board which, if used, must have a current license. It is unlawful to operate a Ship Station which is not licensed. Inquire through your dealer or appropriate government agency for an application for a Ship Radio-Telephone license. Your craft station will be issued a call sign.

2. Operators License

A Restricted Radiotelephone Operator Permit is the license most often held by small vessel radio operators if a radio is not required for safety purposes. You can usually obtain this permit by mail without examination. Again, contact your marine dealer or appropriate government agency for information or application.

The Restricted Radiotelephone Operator Permit must be posted or kept on the person of the operator. Only a licensed radio operator may operate a radiotelephone transmitter. However, non-licensed individuals may talk over a radiotelephone if a licensed operator starts, supervises, ends the call, and makes necessary log entries.

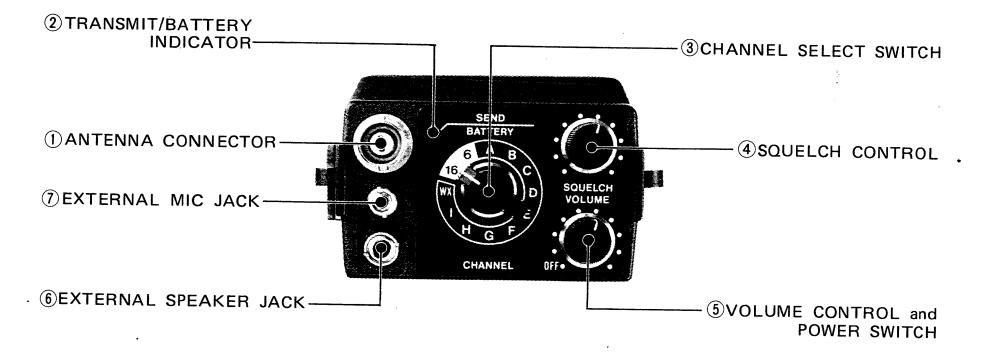
A current copy of the appropriate government agency rules and regulations is usually required to be kept.

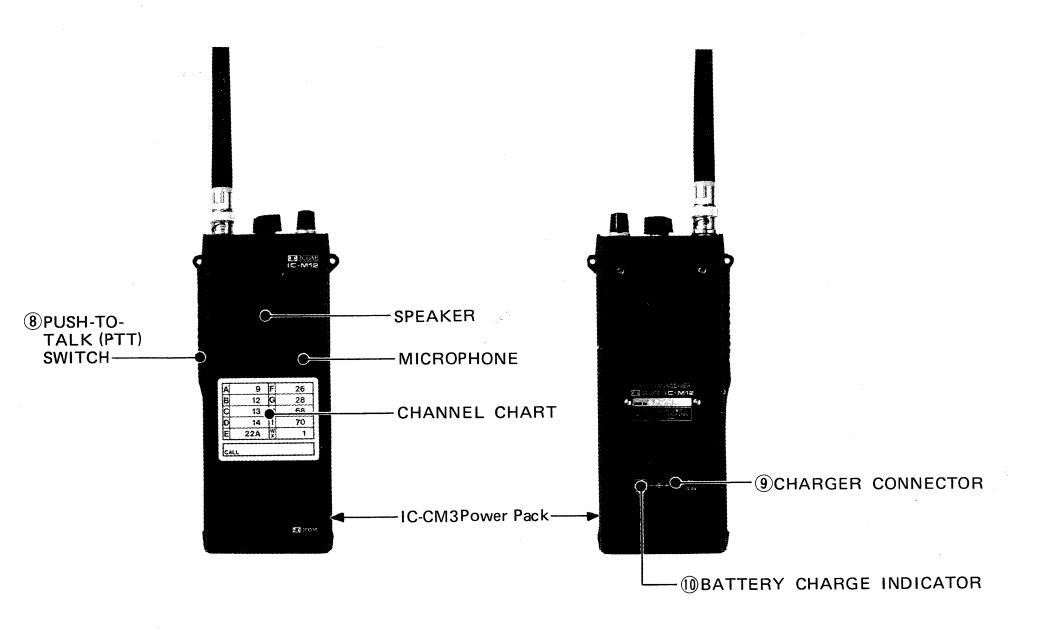
LOGS AND DOCUMENTS

Most countries require that a log of all contacts made over the Radiotelephone be kept. The Ship Radiotelephone Station licensee is the person responsible for compliance.

