

FURUNO

**MARINE VHF
RADIOTELEPHONE**

OPERATOR'S MANUAL

model **FM-2520**



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FM-2520

• Your Local Agent/Dealer

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SAFETY INSTRUCTIONS

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



DANGER

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



WARNING

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



CAUTION

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

SAFETY INFORMATION FOR THE OPERATOR

WARNING



Do not open the cover of the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death. Only qualified personnel should work inside the equipment.

Do not disassemble or modify the equipment.

Fire, electrical shock or serious injury can result.

WARNING

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

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



Do not touch the antenna wire when transmitting.

Transmission high voltage can shock, burn, or cause death.



SAFETY INFORMATION FOR THE OPERATOR



CAUTION

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

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

Do not place heater near the equipment.

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

Do not operate the unit with wet hands.

Electrical shock can result.

Use the correct fuse.

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



SAFETY INFORMATION FOR THE INSTALLER



WARNING



Only qualified personnel should work inside the equipment.

This equipment uses high voltage electricity which can shock, burn, or cause death.

Turn off the power at the ship's mains switchboard before beginning the installation. Post a warning sign near the switchboard to ensure that the power will not be applied while the equipment is being installed.

Serious injury or death can result if the power is not turned off, or is applied while the equipment is being installed.



CAUTION



Ground the equipment.

Ungrounded equipment can give off or receive electromagnetic interference or cause electrical shock.

Confirm that the power supply voltage is compatible with the voltage rating of the equipment.

Connection to the wrong power supply can cause fire or equipment damage. The voltage rating appears on the label at the rear of the equipment.

A WORD TO FM-2520 OWNERS

Congratulations on your choice of the Furuno FM-2520 MARINE VHF RADIOTELEPHONE ! We are confident that you will enjoy many years of trouble-free operation with this fine piece of equipment.

For over 40 years Furuno Electric Company has enjoyed an enviable reputation for quality and reliability throughout the world. This dedication is furthered by our extensive global network of agents and dealers.

Your Equipment is designed and constructed to provide commercial grade performance and reliability, yet affordable for pleasure craft owners.

Please carefully read this owner's manual and follow the recommended procedure for installation, operation and maintenance. With proper care, Your Equipment should provide years of enjoyable and dependable communications.

Thank you for considering and purchasing Furuno product.

FEATURES

- 25W RF output from an ultra-compact and solid cast-aluminum cabinet : may be mounted in any small space.
- Perfect interference rejection and minimum receiver distortion with the newest GaAs FET mixer.
- Pre-programmed with all international marine channels.
- Memory of most-often used 10 channels for quick selection.
- Dual watch for channel 16 and another channel.
- Auto scan where authorized by the administrations.
- Large high-contrast LCD display and keyboard with a dimmerable backlight facility ; easy-to-read for day and night.
- Advanced commercial grade design and components

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SPECIFICATIONS

GENERAL

Communication System :	Simplex or semi-duplex		
Class of Emission :	Frequency modulation with a preemphasis of 6dB/oct (Phase modulation)		
Channel Spacing :	25kHz		
Frequency Stability :	±1.5kHz		
Operating Temperature Range :	-15°C to +55°C		
Antenna Impedance :	50 ohms		
Power Supply :	12VDC +30%/-10%		
Current Drain :	Stand-by	Receive	Transmit
	0.34A	0.52A	5.5A
Dimensions and Weight :	135 (W) x 45 (H) x 170 (D) mm,		0.95 kg
	5.34" (W) x 1.78" (H) x 6.72" (D),		4.6 lbs.
Memory Backup Period :	More than 3 years		

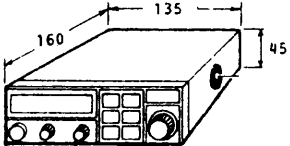
RECEIVER

Frequency Range :	155.000MHz to 162.025MHz
Receiving System :	Double superheterodyne
Intermediate Frequency :	1st. 16.9MHz 2nd. 455kHz
Sensitivity :	Less than $-6\text{dB } \mu$ ($0.5 \mu\text{V}$) for 20dB SINAD
Selectivity :	-70dB
Spurious Response Rejection :	-70dB
Intermodulation :	70dB
Squelch Sensitivity :	Threshold ; $-8\text{dB } \mu$ ($0.4 \mu\text{V}$) Tight ; $1\text{dB } \mu$ ($1.1 \mu\text{V}$)
Audio Output :	Internal ; 0.5W into 8-ohm speaker External ; 4W into 4-ohm speaker
Harmonic Distortion :	Less than 10%

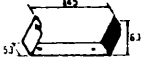

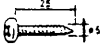

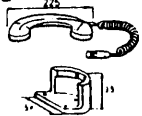
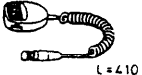

TRANSMITTER

Frequency Range :	155.000MHz to 161.400MHz
RF Output Power :	25W (HI), 1W (LOW) switchable Automatic power reduction on some specific channels as required by regulations
Frequency Deviation :	±5kHz max.
Spurious Emissions :	Less than 0.25 μ W
Harmonic Emissions :	80dB below carrier level
Modulation AF Response :	Modulation index within +1dB or -3dB relative to its value at 1000Hz for modulation frequencies 300 to 3000Hz (constant deviation)
Audio Frequency Distortion :	Less than 10% for ±3kHz deviation (at 1000Hz)

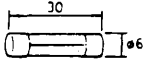
COMPLETE SET

NO	NAME	TYPE	Q'TY	1
1	Transceiver Unit	FM-2520	1	
2	Accessories	FP05-01300/01310/01320	1 set	
3	Spare Parts	SP05-01600	1 set	
4	Installation Materials	CP05-02100	1 set	

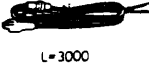
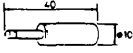
ACCESSORIES

NO	NAME	TYPE	CODE	Q'TY	1	2.3.4
1	Hanger Bracket	FP05-01301	005-368-030	1		
2	Knob Screw	05-024-0124	100-076-110	2 sets		
3	Knob Washer	05-024-0123	100-076-100			
4	Nylon Washer	TM-137 No.6	000-801-575		5.6	
5	Tapping Screw	5x25 SUS304	000-867-553	2		
6	Flat Washer	M5 SUS304	000-864-128	2		
7a	Handset (Europe) & Hanger	HS-6000FZ5	000-112-623	1		
		FP05-01311	005-011-950	2		
7b	Microphone	DM1620FZ1	000-112-622	1		
7c	Noise Canceller Mic.	M112D4509910	000-113-344	1		

SPARE PARTS

NO	NAME	TYPE	CODE	Q'TY	1
1	Fuse	FGB010A125Vac	000-549-065	2	

INSTALLATION MATERIALS

NO	NAME	TYPE	CODE	Q'TY	1	2
1	Power Cable	05S0388	000-111-061	1		
2	US Plug (ext. spkr)	PJ-2240-P	000-110-961	1		

OPTION

NO	NAME	TYPE	CODE	REMARKS
1	Whip Antenna	150M-W2VN	000-113-498	w/bracket
2	Coaxial Cable	5D-2V (White Sheath)	000-111-063	10 meter long
			000-111-064	20 meter long
3	Rectifier	PR-101	000-053-754	IN : 110/220Vac, OUT : 13.8Vdc
4	DC-DC Converter	PC-208	000-053-761	IN : 24Vdc, OUT : 12Vdc
5	External Speaker	HCB100D	000-113-352	4 ohms, 4W
6	Microphone	DM1620FZ2	000-113-500	w/15m cable
7	Coaxial Plug	OP05-13 (MP5)	005-371-440	2 pcs/set

SPECIFICATIONS

INSTALLATION

GENERAL NOTES ON INSTALLATION

Any radio equipment can provide its intended performance only when it is installed properly. Prior to starting installation, the following precautions should be kept in mind.

