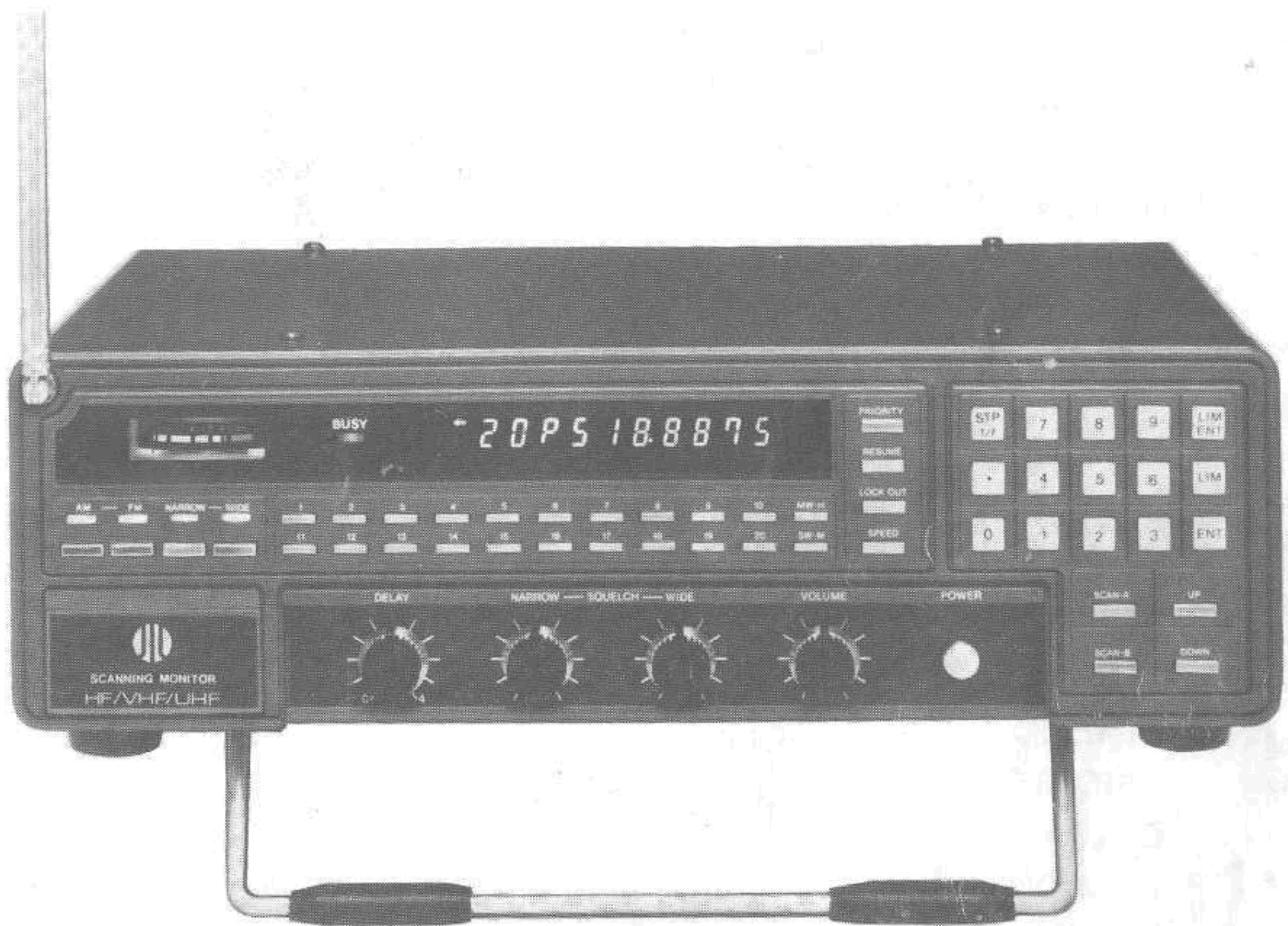


OWNERS MANUAL



J.I.L. — SX 400

MULTI-BAND 20 CHANNEL

CRYSTALESS SCANNER

FREQUENCY RANGE 26 — 520MHz

CONTINUOUS COVERAGE

TABLE OF CONTENTS

1. SPECIFICATIONS	3
2. GENERAL DESCRIPTION	4
3. SAFETY PRECAUTIONS	5
4. OPTIONAL ACCESSORIES	6
5. OPERATING INSTRUCTIONS	7
6. FRONT PANEL CONTROLS	8
7. OPERATION OF SCANNER	12
DIRECT SELECTION OF DESIRED FREQUENCIES	12
PROGRAMMING	13
DIRECT CHANNEL ACCESS	14
SEEKING — NORMAL SEEK	14
— LIMIT SEEK	14
SCANNING — SCAN-A	16
— SCAN-B	16
SPEED	17
DIM	17
TIME	17
PRIORITY	18
DELAY	18
LOCKOUT	18
RESUME	18
8. FUNCTIONS OF REAR PANEL	19
9. AUTOMOBILE INSTALLATION PROCEDURES	21
10. OPERATION HINTS	22