SECTION V CONTROL FUNCTIONS

TOP PANEL





1 ANTENNA CONNECTOR

Connect the supplied flexible antenna. An external antenna can be used, using a BNC connector.

2 TRANSMIT/BATTERY INDICATOR

Illuminates in the transmit mode. Also indicates the battery condition; during transmission. The voltage of Nickel-Cadmium batteries drops rapidly just before they are exhausted, so when this indicator goes out, be sure to immediately stop using it, and charge the batteries again.

③ CHANNEL SELECT SWITCH

Selects one of the programmed channels.

4 SQUELCH CONTROL

Sets the squelch threshold level. To turn OFF the squelch function, rotate this control completely counterclockwise. To set the threshold level higher, rotate the control clockwise.

⑤ VOLUME CONTROL and POWER SWITCH

When the control is turned completely counterclockwise, the power is OFF. By turning the control clockwise beyond the "click", the unit is turned ON and the audio level increases by further rotating it clockwise.

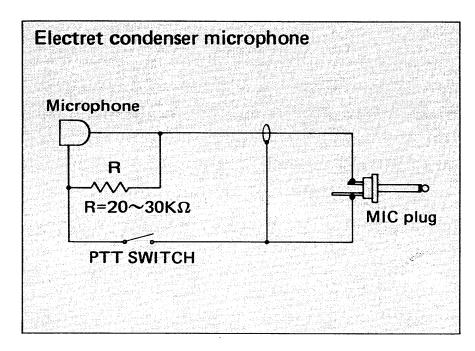
6 EXTERNAL SPEAKER JACK

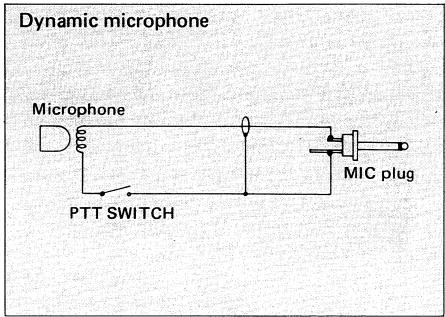
When an external speaker (or an earphone) is used, connect it to this jack. Use a speaker with an impedance of 8 ohms. When the external speaker is connected the built-in speaker does not function.

TEXTERNAL MIC JACK

When an external microphone is used, connect it to this jack. See the schematic for the proper

hookup. When the external microphone is connected the built-in microphone does not function. The IC-CM9 optional speaker-microphone can also be used.





PUSH TO TALK (PTT) SWITCH

For transmission, press this switch and talk into the microphone with normal voice. The internal microphone is of the electret-condenser type and provides good pickup for all levels of voice.

- 10 BATTERY CHARGE INDICATOR Lights during battery charging.

SECTION VI OPERATION

RECEIVING

Make sure the ⑤ VOLUME CONTROL and POWER SWITCH is in the OFF position, and before turning ON the power switch, confirm as follows:

- 1. Make sure the power pack is properly charged and attached to the set.
- 2. Make sure the supplied flexible antenna is properly set.

 When an external antenna is employed, make sure the coaxial line is of the correct impedance (50 ohms) and is neither shorted nor opened, and is firmly connected to the antenna connector.

Set the controls and switches as follows:

SQUELCH CONTROL
 Completely counterclockwise

5 VOLUME CONTROL and POWER SWITCH Completely counterclockwise (OFF position)

③ CHANNEL SELECT SWITCH Desired channel

Turn the ⑤ VOLUME CONTROL and POWER SWITCH clockwise (it will "click" ON) to a comfortable audio level.