AVOID WATER SPRAY

Though the Equipment is splash-proof, it is not designed to be used outside the cabin, directly exposed to the environment! Salt water spray should be avoided.

NOTE

Furuno will assure no responsibility for the damage caused by the exposure to the salt water spray.

AVOID SHOCK OR VIBRATION

The Equipment is designed to withstand possible shocks and vibrations normally experienced on small boats. However, excessive and continued shock and vibration can shorten the life of the equipment. Where necessary, appropriate shock absorption measures should be taken.

AVOID HOT ENVIRONMENT

Even though the LCD used on the Equipment is quite legible in the sunlight, it is requested to keep the transceiver out of the direct sunlight or at least shaded because of the heat that can build up in the cabinet.

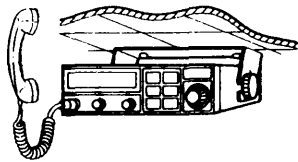
The cabinet of the transceiver, especially the rear panel, gets warm after a long transmission. It is requested to provide some space around the transceiver to allow good air circulation.

AVOID ONBOARD NOISE

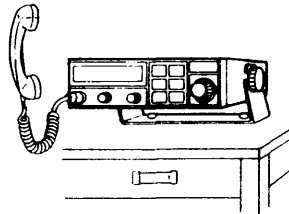
Though the Equipment is well shielded with cast-aluminum cabinet, it is requested to install the transceiver away from radio and navigation equipments, such as SSB/CB radiotelephone, direction finder or Loran receiver to avoid mutual interferences. Separate from the radar equipment, too, as much as possible.

MOUNTING TRANSCEIVER

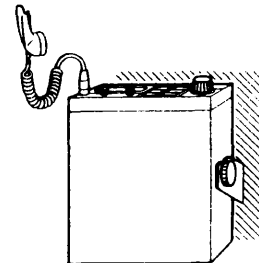
The Equipment can be mounted on overhead, tabletop or bulkhead with an optimum viewing angle by using the hanger bracket supplied. The hanger should be installed adequately to minimize wave shock and engine vibration. If necessary, reinforce the mounting location by lining block or doubling plate.



OVERHEAD
(DASHBOARD)

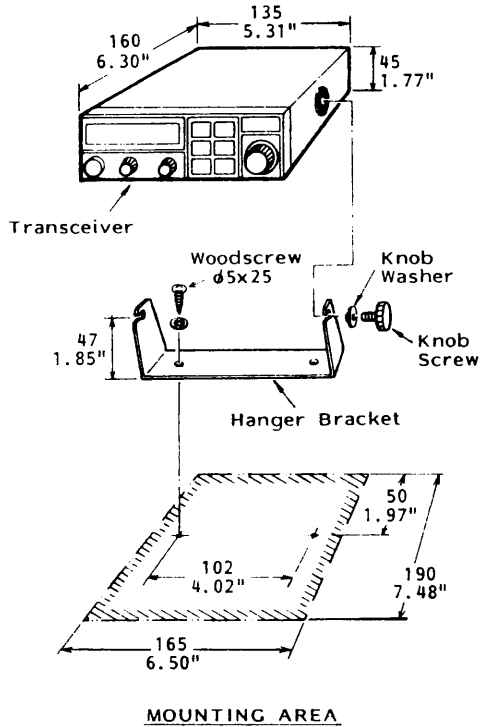


TABLETOP



BULKHEAD

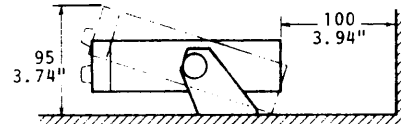
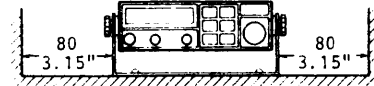
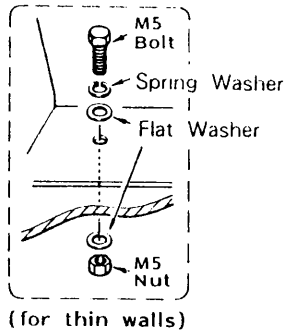
MOUNTING PROCEDURE



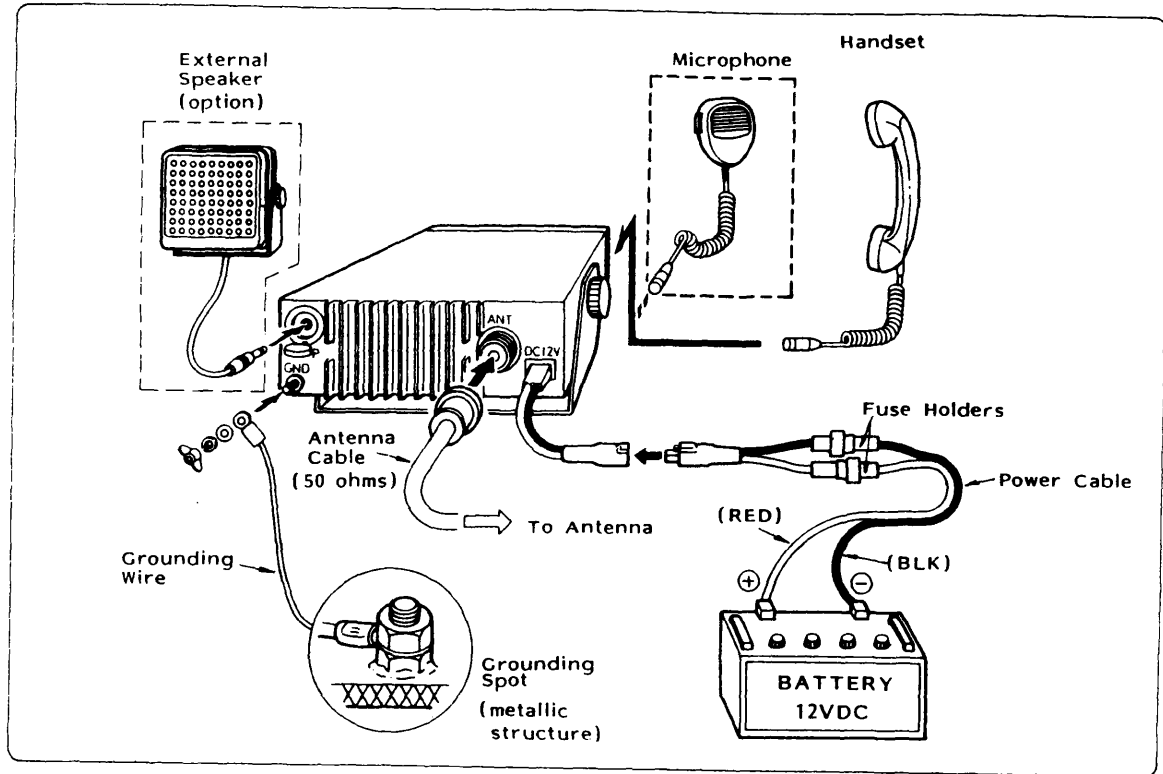
1. Drill two pilot holes for the hanger bracket.
2. Fix the hanger with the woodscrews supplied.