1. SPECIFICATIONS

1. Type	AM & FM		
2. Frequency Range & Channel Space	(divided into 12 blocks)		
			Factory-Set Modulation
A) HF/VHF	1.	26 — 33.995.000 (5 KHz step)	AM
		26 — 33.993.750 (6.25 KHz step)	AM
B) VHF	2.	34 — 49.995.000 (5 KHz step)	FM
		34 — 49.993.750 (6.25 KHz step)	FM
	3.	50 — 67.995.000 (5 KHz step)	FM
		50 — 67.993.750 (6.25 KHz step)	FM
	4.	68 — 87.995.000 (5 KHz step)	FM
		68 — 87.993.750 (6.25 KHz step)	FM
	5.	88 — 107.995.000 (5 KHz step)	FM
		88 — 107.993.750 (6.25 KHz step)	FM
	6.	108 — 139.995.000 (5 KHz step)	AM
		108 — 139.993.750 (6.25 KHz step)	AM
	7.	140 — 179.995.000 (5 KHz step)	FM
		140 — 179.993.750 (6.25 KHz step)	FM
	8.	180 — 219.990.000 (10 KHz step)	FM
		180 — 219.987.500 (12.5 KHz step)	FM
	9.	220 — 299.990.000 (10 KHz step)	FM
		220 — 299.987.500 (12.5 KHz step)	FM
C) UHF	10.	300 — 379.990.000 (10 KHz step)	FM
		300 — 379.987.500 (12.5 KHz step)	FM
	11.	380 — 459.990.000 (10 KHz step)	FM
		380 — 459.987.500 (12.5 KHz step)	FM
	12.	460 — 520.000.000 (10 KHz & 12.5 KHz step)	FM
3. Sensitivity	HF/VHF	FM (S/N = 12 dB)	0.5 μ V
		AM (S/N = 10 dB)	1.0 μ V
	UHF	FM (S/N = 12 dB)	0.5 μ V
		AM (S/N = 10 dB)	2.0 μ V
4. S/N			45 dB
5. Image	HF/VHF		50 dB
	UHF		40 dB
6. Selectivity	FM		60 dB at ± 15 KHz
	AM		60 dB at ± 10 KHz
7. Squelch Threshold	FM		Less than 1.0 μ V
	AM		Less than 2.0 μ V

8.	Scan Stop Sensitivity	Within 2 μ V
9.	Center Detector	$\pm 4 - \pm 7$ KHz
10.	Frequency Stability	Within 1 KHz
11.	Audio Output	4 watts (4 ohm load)
12.	Scan Rate	Fast 8 channels/sec. Slow 4 channels/sec.
13.	Seek Rate	Fast 16 channels/sec. Slow 8 channels/sec.
14.	Delay Time	0 – 4 sec.
15.	Memory Channels	20 channels
16.	Clock Error	Within 10 sec./month
17.	Antenna Impedance	50 – 75 ohms Whip or External Antenna with Attenuator (20 dB Att.)
18.	Power Supply	AC adaptor (P-1A, Output 13.8V DC), or 12 – 14V DC power supply, negative ground
19.	External Speaker Impedance	4 – 8 ohms
20.	Dimensions	330 (W) x 90 (H) x 210 (D) mm
21.	Weight	3.5 Kgs.

2. GENERAL DESCRIPTION

Your SX-400 is a direct-accessible, double superheterodyne 20 channel HF/VHF/UHF, AM-NARROW, FM-NARROW, FM-WIDE scanning monitor receiver, utilizing a miniature Micro Computer. Your SX-400 has no birdies (no interruptions by internal oscillations) at all, therefore, you can scan or seek sequentially without being annoyed by birdie frequencies. Also, very unique 3-position STOP MODE SWITCH enables you selectively to scan or seek stopping on a channel without voice, and returning to scan or seek operation after a certain delay time if no voice appears on the channel. Advanced seek feature allows unknown signals to be captured, monitored and their frequencies can be manually stored in memory for later recall. The versatile keyboard will allow you to control a variety of convenient functions, such as digital display of frequencies, channel num-

bers, and time, direct channel access, scan or manual control, lockout of unwanted channels, priority for important transmission, programmable scan or seek, selectable speed control for both scan and seek, etc., etc.

A capacitor is incorporated for memory backup, and it is not necessary to replace memory backup batteries. All of the memories programmed will remain for approximately 36 hours, if power cord of AC adaptor is unplugged.

Furthermore, adding optional devices to SX-400, your SX-400 enables external computer-controlled data bank, remote controlled scanning and high-speed reprogramming, also expansion of frequency range to 150 KHz at the lowest, 3.7 GHz at the high end of the scale.

3. SAFETY PRECAUTIONS

Read SAFETY PRECAUTIONS before operating the radio. Save the SAFETY PRECAUTIONS for future reference.

- Do not operate this unit if it is wet.
- Never touch an electrical appliance while standing in water or wet ground.
- Do not tamper with the internal circuitry.
- Do not connect or disconnect the rear-panel power connector when the line cord is plugged into an AC receptacle.
- Warnings on the radio and instruction manual are for your safety. Operating and use of instructions should be followed to achieve full satisfaction from your radio.
- The radio should be connected only to a power source of the type described in the instruction manual and as marked on the radio. Power cords should be routed so that they are not likely to be walked on or pinched. The AC power cord is provided with a gripper for ease in removal from the wall outlet. The power cord should be inspected occasionally for damage.
- The radio should be situated so that its location does not interfere with its power ventilation, and placed away from heat sources such as radiators, heat registers, and other appliances that produce heat. The radio should be mounted to a wall or ceiling only as recommended by the manufacturer.