If only noise can be heard and no signal, turn the 4 SQL control clockwise until the noise from the speaker stops and set it just below this threshold. (When adjusting the SQL setting, if some communication signals can be heard, turn the CHANNEL SELECT switch and set it where only noise can be heard.) You transceiver will now remain silent until an incoming signal is received which opens the squelch. If the squelch is unstable due to the reception of weak signals, adjust the squelch control further until the proper threshold is obtained.

If you wish to monitor one of the channels installed, simply rotate the Channel Select switch to the proper channel.

If you wish to monitor the Weather channel, simply set the Channel Select switch to the weather (WX) channel (or the letter channel with weather channel installed).

TRANSMITTING

Set the controls and switches at the same positions as receiving.

Rotate the Channel Select Switch until you find an empty channel that can be used for the type of communication you wish. Be sure the channel is open.

Then set the Channel Select switch to the Channel 16, and after confirming that it is open, call the party you wish to contact. When contact is made, go to the channel you checked before. (Don't turn the Channel Select switch during transmission.)

Hold the transceiver fairly close to your mouth. Depress the ® PTT switch and speak in a clear, natural voice. When you have finished your part of the conversation, release the PTT switch, and the radio will receive.

When your conversation is completely finished, set the Channel Select switch to the Channel 16.

SECTION VII OPERATING RULES AND GUIDELINES

Prevent Interference

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

Call Procedures

Calls must be properly identified and time limits must be respected.

- 1. Give your call sign each time you place a call to another vessel or a coast station. (If a call sign has not been assigned, identify the station by announcing the vessel name and the name of the licensee.)
- 2. Give your call sign at the end of each transmission of more than 3 minutes duration.
- 3. You must break and give your call sign at least once every fifteen minutes during long ship to shore calls.
- 4. Keep your unanswered calls short (less than thirty seconds) and do not repeat a call for two minutes.
- 5. Unnecessary Transmissions are not allowed.

Priorities

Read all the rules and regulations pertaining to priorities and keep an up-to-date copy handy. Safety and Distress take priority over all others.

You must monitor and be able to transmit on 156.8MHz, Channel 16.

False or fraudulent distress signals are prohibited and punishable by law!

Privacy

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

Logs

Use of this equipment required entry of the watch period of 156.8MHz (CH 16) by the operator with vessel name, call sign and operator signature. All distress, emergency, and safety messages must be recorded in complete detail. Log date activity is usually recorded in 24 hour time. Universal Time (formerly GMT) is frequently used.

Adjustments, repairs, channel frequency changes and authorized modifications affecting electrical operation of the equipment must be kept in the equipment log and entries signed by the authorized licensed technician performing or supervising the work. This is done in the equipment log, a small section is included in the back of this manual. Contacts are recorded in a communication log. A sample of what would be on the page is shown below.

DATE/TIME	CHANNEL	VESSEL	REMARKS	OPERATOR

Channel usage

A channel selection system, frequency-usage, has been internationally adapted for the marine VHF band. Each frequency within the spectrum has been assigned a channel number, for example, 156.300 is Channel 6. Specific purposes have been assigned to each channel under this system i.e. inter-ship between two vessels and ship-to-shore. Geographical locations have specific channels assigned for use with the land telephone system.

Your selection of channels to be installed should be based on the type of contacts you plan to make within the areas you live or travel to. The chart on the following pages will aid this selection.

Each geographical area has specific channels assigned to it for use with the land telephone system.

Be sure to review the channels you should have installed in your radio to give you the capability to make the type of contacts you want in the area where you live or plan to travel.

Study the chart on the following pages, showing the available channels and their usage.

Dead Spots

Topography may prevent reception and/or transmission from some locations. Move to another location if you find a "dead spot".

Routine Maintenance

Your ICOM transceiver is designed to provide high quality performance for many years if cared for in a proper manner. Each year you should have the following checked by a licensed technician to verify your unit's performance.