For thin walls, use bolts and nuts instead of the woodscrews.

3. Mount the transceiver unit on the hanger and tighten the knob screws at an adequate viewing angle.



CABLE CONNECTIONS



POWER CONNECTION

The Equipment is designed to operate from 12VDC power supply. For 24VDC or AC mains, use the separate DC-DC converter or rectifier respectively.

A 3 meter (10') cable, fitted with two snap-in fuse holders, is provided. Connect the wire ends to battery, distribution box or said unit; the red lead to positive (+) terminal and the black lead to negative (-) terminal. Refer to the illustration on page 7. Make sure to leave some wire behind the transceiver to gain easy access to the fuse holders.

If it is necessary to extend the power cable, use a heavy wire depending on the extension distance. Refer to the guideline below.

LENGTH	US GAUGE (AWG)	BRITISH GAUGE
5m (17')	14	16
10m (33')	10	12
20m (66')	8	10

Lighter wire will spoil the performance of the transceiver, or even cause fire in the worst case. Do not twist-wrap the joints but solder or use screw terminal when splicing the extension cable, and ensure all connections are tight, clean and well-insulated.

ANTENNA CONNECTION

The antenna is the most important item to obtain the expected performance of your Equipment. Provide a location as high and clear as possible, free from the influence of nearby antenna, rigging and masts.

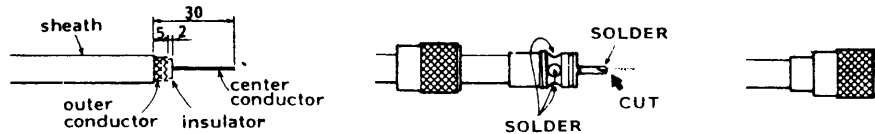
The optional antenna supplied from Furuno is a 1.2 meter whip containing a matching network in its base.

Any good quality antenna, complying with the following requirements, may be arranged locally. A high-gain antenna is most preferable. If you are not sure, consult with your dealer for the most suitable one.

- Frequency Range : 155MHz to 164MHz
- Impedance : 50 ohms
- Polarization : Vertical
- Handling Power : 30W min.
- Quality : To be able to withstand against possible marine environment

Any 50 ohm coaxial cable heavier than 5D-2V (equivalent to RG-212/U) may be used for connection between the antenna and the transceiver. To extend the antenna cable longer than 20m (67'), use heavier coaxial cable, such as 8D-2V or RG-213/U, to minimize the power loss and signal attenuation through the cable. Make sure to leave some service loop behind the transceiver for future service and maintenance.

When the antenna cable is layed, solder the "M" type plug onto the cable end. See the illustrations below.

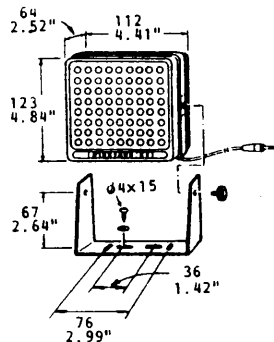


GROUND CONNECTION

To obtain maximum sensitivity of the receiver and to minimize mutual interference with the other equipments, the transceiver cabinet must be grounded properly to the ship's grounding bus. If grounding bus is not available, a good connection to the hull will be sufficient on a metallic boat.

On a wooden or fibreglass boat, consult with a shipyard or service shop.

EXTERNAL SPEAKER

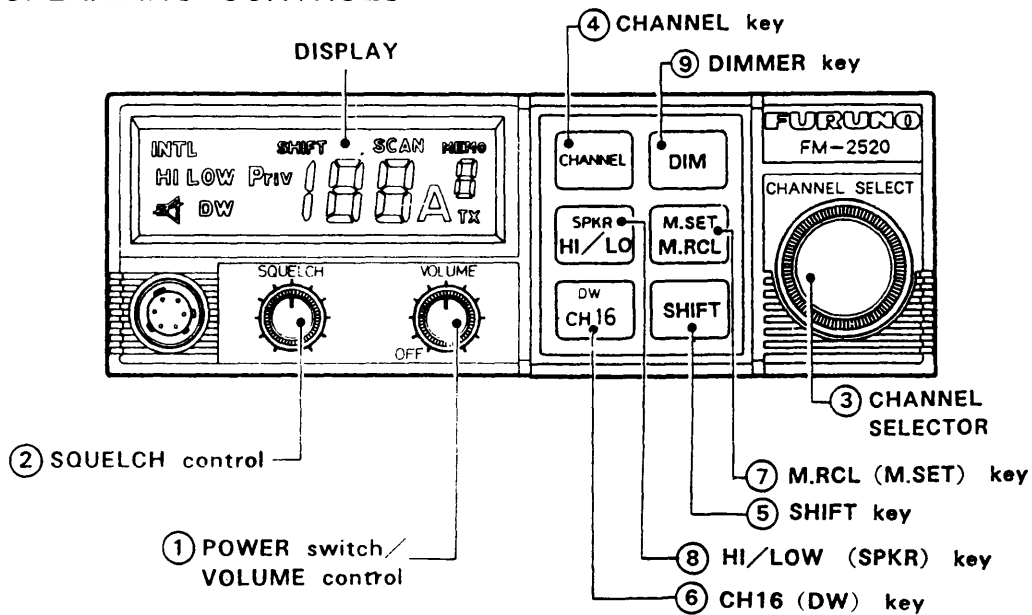


The Equipment has a built-in loudspeaker suitable for most applications. However, if an transceiver is installed flush in the dashboard or in the instruction panel, the external loudspeaker may be recommended. Connect the optional external speaker (4W/4 ohms) to the SPKR jack on the rear panel of the transceiver unit.

The built-in loudspeaker is muted when the external speaker is plugged in. The handset receiver is always active whether the built-in or external loudspeaker is in use or cut off.

OPERATION

OPERATING CONTROLS



① **VOLUME control**
POWER switch



Changes the audio output level of the loudspeaker.

Rotate the control clockwise to turn on the equipment. Turn it fully counterclockwise, beyond click, to switch off the power.

② **SQUELCH control**



This is used to hear communication signal only by blocking unwanted noise which is remarkable when no signal is received. Set it at a position where noise just fades out while turning it slowly clockwise.

③ **CHANNEL SELECTOR**



Press the CHANNEL key and rotate the CHANNEL SELECTOR to select a channel required. Rotating it clockwise increments the channel or memory channel number, and vice versa.

④ **CHANNEL key**



If the equipment is memory mode or dual watch mode, press this key to bring the equipment into the channel select mode, then rotate the CHANNEL SELECTOR.

⑤ **SHIFT key**



Activates the secondary function of each dual-function key. Press this key prior to selecting an upper case function (M.SET, SPKR, DW).

⑥ CH16 (DW) key



Primary : Selects the channel 16 instantly.

Upper case : Activates the dual watch function when pressed after the SHIFT key is pressed.

⑦ HI/LOW (SPKR) key



Primary : Alternates between high power (25W) and low power (1W) of the transmitter.

Upper case : Turns on and off the loudspeaker. The handset is always activated regardless of operation of the loudspeaker.

⑧ M.RCL (M.SET) Key



Primary : Selects memory channel mode.


Upper case : Enables programming of memory channels. function

⑨ DIMMER key



Changes the display illumination and backlight intensity.