- The radio should not be operated near water — for example, a wet basement, kitchen sink or near a swimming pool.
- Care should be taken so that objects do not fall and liquids are not spilled into the radio.
- Damage Requiring Service — the radio should be serviced by qualified service personnel when:
 - A. The power supply cord of the plug has been damaged; or
 - B. Objects have fallen, or liquid has been spilled into the radio; or
 - C. The radio has been exposed to rain; or
 - D. The radio does not appear to operate normally or exhibits a marked change in performance; or
 - E. The radio has been dropped, or the enclosure damaged.
- Servicing — the user should not attempt to service the radio beyond that described in the operation instructions. All other servicing should be referred to qualified service personnel.
- Cleaning — radio should be cleaned with a damp cotton cloth. Do not use a cloth of polyester for example, which charges static.
- Outdoor Antenna Grounding — Many of the JIL radios have been provisions for connection to an outside antenna. An outside antenna should be located away from power line. The antenna system should be installed only by qualified service personnel.
- Your SX-400 may be installed in any vehicle or boat which has a 12 volt negative-ground system. Refer to installation procedure in page 19.

4. OPTIONAL ACCESSORIES

1. DATA INTERFACE (MODEL RC4000) (to be used with computers) enables you:

A. RECORDING OF INFORMATION

Without touching keyboard but with Seek/Scan operation key, Frequency and Time to a computer, and Voice to a standard cassette tape recorder.

B. SCANNING OF UNLIMITED CHANNELS

Pre-recorded frequencies of more than 20 channel (unlimited) at predetermined time.

C. HIGH-SPEED REPROGRAMMING OF 20 CHANNELS

SX-400 is programmable for maximum 20 channels. It takes long time to re-programme the 20 channels manually. Using interface, you may reprogramme 20 pre-recorded frequencies quickly.

2. RF CONVERTERS

Enables you to scan or seek to 150 KHz at the lowest (with 15026), 3.7 GHz at the highest end of the spectrum (with 520UP) by simply connecting RF CONVERTER to SX-400. The specifications of the RF CONVERTER will be discussed with each customer according to their requirements.

5. OPERATION INSTRUCTIONS

By reading this section carefully, you can be using your new scanner within minutes. Channel space of SX-400 is individually selectable either 5 KHz or 6.25 KHz between 26 and 180 MHz in 7 blocks, and either 10 KHz or 12.5 KHz between 180 and 520 MHz in 5 blocks. Also, modulation, AM or FM, of each block is set at the factory. This can be altered manually. Refer to the specifications on page 3 for the frequency range and modulation of each block, and make sure the channel space prevailing in your country between 26 and 520 MHz of entire 12 blocks, then follow the sequence of directions.

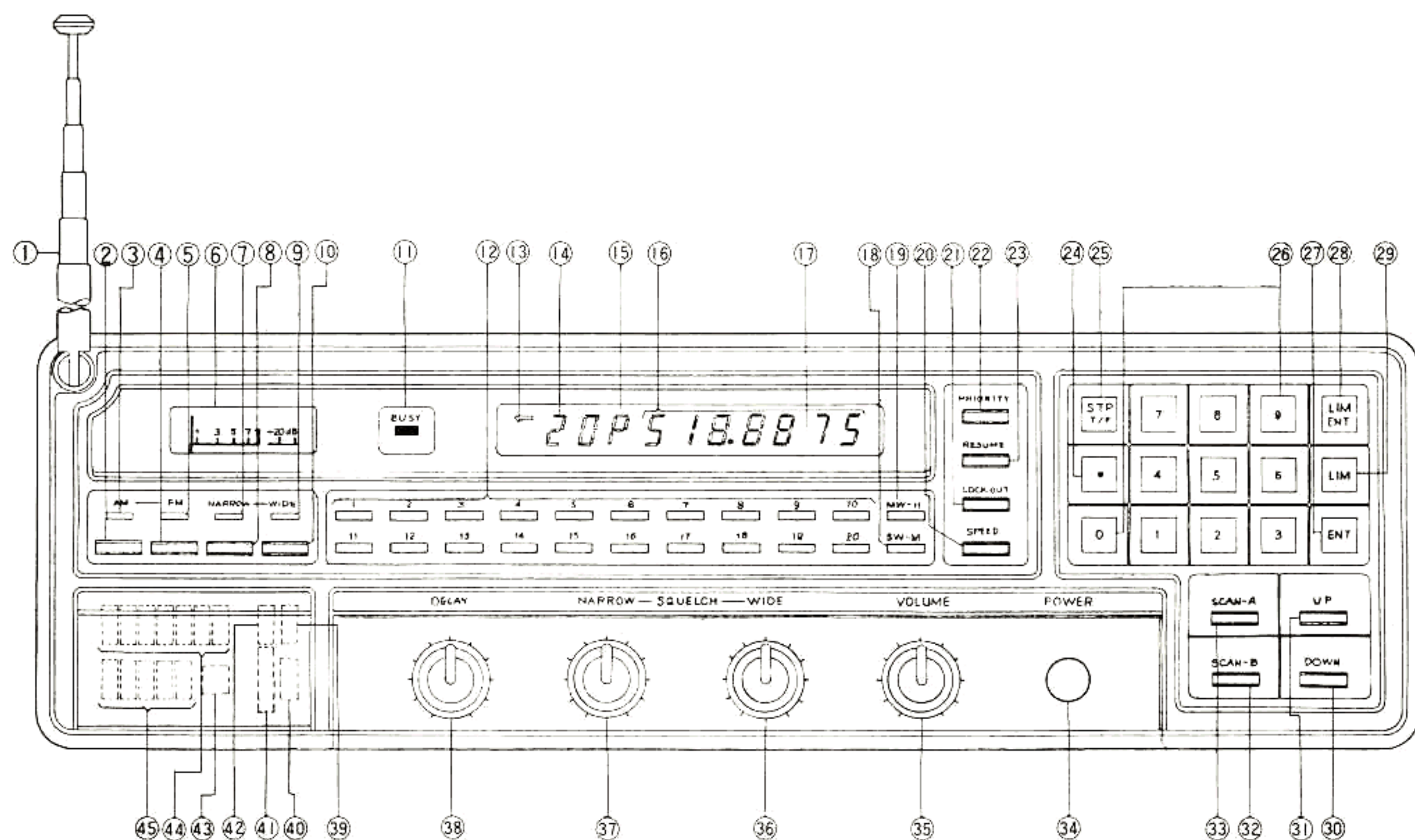
1. After unpacking the unit from carton (save the carton for possible future use), check your SX-400 for shipping damages; if damages have occurred, contact your dealer immediately.
2. Open the switch compartment cover of the left lower corner on the front panel by pulling it gently toward you. Set each channel space switches as per your requirements by sliding up the upper 7 switches for 5 KHz step (26 - 180 MHz) and lower 5 switches for 10 KHz step (180 - 520 MHz), or sliding down the upper 7 switches for 6.25 KHz step and lower 5 switches for 12.5 KHz step.
3. Insert the AC power cord into the connector provided on the rear panel of your scanner. Plug the cord into AC outlet (mobile installation will be described later).
4. Turn the scanner ON by pushing POWER ON/OFF switch. The signal meter will be lit.
5. Push MEMORY RE-SET SWITCH quickly after power switch turned on, with a pointed instrument like the pointed end of a ball-pen. Do not change channel space settings once MEMORY RE-SET SWITCH is pushed, as it may cause improper reception of signals.