- 1. Check antenna system.
- 2. Verify transmitter frequency, deviation, and power output.

SECTION VIII MARINE VHF RADIOTELEPHONE CHANNEL FREQUENCIES

							Fur	nction	
Channel	Ship Transmit	Ship Receive	Mode S/D	Only Intl		USCG	Ship - Ship	Ship to Shore	Type of Operation
1 2 3 4 5	156.050 156.100 156.150 156.200 156.250	160.650 160.700 160.750 160.800 160.850	D D D	yes yes yes yes yes			no no no no	yes yes yes yes yes	Public Correspondence, Port Operation Public Correspondence, Port Operation Public Correspondence, Port Operation Public Correspondence, Port Operation Public Correspondence, Port Operation
6 7 7A 8 9	156.300 156.350 156.350 156.400 156.450	156.300 160.950 156.350 156.400 156.450	S D S S S		yes yes yes		yes no yes yes yes	no yes yes no yes	Safety Public Correspondence, Port Operation Port Operation Intership Port Operation
10 11 12 13 14	156.500 156.550 156.600 156.650 156.700	156.500 156.550 156.600 156.650 156.700	S S S S S		yes yes	·	yes yes yes yes	yes yes yes yes yes	Port Operation Port Operation Port Operation Bridge to Bridge, (1W) Navigational Port Operation
15 16 17 18 18A	156.800 156.850 156.900 156.900	156.750 156.800 156.850 161.500 156.900	S S D S	yes	yes		Rcv yes no no yes	Rcv yes yes yes yes	Recv Only - Coast to Ship Calling & Safety State Controlled - Ship to Coast (1W) Port Operation Port Operation
19 19A 20 21 21A	156.950 156.950 157.000 157.050 157.050	161.550 156.950 161.600 161.650 157.050	D S D D S	yes yes	yes	yes	no yes no no yes	yes yes yes yes yes	Port Operation Port Operation Port Operation Port Operation Port Operation Port Operation (USCG)
22 22A 23 23A 24	157.100 157.100 157.150 157.150 157.200	161.700 157.100 161.750 157.150 161.800	D S D S D	yes yes		yes yes	no yes no yes no	yes yes yes yes yes	Port Operation Port Operation (USCG) Public Correspondence Port Operation (USCG) Public Correspondence
25 26 27 28	157.250 157.300 157.350 157.400	161.850 161.900 161.950 162.000	D D D				no no no no	yes yes yes yes	Public Correspondence Public Correspondence Public Correspondence Public Correspondence

							Fui	nction	
Channel	Ship Transmit	Ship Receive	Mode S/D	Only Intl	Only Com	USCG	Ship - Ship	Ship to Shore	Type of Operation
60 61 62 63 64 65	156.025 156.075 156.125 156.175 156.225 156.275	160.625 160.675 160.725 160.775 160.825 160.875	D D D D	yes yes yes yes yes yes			no no no no no	yes yes yes yes yes	Public Correspondence, Port Operation
65A 66 66A 67 68	156.275 156.325 156.325 156.375 156.425	156.275 160.925 156.325 156.375 156.425	S D S S	yes	yes		yes no yes yes yes	yes yes yes no yes	Port Operation Public Correspondence, Port Operation Port Operation Port Operation Port Operation Port Operation
69 70 71 72 73	156.475 156.525 156.575 156.625 156.675	156.475 156.525 156.575 156.625 156.675	\$ \$ \$ \$ \$				no yes no yes yes	yes no yes no yes	Port Operation Intership Intership, Port Operation Intership Port Operation
74 77 78 78A 79	156.725 156.875 156.925 156.925 156.975	156.725 156.875 161.525 156.925 161.575	S S D S	yes yes	yes	(e ¹⁷⁷	yes yes no no no	yes no yes yes yes	Port Operation Intership Port Operation Port Operation Port Operation
79A 80 80A 81 81A	156.975 157.025 157.025 157.075 157.075	156.975 161.625 157.025 161.675 157.075	S D S D S	yes yes	yes yes	yes	yes no yes no yes	yes yes yes yes yes	Port Operation Port Operation Port Operation Port Operation Port Operation Port Operation (USCG)
82 82A 83 83A 84	157.125 157.125 157.175 157.175 157.225	161.725 157.125 161.775 157.175 161.825	D S D S D	yes yes		yes yes	no yes no yes no	yes yes yes yes	Port Operation, Public Correspondence Port Operation (USCG) Public Correspondence Intership, Port Operation (USCG) Port Operation, Public Correspondence
85 86 87 88 88 A	157.275 157.325 157.375 157.425 157.425	161.875 161.925 161.975 162.025 157.425	D D D S	yes	yes		no no no no yes	yes yes yes yes no	Public Correspondence Public Correspondence Public Correspondence Public Correspondence Intership
WX1 WX2 WX3 WX4(21R)		162.550 162.400 162.475 161.650					Rcv Rcv Rcv Rcv	Rcv Rcv Rcv Rcv	NOAA Weather (Recv Only) NOAA Weather (Recv Only) NOAA Weather (Recv Only) Canada Weather (Recv Only)