STATUS INDICATORS

1. **INTL** Indicates the channel assignment "international".
2. **HI and LOW** Alternatively indicates the transmitter power; high (25W) or low (1W).
3. **DW** Indicates that the receiver is in the dual watch mode.
4. **Priv** Indicates that the transceiver is in the private channel mode (depends on authorization).
5. **SCAN** Indicates that the receiver is in the scan mode (depends on authorization).
6. **TX** Indicates that the transmitter is activated.
7. **MEMO** Indicates that the transceiver is in the memory channel mode.
8.  **(SPEAKER OFF)** Indicates that the loudspeaker is disabled.

RECEIVING

1. POWER ON



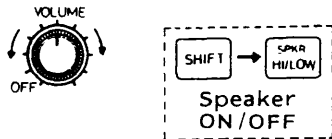
Turn on the VOLUME (POWER) control clockwise to 9 o'clock position. The channel number "16" will be presented on the display.

2. SELECTING CHANNEL



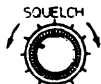
Rotate the CHANNEL SELECTOR for the desired channel number. A clockwise rotation increments the channel number, and vice versa. Hit the CHANNEL key beforehand, if the equipment is in other modes such as DW, M.RCL.

3. ADJUSTING VOLUME



Turn the VOLUME control for an optimum sound level. If the "🔊" (speaker off mark) is present on the display, either listen on the handset or hit the SHIFT key and then HI / LOW (SPKR) key in sequence to enable the loudspeaker.

4. ADJUSTING SQUELCH



(Turn slowly.)

Turn the SQUELCH control slowly clockwise until the receiver noise just fades away. Perform this operation when no traffic is being received. Do not turn the SQUELCH too far clockwise. Otherwise, you will miss weak incoming signal.

NOTE

To obtain correct dual watch response, adjust the SQUELCH control precisely.

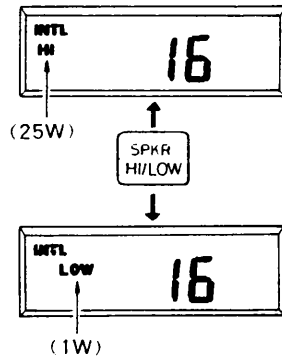
5. ADJUSTING DIMMER



Hit the DIM key. The illumination intensity for the display changes in four steps. Select an optimum brightness depending on the working environment.

TRANSMITTING

1. SELECTING TRANSMITTER POWER

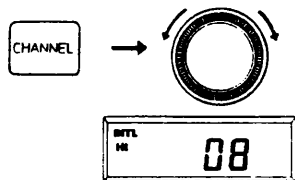


After power-on, the transmitter is automatically set to "HI" (25W) output power. If desired, hit the HI/LOW (SPKR) key to select low power (1W). The "LOW" mark appears instead of "HI." Some channels always set to low power. (Refer to APPENDIX A.)

Transmission at low output power is recommended for short range communications or in harbor areas to minimize interference to the others. Otherwise, use high power for reliable communications.

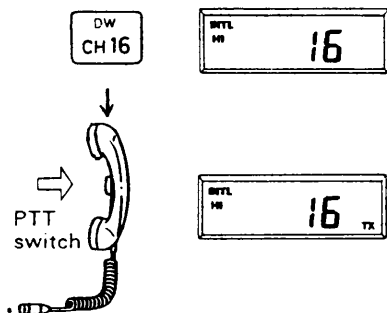
To return to the high power mode, hit the HI/LOW (SPKR) key again.

2. CHECKING OPERATING CHANNEL



- 1) If you are on the DW or memory mode (MEMO is displayed on LCD), hit the CHANNEL key to return to the ordinary marine channel mode. This step can be omitted if you are already on ordinary channel.
- 2) Rotate the CHANNEL SELECTOR for the channel you want to use, and listen carefully to confirm that the channel is open.

3. CALLING ON CHANNEL 16



- 1) Hit the CH16 (DW) key to select CH16 instantly. Confirm that the channel is not busy before commencing transmission.
- 2) Pick up the handset (or microphone), press the PTT (press-to-talk) switch. Then speak clearly.

Press the PTT switch to talk and release it to listen for the response.

IMPORTANT

CH16 is important for distress and calling. Remember to keep the communications as short as possible to give way to the others.

4. SWITCHING TO WORKING CHANNEL



When the contact is established on channel 10, turn the CHANNEL SELECTOR to the working channel as instructed by the coastal station operator.

(NOTE: Follow the relevant traffic regulations.)

Press the PTT switch to talk and release it to listen for the response.

DUAL WATCH

In the dual watch mode, a desired channel and the calling/distress channel (CH16) are received alternately (1 second for the desired channel and 0.05 second for channel 16). If a signal is present on channel 16, the receiver locks on channel 16 and ignores the signal on the other channel. 5 seconds after the signal on channel 16 has gone, the receiver reverts to dual watching again. If a signal is present on the desired channel, the receiver continues dual watching.

For proper execution of the dual watch, adjust the SQUELCH control precisely.

1. SELECTING DESIRED CHANNEL

Select a desired channel. The channel can be an ordinary marine channel, memory channel or private channel.

2. STARTING DUAL WATCH

Hit the SHIFT key first, followed by the CH16 (DW) key in sequence. The "DW" mark appears, and the channel display will start alternating between the two channels.



3. STOPPING DUAL WATCH

To terminate the dual watch function, hit any key except the HI/LOW (SPKR) key as shown below.

The key depressed	Next mode/Freq.
CHANNEL	WATCH CHANNEL
PTT switch	WATCH CHANNEL
SHIFT	WATCH CHANNEL
CH16 (DW)	CH16
M.RCL (M.SET)	MEMORY RECALL
DIM *1	PRIVATE RECALL

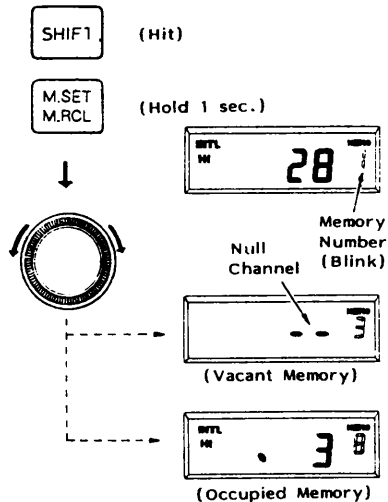
*1: Private channel available only where permitted.

MEMORY CHANNEL OPERATION

The memory channel function provides quick selection of up to 10 most used channels.

STORING CHANNELS

SETTING MEMORY NUMBER

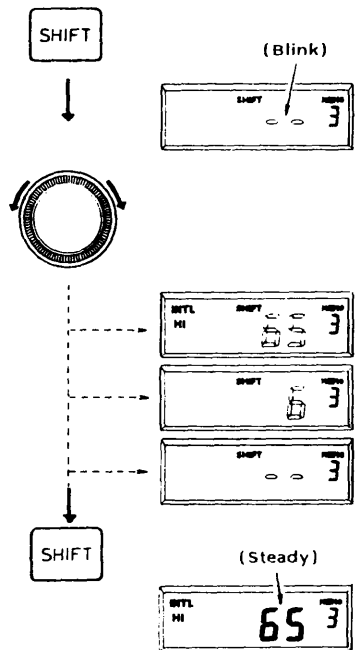


- 1) Hit the SHIFT key, and press and hold the M.RCL (M.SET) key for more than one second. The memo number should start blinking.
- 2) Rotate the CHANNEL SELECTOR for the desired memory number (0 to 9).