6. Make sure that ROD ANTENNA PLUG on rear panel is plugged into EXT ANT RECEPTACLE securely. Then, pull out antenna gently straight toward you, stand it straight up, and extend it fully. Do not apply extra power to the antenna when it is pulled out and extended, either upwards, downwards, right side or left side, as it may damage the antenna.
7. Rotate NARROW squelch control on the front panel clockwise till noise disappears. Then push FM and WIDE switches. Then FM and WIDE indicator lamps will be turned on. Turn WIDE Squelch control clockwise till noise disappears.

Now your radio is in the "first power-on" condition. The status of various features is as follows:

- a. It is scanning at slow speed.
- b. Priority is inactive; Seek Limits, SCAN-B memories and Lockout are cleared.
- c. 26,000 MHz is put into all of the 20 memory channels.
- d. The clock starts at A 12:00.

6. FRONT PANEL CONTROLS & FUNCTIONS



1. **TELESCOPIC ANTENNA**
2. **AM SELECTOR Key**
manually switches factory-set FM modulation to AM modulation.
3. **AM INDICATOR Lamp**
indicates reception, scanning, seeking or programming in AM mode.
4. **FM SELECTOR Key**
manually switches factory-set AM modulation to FM modulation.
5. **FM INDICATOR Lamp**
indicates reception, scanning, seeking or programming in FM mode.
6. **SIGNAL METER**
indicates strength of incoming signals.
7. **NARROW INDICATOR Lamp**
indicates reception, scanning or seeking in FM or AM NARROW mode.
8. **NARROW SELECTOR Key**
manually switches FM IF Filter Bandwidth to NARROW when the ratio is in FM mode.
9. **WIDE INDICATOR Lamp**
indicates reception, scanning or seeking in FM WIDE mode.
10. **WIDE SELECTOR Key**
manually switches FM IF Filter Bandwidth to WIDE when the ratio is in FM mode.
11. **BUSY Indicator**
indicates that the receiver is receiving a signal.
12. **1-20 MEMORY CHANNEL KEYS**
stores any frequencies in the tuning range of the radio and recalls when the corresponding key is depressed.
13. **LOCKOUT INDICATOR ALLOW**
indicates that the channel displayed is locked out of SCAN-B memory.
14. **CHANNEL NUMBER (1-20), LIMIT ENTRY (LE) LIMIT SEEK (L) Display:**
indicates:
 "1-20" channel number selected, programmed, scanned or captured.
 "LE" LIMIT ENTRY (LIM ENT) Key is depressed and one frequency is entered, and the radio is ready to accept another frequency for limit seek.
 "L" radio is in Limit Seek mode.
15. **PRIORITY INDICATOR**
indicates:
 "P" Priority is ON.