TRANSMITTER LOG

The second second			

TRANSMITTER LOG

	Date						
Transmitter RF Power Output							
Transmitter Deviation							
Transmitter Frequency CH16							
Transmitter Frequency CH6							
TECHNICIAN SIGNATURE, ADDRESS, FCC LICENSE NO., EXPIRATION DATE							
EXPIRATION DATE							

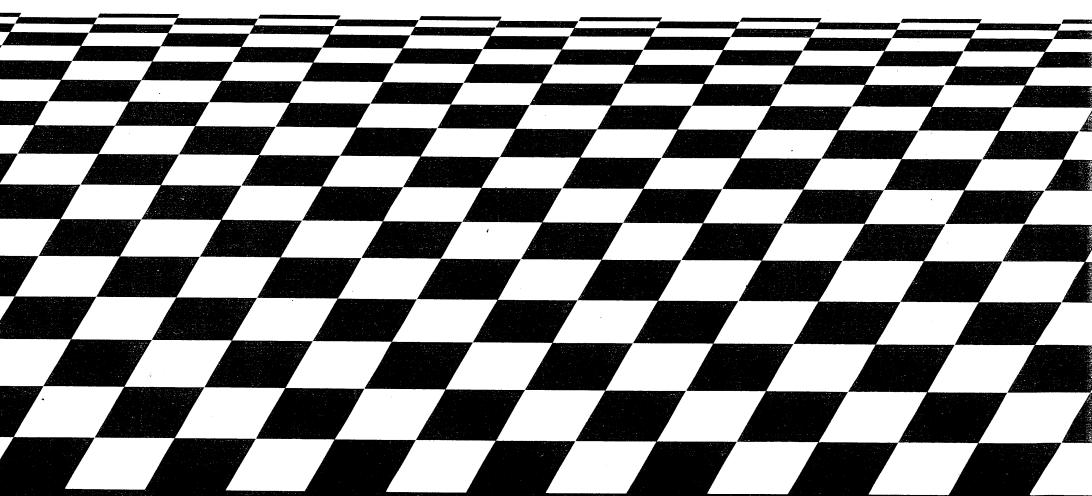
EMERGENCY USE

If your vessel requires assistance, attract the attention of other vessels and the Coast Guard by sending a distress message on Channel 16.

Procedures for sending a distress signal.

- 1. MAYDAY, MAYDAY (repeat three times)
- 2. THIS IS (name of the vessel)
- 3. LOCATED AT (gives position)
- 4. Give the reason for the distress call.
- 5. Explain what assistance you need.
- 6. Give additional information to help those come to your assistance, (vessel length, color, type, etc.)
- 7. Use Channel 16 only to make initial contact.
- 8. After making initial contact agree on an alternate frequency, such as Channel 22A or Channel 6 and clear Channel 16 for other traffic.





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