If the memory is vacant, the "—" (null channel mark) will be displayed instead of a channel number. Select a vacant memory to store new channel.

If some channel has already been stored in that memory, the channel number will be displayed. Stored memory may be selected to correct the memory contents or overwrite new channel.

SETTING CHANNEL NUMBER



- 3) Hit the SHIFT key once. The "SHIFT" mark appears, and now the channel number starts blinking.
- 4) Rotate the CHANNEL SELECTOR for the desired channel number.

As turning the CHANNEL SELECTOR, all possible channel numbers are displayed one by one.

To set channel 65, call "65" on the display.

To set channel 06, call "06" on the display.

To clear the memory contents, select "—" (null channel).

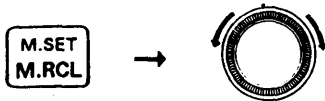
- 5) When the desired channel number is selected, hit the SHIFT key once again to terminate the store sequence. The channel number should cease blinking.

To store another channel, repeat the steps 1 to 5 above.

When the programming is completed, make a note on the "MEMORY CHANNEL LIST" / APPENDIX C for your future reference.

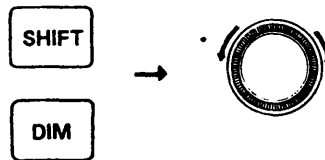
The contents of memory will be preserved even when the power is turned off.

RECALLING MEMORY CHANNELS



Hit the M.RCL (M.SET) key and rotate the CHANNEL SELECTOR for your desired memory number.

RECALLING PRIVATE CHANNELS (Private available only where permitted.)



Hit the SHIFT key first, followed by the DIM key and rotate the CHANNEL SELECTOR for your desired private channel.

SCANNING

In the scan mode the unit scans user-designated channels, and stops scanning when a signal above a certain strength level is detected.

Note that the Scanning function is not available in all unit, but only available where permitted.

For proper execution of the scan watch, the SQUELCH control must be adjusted precisely, since the scan/lock judgement is done by detecting squelch status.

1. START SCANNING

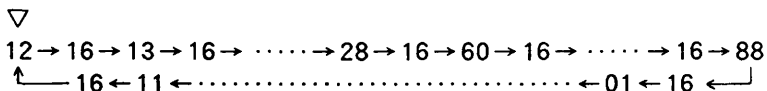
Use one of the following key stroke sequence depending on the channel group you want to scan.

A. All Channel Scan Mode

Press and hold the CHANNEL key for more than one second until the scan mark appears on the display. Scan starts from the latest set channel.



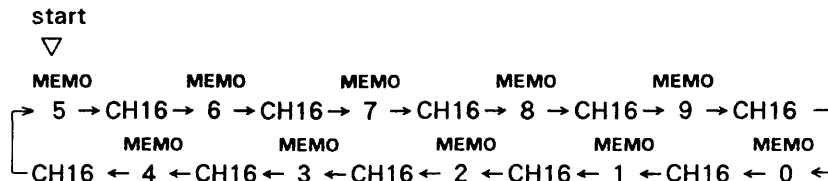
start



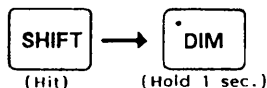
B. Memory Channel Scan Mode



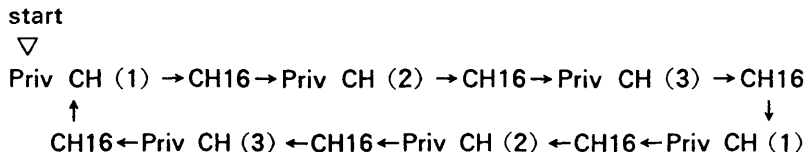
Press and hold the M.RCL key for more than one second until the scan mark appears on the display.
Scan starts from the latest set channel.
(Memo number which has no channel assigned to it is skipped.)



C. Private Channel Scan Mode



Hit the SHIFT key first, and hold the DIM key for more than one second until the scan mark appears on the display.
Scan starts from the latest set private channel.



- o Scanning time is 0.05 second on CH16 and 1 second on the other channels.
- o While in the scan mode, pressing the SHIFT key increments channel number by one. This function may be used to skip over the current channel and to approach to your desired channel range.
- o If a signal is present on CH16, the receiver locks on CH16. 5 seconds after the signal has gone, the receiver reverts to scanning again.
- o If a signal is present on a channel other than CH16, the receiver stops scanning and starts dual watching between CH16 and that channel. 5 seconds after the signal has gone, the receiver stops dual watching and reverts to scanning again.

2. STOP SCANNING

To terminate the scan mode, hit the any key except SHIFT and HI/LOW key as shown below.

The key depressed	Next mode/Freq.
CHANNEL	WATCH CHANNEL
PTT switch	WATCH CHANNEL
CH16 (DW)	CH16
M.RCL (M.SET)	MEMORY RECALL
DIM *1	PRIVATE RECALL

*1 : Private channel available only where permitted.

GENERAL KNOWLEDGE ON OPERATING MARINE VHF

RULES AND MANNERS

The Equipment fully complies with requirements for maritime VHF radio service. And it is intended to be used by a person who holds valid radio operator license and station call sign.

Followings are some important rules, regulations and manners on operating the equipment.

- Whenever the radio is turned on, keep watch on channel 16 for distress or calling message.
- Distress communications have absolute priority. If you hear a MAYDAY, talk only if you can help, and be prepared to offer assistance or relay the distress message.
- Listen before transmitting to avoid interfering with other communications.
- The ship Radiotelephones Station licensee is responsible for recording in a communication log all contacts made over the radiotelephone and watch period on channel 16. All distress, emergency and safety messages must be recorded in detail. Entries must show boat's name, call sign, watch start/stop times, and operator's signature. Use 24-hour notation to record time.

- Radio wave is public property, and keep all communications as brief and clear as possible.
- Declare ID or call sign at the beginning and end of each communication.
- Use appropriate channel for the purpose of communication. (Refer to CHANNEL USAGE below.)
- Do not divulge contents of communications nor use them for private benefit without permission. (This does not apply for distress communications.)

CHANNEL USAGE

The Equipment contains all the channels assigned for maritime VHF service. However, each channel is intended to be used for particular purpose (s). The following shows common usage for some important channels.

As purpose of some other channels are slightly different from country to country, operator is requested to study local channel assignment.

CH16 DISTRESS, SAFETY and CALLING for Intership and Ship-to-coast

CH06 SAFETY for Intership only

CH08 General Intership

CH12/14 PORT OPERATIONS for Intership and Ship-to-coast

CH20/22 PORT OPERATIONS for Ship-to-coast

Refer also to channel/frequency list for general use of each channel. (APPENDIX B)

COMMUNICATION DISTANCE

The equipment operates on VHF band assigned for maritime mobile stations. (155.000MHz to 162.025MHz)

VHF radio wave, unlike LF or HF, propagates like light ray. Thus, communication is available only with the one visible above the horizon, so called line-of-sight basis.

Under normal propagation conditions, however, refractive index of the atmosphere decreases with height so that radio waves travel more slowly near the seasurface than at higher altitude. That is, the radio wave is bent along the earth and reaches slightly beyond the geographical horizon.

Even if a clear line-of-sight condition is given, radio wave is attenuated through the signal path. The communication distance is limited also by transmitter power, antenna efficiency and receiver sensitivity.

It is practically known that average communication range, using 25W (20W) marine VHF, is 10 to 15 n.m. for ship-to-ship and 20 to 30 n.m. for ship-to-shore.