- 16. FREQUENCY/TIME Display**
also displays "A" for AM, "P" for PM when time is displayed.
- 17. DISPLAY PANEL**
consists of 11 digit spaces or windows in which lighted characters indicate the programming command of the keyboard.
- 18. SCAN WRITE/MINUTE ADJUSTMENT (SW-M) Key**
clears all of the memory channels previously programmed into SCAN-B memory, and newly programs memory channels for SCAN-B operation. Or, when TIME is displayed, increments one minute when the key is pushed slightly, and keeps incrementing minutes when the key is held depressed.
- 19. MEMORY WRITE/HOUR ADJUSTMENT (MW-H) Key**
Enters frequencies into the 20 memory channels. Or, when TIME is displayed, increments one hour when the key is pushed slightly and keeps incrementing hours when the key is held depressed.
- 20. SPEED CONTROL KEY**
selects scan rate of 8 or 4 channels per second, and seek rate of 16 or 8 channels per second.
- 21. LOCKOUT Key**
locks out a memory channel stored in SCAN-B memory.
- 22. PRIORITY Key**
turns PRIORITY ON or OFF. When PRIORITY is ON, samples channel 1 every 5 channels during scanning, every 10 channels during seeking, or every 2 seconds when a signal is received or time is displayed, and resumes former operation as soon as the signal on channel 1 goes off.
- 23. RESUME Key**
interrupts the signal being received.
- 24. DECIMAL Dod (.)**
places decimal point to put frequencies into scanner.
- 25. STOP/FREQUENCY/TIME (STP T/F) Key**
stops scan or seek operation, or switches display of time to frequency, and frequency to time.
- 26. 0-9 FREQUENCY SELECTOR Buttons**
to be used to put frequencies manually into the scanner.
- 27. FREQUENCY ENTRY (ENT) Key**
to be used to put frequencies and memory channels manually.
- 28. LIMIT ENTRY (LIM ENT) Key**
enters two frequencies for limit seek.

- 29. LIMIT (LIM) Key**
switches limit seek to normal seek, or normal seek to limit seek.
- 30. DOWN SEEK (DOWN) Key**
decrements one channel of a signal being displayed when pushed slightly, or starts seeking to lower frequencies, when the key is kept depressed.
- 31. UP SEEK (UP) Key**
increments one channel of a signal being displayed when pushed slightly, or starts seeking to upper frequencies, when the key is kept depressed.
- 32. SCAN-B Key**
starts scanning of selected channels.
- 33. SCAN-A Key**
starts scanning all of the 20 memory channels in sequence.
- 34. POWER ON/OFF (POWER) Key**
turns the receiver ON and OFF.
- 35. VOLUME Control**
adjusts the sound level.
- 36. SQUELCH WIDE Control**
keeps the radio quiet unless a signal is received and allows the radio to scan or seek a signal in FM WIDE mode.
- 37. SQUELCH NARROW Control**
keeps the radio quiet unless a signal is received and allows the radio to scan or seek a signal in AM or FM NARROW mode.
- 38. DELAY Control**
selectively activates 0-4 seconds delay to resume scanning or seeking after a signal goes off.

IN THE SWITCH COMPARTMENT

- 39. AUTOMATIC NOISE LIMITER (ANL)**
minimizes AM Pulse Noise, when switch ANL is ON.
- 40. MUTE ON/OFF Switch**
mutes carrier noise when a signal without modulation is received, when the switch is ON.
- 41. STOP MODE Switch**
detects modulation on a signal received during seeking or scanning, selectively stops seek or scan operation and resumes the programmed operation after a certain period depending on the setting of DELAY control.

- Position 1. Seek or scan operation stops upon receipt of a signal regardless with or without modulation on it until the signal goes off.
- Position 2. Seek or scan operation stops upon receipt of a signal regardless with or without modulation on it until the modulation disappears.
- Position 3. Seek or scan operation stops upon receipt of a signal with modulation until the modulation goes off.

42. DIMMER Switch

dims/brightens display.

43. MEMORY RE-SET Switch

clears all of the memories programmed when pushed, and will transfer new memory instructions (channel space settings, 1-20 memory channel frequencies, time, etc.) to be programmed to the micro computer of SX-400. THIS SWITCH MUST BE PUSHED BEFORE THE RADIO IS OPERATED FIRST or memories are entered when programmed one have gone off with AC power supply unit unplugged for long period of time (more than approx. 36 hours).

44. CHANNEL SPACE Switches of 7 Frequency Blocks (26 - 180 MHz)

selectively set channel space of 7 frequency blocks either 5 KHz when in upper position or 6.25 KHz when in lower position.

45. CHANNEL SPACE Switches of 5 Frequency Blocks (180 - 520 MHz)

selectively set channel space of 5 frequency blocks either 10 KHz when in upper position or 12.5 KHz when in lower position.

7. OPERATION OF SCANNER

Read this section thoroughly before attempting frequency selection or programming.

Now that you are aware of some of the flexibility of your SX-400, you are ready to enter local frequencies.

DIRECT SELECTION OF DESIRED FREQUENCIES

EXAMPLES:

To select 123.4500 MHz:

PRESS 1 2 3 . 4 5 ENT
 AM and NARROW indicator lamps turn on. (AM or FM Modulation is internally selected in accordance with the factory-set modulation on the selected frequency, and the relative indicator lamp turn on.)

READ 123.4500

When selecting or programming a frequency, you may ignore last zero(s) or decimal if the last four digits are all zeros.

If you make a mistake while selecting a frequency:

PRESS ENT
 PRESS Correct frequency ENT

If you attempt to select or program a frequency that is outside of the turning range of the receiver, Error (EEEEEEEEEE) appears in the display panel, then you simply enter a new frequency.

To select 123.4500 MHz in FM mode:

PRESS 1 2 3 . 4 5 ENT
 AM and NARROW indicator lamps turn on.

READ 123.4500

PRESS FM
 AM indicator lamp turns off, and FM indicator lamp turns on. (Factory-set AM or FM modulation is manually altered using FM or AM selector key when a signal is received. For receipt of FM signals, NARROW or WIDE FM IF Filter Bandwidth shall be manually selected. NARROW or WIDE indicator lamp turns on as selected.)