Note that the radio barrier in the signal path, such as big boat, crane, building or mountain, can destroy VHF communications even for short distance.

MAINTENANCE

The Equipment is designed to provide trouble-free operation for years. It is, however, recommended to inspect and maintain the following points to minimize possibility of a equipment failure and assure optimum performance. Be sure to disconnect the power cable at the fuse holders before maintenance work.

CLEANING

Transceiver : Keep the unit clean and dry at all times. Dust or loose dirt accumulated on the front panel and knobs should be wiped off with a soft, dry cloth. Use mild detergent and water on a cotton tipped swab or soft cloth in stubborn case.

CAUTION

Never use plastic solvents, such as thinner or acetone for cleaning. It may dissolve paint coating/marking on the front panel and cabinet case.

Plugs : Check all plugs for dust or corrosion. If corroded, polish the contact and re-tighten securely.

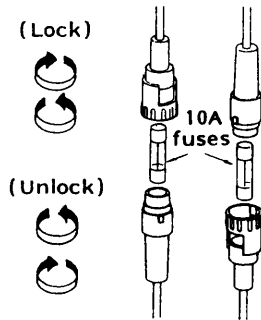
ANTENNA SYSTEM CHECK

Since the antenna is exposed to direct sunshine and/or salt water spray, it is subject to corrosion or salt water immersion at the antenna basement. The physical damage, such as crack, may sometimes be expected on the element under severe ship's vibration. Should the trace of cracks or water immersion is found, contact your local authorized FURUNO dealer for servicing.

BATTERY CHECK

The Equipment operates normally at any voltage between 11 and 15Vdc. If the battery voltage is out of ratings, check the battery liquid or the charging system of your boat. Check also rust or corrosion at the battery terminals and ship's mains switch-board for poor contact.

FUSE REPLACEMENT



To prevent the transceiver from serious damage, two 10A fuses are provided in the snap-in fuse holders on the power cable. The fuse protects against overvoltage/reverse polarity of the ship's mains or internal fault of the equipment. If the fuse has blown, first find the cause of the problem before replacing it with new one.

CAUTION

Do not use a fuse rated for more than 10A, since it may cause more serious damage to the equipment.

TROUBLESHOOTING

MINOR TROUBLESHOOTING

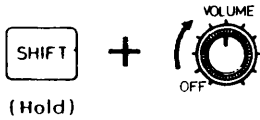
It is known that more than 50% of VHF troubles are raised not by the transceiver itself but by ANT/feeder or power supply system. The list below provides simple troubleshooting that can be done by the operator. DO NOT ATTEMPT TO CHECK INSIDE THE TRANSCEIVER. CARELESS HANDLING MAY CAUSE PERMANENT DAMAGE TO THE TRANSCEIVER.

Symptom	Possible Cause	Remedy
Transceiver not initiated.	<ol style="list-style-type: none">1. Power is off at mains switchboard.2. Power lead is loose , pulled out or connected in the reverse polarity.3. Mains battery is flat.4. Fuse has blown.	<ol style="list-style-type: none">1. Turn mains switch on.2. Secure plug firmly and check connections to battery.3. Check battery liquid, charging system, etc.4. Check mains voltage and then put 10 amp fuse.
LCD display looks normal but nothing heard from the loudspeaker.	<ol style="list-style-type: none">1. Speaker is switched off.	<ol style="list-style-type: none">1. Hit [SHIFT] and [HI/LOW (SPKR)] keys in sequence. Check the handset for damage of lead or loosened plug connection.

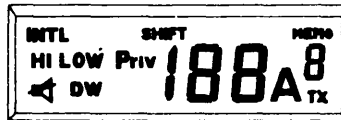
Symptom	Possible Cause	Remedy
LCD display looks normal but nothing heard from the loudspeaker.	2. SQUELCH setting is too high. (Turned too much clockwise) 3. VOLUME setting is too low. 4. External speaker connection (rear panel) is improperly made.	2.3 To confirm audio output, turn SQUELCH fully CCW and turn VOLUME slowly CW. 4. Check external speaker connection.
Noise but no or poor signal reception.	1. ANT connector (rear panel) is loose or pulled out. 2. Antenna is smashed off. 3. Antenna cable is damaged or immersed with water. 4. Radio barrier (big vessel, crane, mountain, etc.) in the signal path. 5. Transmitter is too far away or transmitting in low power.	1. Fasten antenna plug tightly. 2. Install new antenna vertically. 3. Lay new cable (50 ohm coaxial cable). 4.5 Line-of-sight is a rule for VHF communications.
"TX" mark appears but no or low output power.	1. Refer to items 1 thru 4 above.	
	2. POWER setting is "LOW".	2. Set it to "HI". Note: Some channels are always LOW power. (Refer to APPENDIX A.)

Symptom	Possible Cause	Remedy
<p>"TX" mark won't come on with PTT switch pressed.</p>	<ol style="list-style-type: none"> 1. Attempting transmission on a channel assigned only for reception. 2. Transceiver is in "DW" or in "SCAN" mode. 	<ol style="list-style-type: none"> 1. Refer to channel list. 2. Press the CHANNEL key to return to normal mode.
<p>Can't use private channel.</p>	<ol style="list-style-type: none"> 1. Private channels are not programmed. 	<ol style="list-style-type: none"> 1. Ask your dealer for channel preset. (authorization required)
<p>Won't scan normally on "DW" or "SCAN" mode. (locked on a channel)</p>	<ol style="list-style-type: none"> 1. SQUELCH setting too low causing noise all the time. 	<ol style="list-style-type: none"> 1. Adjust SQUELCH so that noise just fades out.
<p>Turned abnormally to channel 16.</p>	<ol style="list-style-type: none"> 1. Had short power failure. 	<ol style="list-style-type: none"> 1. Select desired channel and function again. Check power line connections.

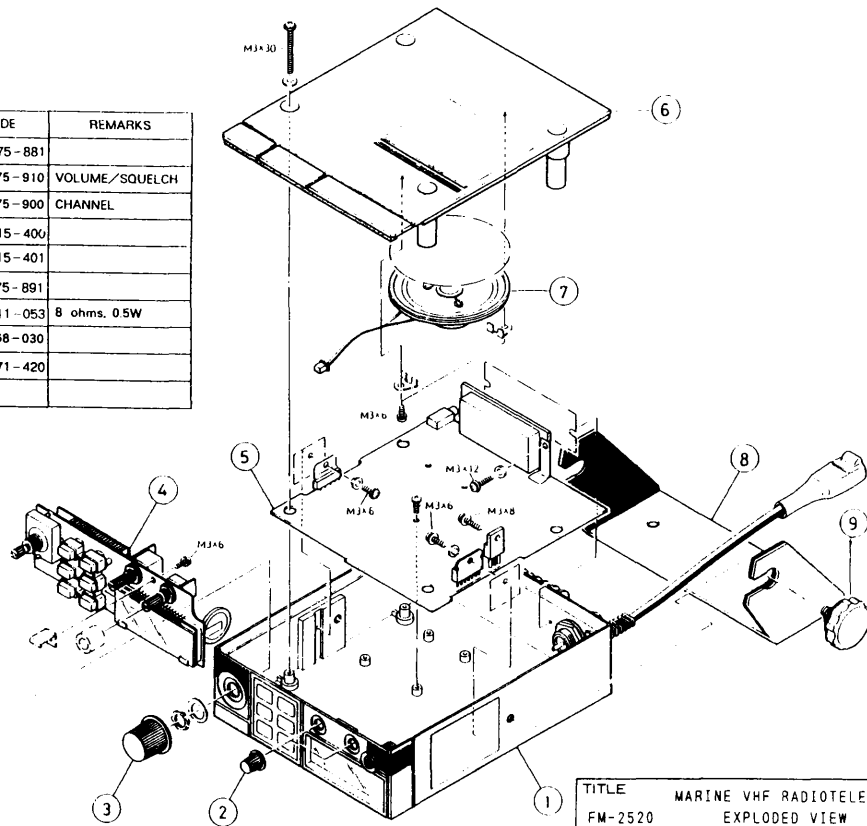
DISPLAY TEST



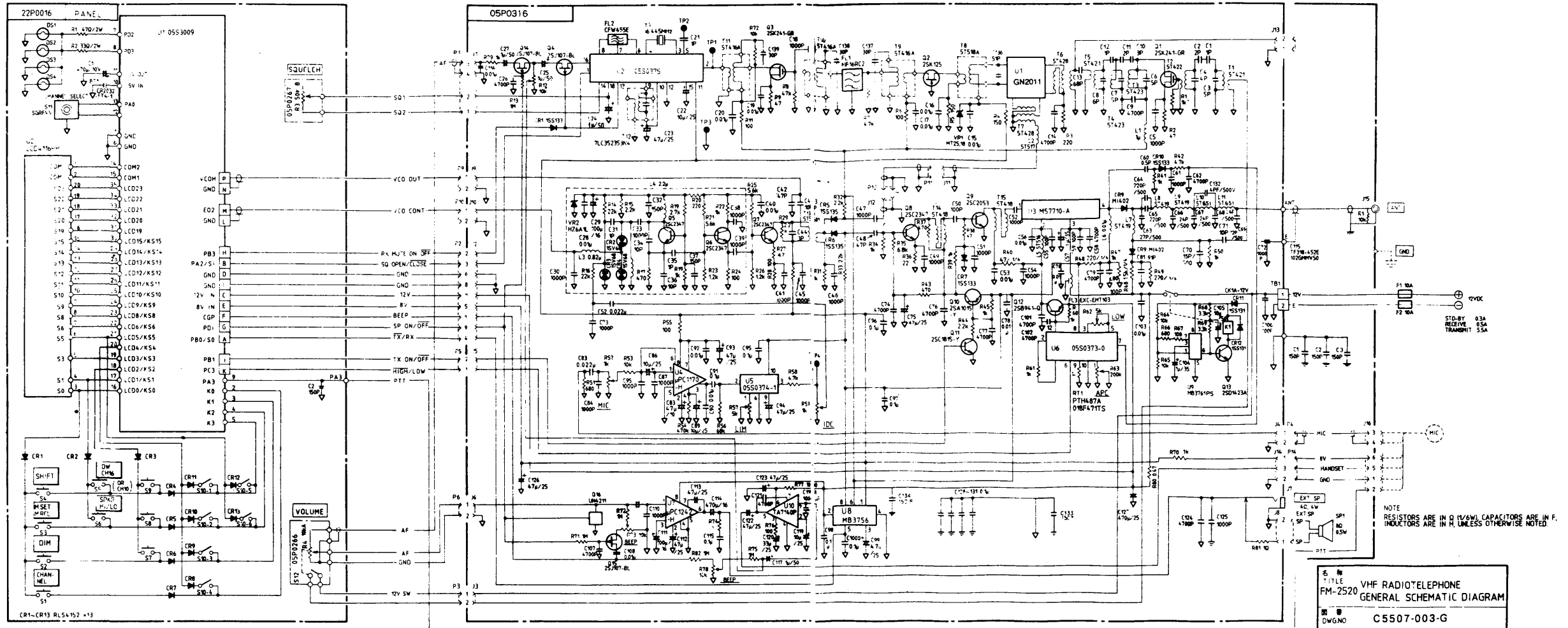
If the LCD display appears to be abnormal, conduct the LCD Display selftest. Press and hold the SHIFT key, then turn the power on. If the LCD display is normal, the test reading shown below is displayed. Watch the LCD carefully if there exists any missing segment.



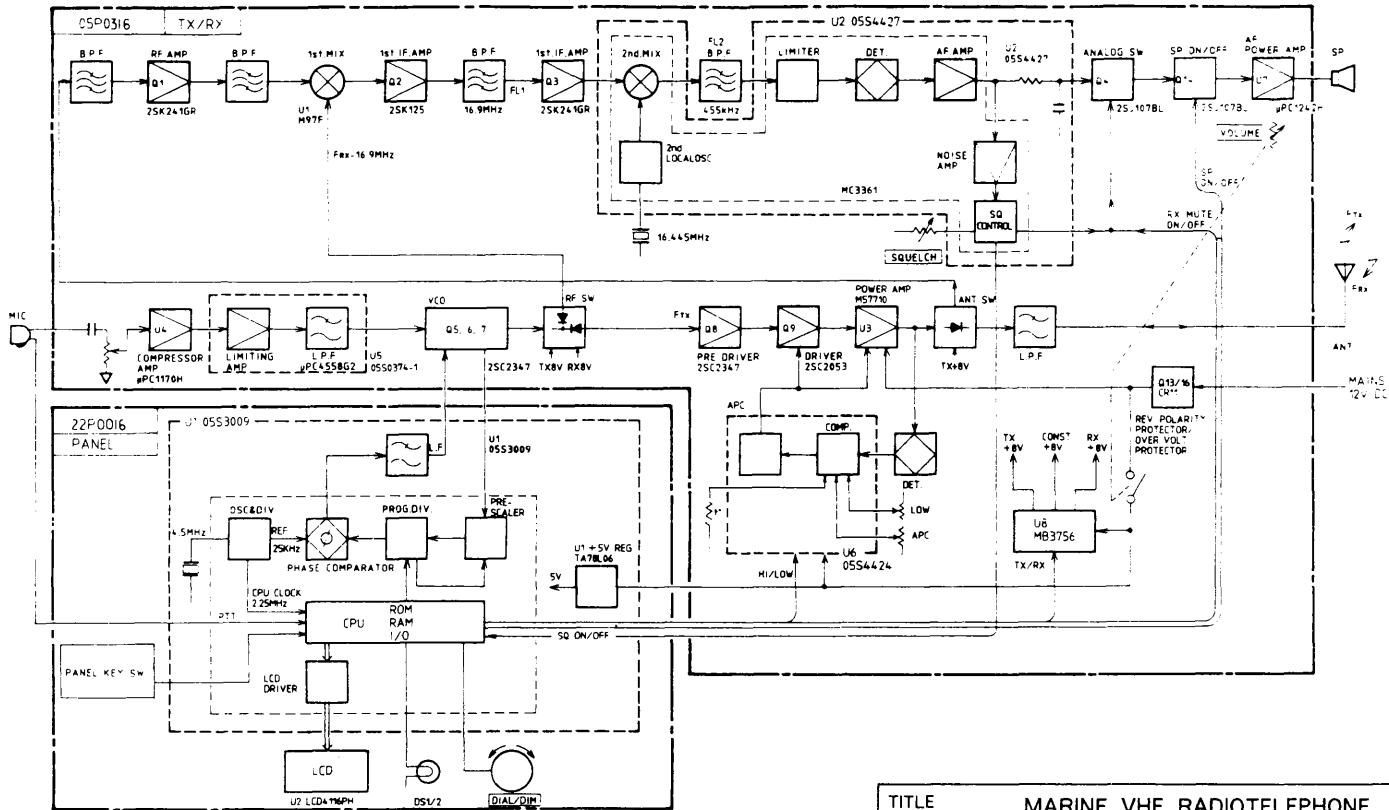
NO.	NAME	TYPE	CODE	REMARKS
1	Main Case Assy	05-024-0101	100-075-881	
2	Knob (S)	05-024-0104	100-075-910	VOLUME/SQUELCH
3	Knob (L)	05-024-0103	100-075-900	CHANNEL
4	Panel Board Assy	22P0016	000-115-400	
5	TX/RX Board Assy	05P0316	000-115-401	
6	Bottom Cover Assy	05-024-0102	100-075-891	
7	Speaker Assy	SI006517	000-111-053	8 ohms, 0.5W
8	Hanger Bracket	FP05-01301	005-368-030	
9	Knob Screw Assy	FP05-01302	005-371-420	