PROGRAMMING

EXAMPLES:

To programme 92.45625 MHz into Channel 16: (channel space: 6.25 KHz on No.5 band)

PRESS 9 2 . 4 5 6 2 ENT MW-H 16
 FM indicator lamp turns on. (FM or AM modulation is automatically programmed in accordance with the factory-set modulation on the programmed frequency.)

READ 16 92.4562

If you attempt to enter more than five digits after decimal, the Micro-Computer of SX-400 ignores the digit(s) after 4th digit after decimal. Also, if you try to enter odd frequency to the channel space setting, SX-400 Micro Computer will round the frequency to the nearest frequency according to the channel space setting.

To programme 92.45625 MHz into Channel 17 in AM mode: (channel spece: 6.25 KHz on No.5 band)

PRESS 9 2 . 4 5 6 2 ENT
 FM indicator lamp turns on.

PRESS **AM**
 FM indicator lamp turns off, and AM indicator lamp turns on.

PRESS **MW-H** **17**
 READ 17 92.4562

To enter a frequency found during seeking into Channel 18:

PRESS **STP T/F** **MW-H** **18**
 READ 18 along with the frequency

DIRECT CHANNEL ACCESS

To display any channel (for example: Memory channel 19), when scanning or seeking:

PRESS **STP T/F**
 READ Channel No. (when scanning) and frequency where the operation stops.

PRESS **19**
 READ 19 along with frequency

SEEKING – NORMAL SEEK

To put your receiver in normal seek mode, adjust the squelch controls properly.

SELECT Narrow or Wide IF Filter Bandwidth for FM reception.
 PRESS **NARROW** or **WIDE** selector key
 Narrow or wide indicator lamp turns on as selected.

SELECT A frequency within the tuning range of the receiver, from where seek starts.
 PRESS **UP** or **DOWN** key
 READ Rolling frequencies until a signal is received. When a signal is received, seek will stop, and display will show:
 – the frequency being received.

AM or FM modulation is manually altered when a signal is received and seek stops.
 The modulation returns as factory-set as soon as the receiver resumes seeking.

To stop seeking:

PRESS **STP T/F**

SEEKING – LIMIT SEEK

To seek for signals continuously between two frequencies:

EXAMPLES:

To seek between 139.9 MHz (factory-set modulation: AM) and 140.05 (factory-set modulation: FM)

PRESS **1** **3** **9** **.** **9** **ENT**
 Am and NARROW indicator lamps turn on.

READ 139.9000

PRESS **LIM ENT** "LE" appears in the 2nd and 3rd spaces of display panel. Frequency display disappears.

PRESS **1** **4** **0** **.** **0** **5** **ENT**
 READ L 139.9000

PRESS **NARROW** or **WIDE** selector switch for FM reception.

PRESS **UP** or **DOWN** key to start seek.

To seek between 139.9 MHz and 140.05 MHz on AM or FM mode throughout the range:

PRESS **1** **3** **9** **.** **9** **ENT**
 AM and NARROW indicator lamps turn on.

READ 139.9000

PRESS **AM** or **FM** to select AM or FM modulation throughout the limit seek range.
 AM indicator lamp turns off and FM indicator lamp turns on, when FM selector key is depressed.
 The modulation selected after **ENT** key was pushed prevails over the limit seek range entirely.

PRESS **LIM ENT** "LE" appears in the 2nd and 3rd spaces of display panel. Frequency display disappears.

PRESS **1** **4** **0** **.** **0** **5** **ENT**
 READ L 139.9000

PRESS **NARROW** or **WIDE** selector key for FM reception if needed.
 Narrow or Wide indicator lamp turns on as selected.

PRESS **UP** or **DOWN** key to start seek

To switch limit seek from normal seek, or normal seek to limit seek:

PRESS **LIM**
 "L" appears in the 2nd space of the display panel, when the receiver is in Limit Seek mode.

SCANNING - SCAN-A

To put your receiver in SCAN-A mode for all of the 20 programmed channels, adjust the squelch controls properly.

SELECT NARROW or WIDE FM IF Filter Bandwidth for FM reception.
PRESS **NARROW** or **WIDE** selector key
Narrow or Wide indicator lamp turns on as selected.

PRESS **SCAN-A**
READ Rolling channel numbers and frequencies. When a signal is received on a channel, scanning will stop and display will show:
— the channel number being received
— the frequency being received

Scanning is resumed to the next channel after the signal on the channel goes off after a certain period depending upon DELAY control setting.

To stop SCAN-A operation:

PRESS **STP T/F**

SCANNING - SCAN-B

Your may wish to scan certain frequencies only and skip the remaining channels over.

To programme the selected channels (for example: Channels 8, 12, 15 and 19) for SCAN-B operation:

PRESS **SW-M**
PRESS **8 10 10 12 15 15 15 19 ENT**
All of the memory channels previously programmed for SCAN-B operation, if any, will be cleared when **SW-N** key is depressed, and the channels 8, 12, 15 and 19 are newly programmed.

If you depressed unwanted memory channel by mistake, depress the same memory channel key again. Lockout Arrow (⇐) appears in the 1st space of the display panel indicating the channel shown is locked out of the SCAN-B memory. If a channel is locked out by mistake, depress the same memory channel key once again, then the channel is entered into SCAN-B memory and lockout arrow (⇐) disappears from the display panel.

To put your receiver in SCAN-B mode for the selected channels:

SELECT NARROW or WIDE IF Filter Bandwidth for FM reception

PRESS **NARROW** or **WIDE** selector key
Narrow or Wide indicator lamp turns on as selected.

PRESS **SCAN-B**
READ Rolling channel numbers and frequencies of the selected channels. When a signal is received on a channel, the scanning will stop and display will show:
— the channel number being received
— the frequency being received

To stop SCAN-B operation:

PRESS **STP T/F**

SPEED

To scan or seek slowly or rapidly (4 or 8 channels per second in SCAN mode, 8 or 16 channels per second in SEEK mode):

PRESS **SPEED** To alter scan or seek rate, PRESS **SPEED**

DIM

To dim display: Slide **DIM** switch up .

To brighten display: Slide **DIM** switch down

TIME

To display time from 12-hour clock, stop scan or seek operation, if in process, then:

PRESS **STP T/F**
READ A 12-00
PRESS **MW-H** key to the desired hour display. One slight push adds one hour. Holding the key depressed adds hours sequentially.

PRESS **SW-M** key to the desired minute display. One slight push adds one minute. Holding the key depressed adds minutes sequentially.

To remove time from display for frequency: PRESS **STP T/F**

To remove frequency from display for time: PRESS **STP T/F**

To set second to "00" internally for very precise time setting (second will not be displayed):

PRESS **ENT**

PRIORITY

This selectable feature will permit you to hear channel one (1) any time it is active, regardless of any other receiver mode. Put your favorite frequency in Channel 1, then:

PRESS **PRIORITY** "P" is displayed

to de-select PRIORITY:

PRESS **PRIORITY** again, then "P" disappears

DELAY

Your scanner may be selectively programmed to pause for 0 to 4 seconds on a channel after a signal received during scanning or seeking goes off.

To set DELAY Control:

TURN DELAY control to the desired position.

LOCKOUT

You may wish to lock out a channel from SCAN-B memory. To programme LOCKOUT on a channel, depress the memory channel key and make sure that no lockout arrow (⇐) appears in the display panel, then depress **LOCKOUT** key. Lockout arrow (⇐) appears in the 1st space of the display panel. A channel now being received with the unit in SCAN-B mode can be locked out just by depressing **LOCKOUT** key.

To remove LOCKOUT:

PRESS **LOCKOUT** again
Lockout arrow (⇐) disappears.

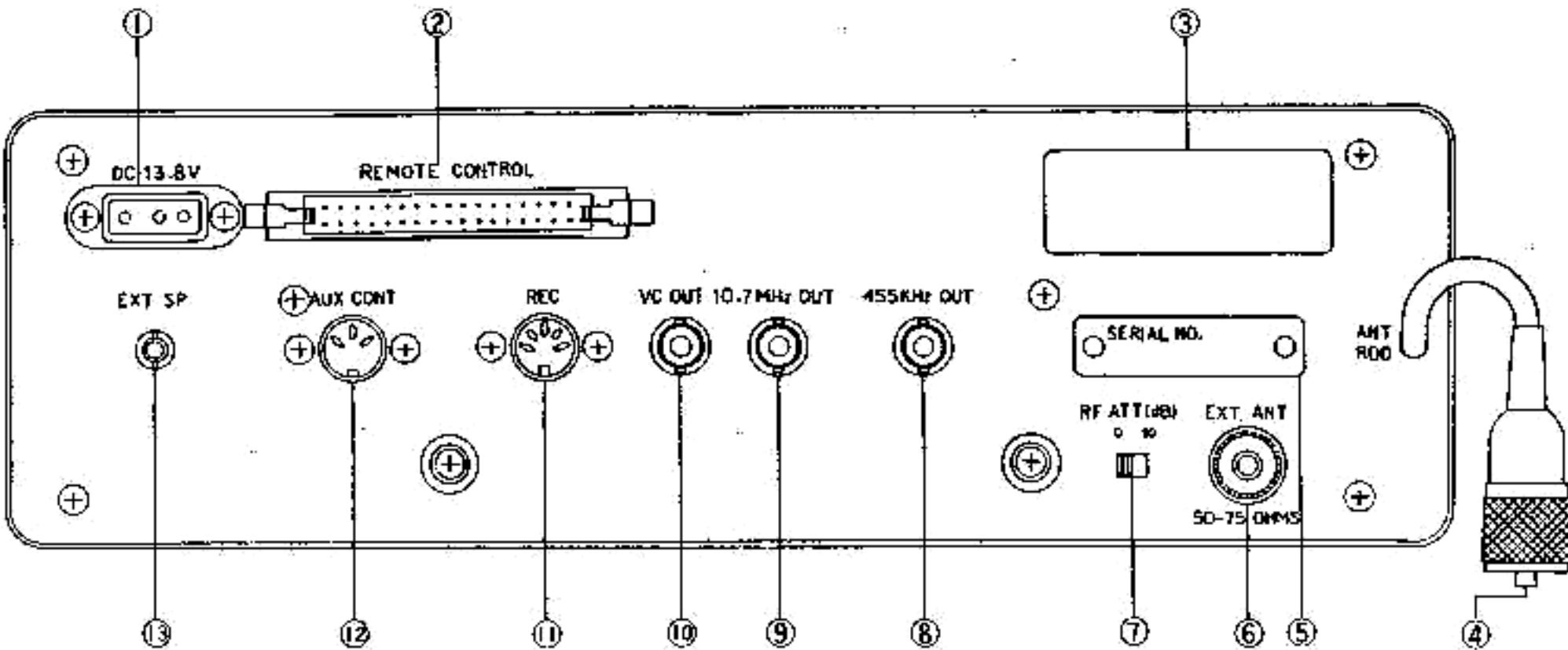
RESUME

When receiving a signal, you may wish to interrupt the signal and return the ratio to operation mode before the signal was received. Then,

PRESS **RESUME**

The signal being received is interrupted and the receiver returns to the operation mode before the signal was received.