TITLE MARINE VHF RADIOTELEPHONE
 FM-2520 EXPLODED VIEW
 DWG. NO. E5507-005-B



5
1 TITLE
FM-2520 VHF RADIOTELEPHONE
GENERAL SCHEMATIC DIAGRAM
DWG NO C5507-003-G



TITLE MARINE VHF RADIOTELEPHONE
 FM-2520 BLOCK DIAGRAM
 DWG.NO. E5507-004-A

FACTORY SETTING

APPENDIX A

COUNTRY	CHANNEL	DUAL WATCH	PRIVATE CHANNEL	SCAN	OUTPUT POWER	PROHIBITED CHANNELS
Holland	International	○	×	×	All Channels : HI	CH70/75/76
W.Germany	International	○	×	○	All Channels : HI	CH70/75/76
Denmark Sweden	International	○	×	○	CH15/17 : LOW Others : HI	CH75/76

**MARINE VHF CHANNEL FREQUENCIES
(INTERNATIONAL VERSION)**

APPENDIX B

CH	Ship Tx	Ship Rx	Type of Operation
01	156.050	160.650	Public Correspondence, Port Operation
02	156.100	160.700	Public Correspondence, Port Operation
03	156.150	160.750	Public Correspondence, Port Operation
04	156.200	160.800	Public Correspondence, Port Operation
05	156.250	160.850	Public Correspondence, Port Operation
06	156.300	156.300	Safety
07	156.350	160.950	Public Correspondence, Port Operation
08	156.400	156.400	Inter Ship
09	156.450	156.450	Port Operation
10	156.500	156.500	Port Operation
11	156.550	156.550	Port Operation
12	156.600	156.600	Port Operation
13	156.650	156.650	Bridge-to-Bridge
14	156.700	156.700	Port Operation
15	156.750	156.750	Coast-to-Ship
16	156.800	156.800	Distress, Safety and Calling
17	156.850	156.850	State-controlled, Ship-to-coast
18	156.900	161.500	Port Operation
19	156.950	161.550	Port Operation
20	157.000	161.600	Port Operation
21	157.050	161.650	Port Operation
22	157.100	161.700	Port Operation
23	157.150	161.750	Public Correspondence
24	157.200	161.800	Public Correspondence
25	157.250	161.850	Public Correspondence
26	157.300	161.900	Public Correspondence
27	157.350	161.950	Public Correspondence
28	157.400	162.000	Public Correspondence

CH	Ship Tx	Ship Rx	Type of Operation
60	156.025	160.625	Public Correspondence, Port Operation
61	156.075	160.675	Public Correspondence, Port Operation
62	156.125	160.725	Public Correspondence, Port Operation
63	156.175	160.775	Public Correspondence, Port Operation
64	156.225	160.825	Public Correspondence, Port Operation
65	156.275	160.875	Public Correspondence, Port Operation
66	156.325	160.925	Public Correspondence, Port Operation
67	156.375	156.375	Port Operation
68	156.425	156.425	Port Operation
69	156.475	156.475	Port Operation
70	156.525	156.525	Digital Selective Calling
71	156.575	156.575	Intership, Port Operation
72	156.625	156.625	Intership
73	156.675	156.675	Port Operation
74	156.725	156.725	Port Operation
77	156.875	156.875	Intership, 1W
78	156.925	161.525	Port Operation
79	156.975	161.575	Port Operation
80	157.025	161.625	Port Operation
81	157.075	161.675	Port Operation
82	157.125	161.725	Port Operation, Public Correspondence
83	157.175	161.775	Public Correspondence
84	157.225	161.825	Port Operation, Public Correspondence
85	157.275	161.875	Port Operation
86	157.325	161.925	Port Operation
87	157.375	161.975	Port Operation
88	157.425	162.025	Port Operation

MEMORY CHANNEL LIST (To be filled by operator)

APPENDIX C

MEMO NO.	Stored Channel No.	Purpose/Remark
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		

MEMO NO.	Stored Channel No.	Purpose/Remark
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		

SHIP RADIO STATION LOG SHEET (Recreational Vessels)

Page No. _____ Name of Vessel _____ Radio Call _____

DATE ¹	TIME ²		CHANNEL OR FREQUENCY	PRIORITY MESSAGE TIME ²	MESSAGE ³	OPERATOR'S SIGNATURE
	Start	Stop				

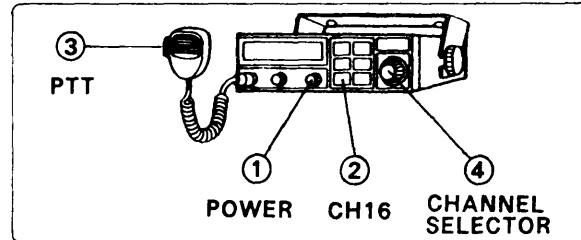
¹Log: Day, Month, Year

²Use UTC (formerly known as GMT) or Local Time. Show which used. Use 24-hour system; that is, 8:45 a.m. is entered as 0845, and 2:15 p.m. as 1415.

³Record as completely as possible all distress communications transmitted or intercepted and all urgency and safety communications transmitted. Retain logs for at least one year; for 3 years if they include entries related to distress; longer if they concern communications being investigated by the FCC or against which claims or complaints have been filed.

DISTRESS CALLING PROCEDURE

- ① Turn on the **POWER** switch.
- ② Confirm the display shows channel "16". If not, press the **CH16** key.
- ③ Pick up the microphone (or handset), press its **PTT** switch and then send the distress message.



Speak **SLOWLY, CLEARLY** and **CALMLY**.

1. Say : "MAYDAY_ MAYDAY_ MAYDAY."
 2. Say : "This is _____, _____, _____." (your boat name)
 3. TELL WHERE YOU ARE (What nav. aids or landmarks are near ?)
 4. STATE THE NATURE OF YOUR DISTRESS. (fire, collision, etc.)
 5. TELL WHAT ASSISTANCE IS REQUIRED.
 6. BRIEFLY DESCRIBE YOUR BOAT. _____ (type), _____ (length),
_____ (material), _____ (color), _____ (registration no.)
_____ (anything else you think will help rescuers to find you.)
 7. Say : "I will be listening on channel 16. _____ OVER." (your boat name)
- ④ Release the **PTT** switch and listen : Coast operator should answer. Follow his directions afterwards. If some other channel is specified, turn the **CHANNEL SELECTOR** dial. IF NO ONE REPLY, REPEAT THE ABOVE CALL AGAIN.