8. FUNCTIONS ON REAR PANEL



- 1. RECEPTACLE for POWER CORD
- 2. RECEPTACLE for DATA INTERFACE
- 3. NAME PLATE
- 4. ROD ANTENNA PLUG
When Rod Antenna is used, ROD ANTENNA PLUG should be plugged into Receptacle for External Antenna (6.) securely.
- 5. SERIAL NO. PLATE
- 6. RECEPTACLE for ROD ANTENNA PLUG or EXTERNAL ANTENNA or RF CONVERTER
- 7. RF ATTENUATOR
attenuates strength of incoming signal.
10 dB — to be used in the strong signal area
0 dB — to be used in the normal or weak signal area

8. 455 KHz OUTPUT JACK

connects to the other equipment for this frequency.

9. 10.7 MHz OUTPUT JACK

connects to the other equipment for this frequency.

10. VC OUTPUT for RF CONVERTER

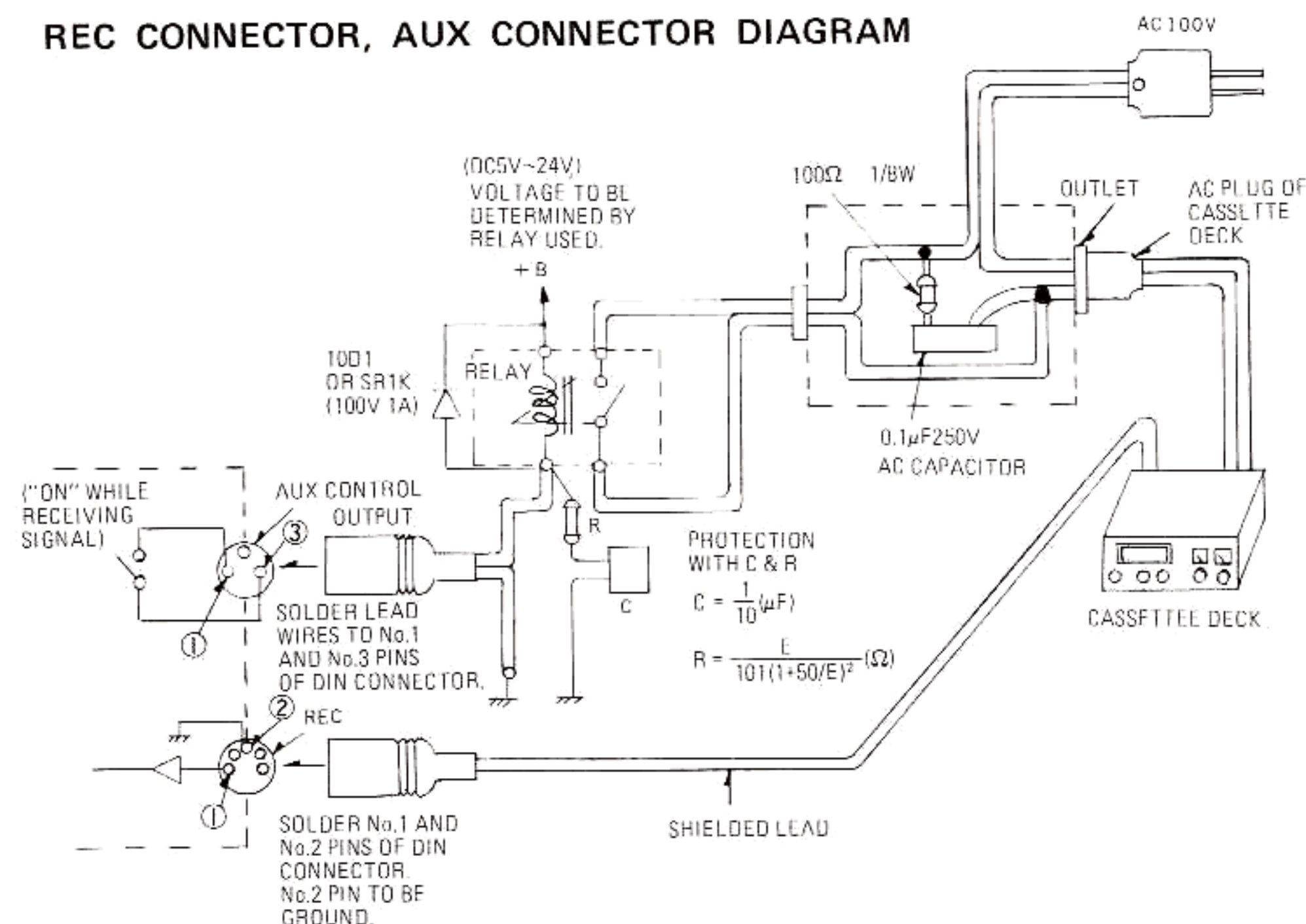
11. RECORDING OUTPUT (REC)

connect the output of open reel type or cassette tape deck to record.

12. AUX. CONTROL OUTPUT

ON/OFF control of auxiliary equipment (tape recorder) using relay. Rating of AUX. CONT. terminal: Max. 100V, 0.5A. Relative relay is incorporated. For protection of the receiver, it is recommended to add following circuits.

REC CONNECTOR, AUX CONNECTOR DIAGRAM

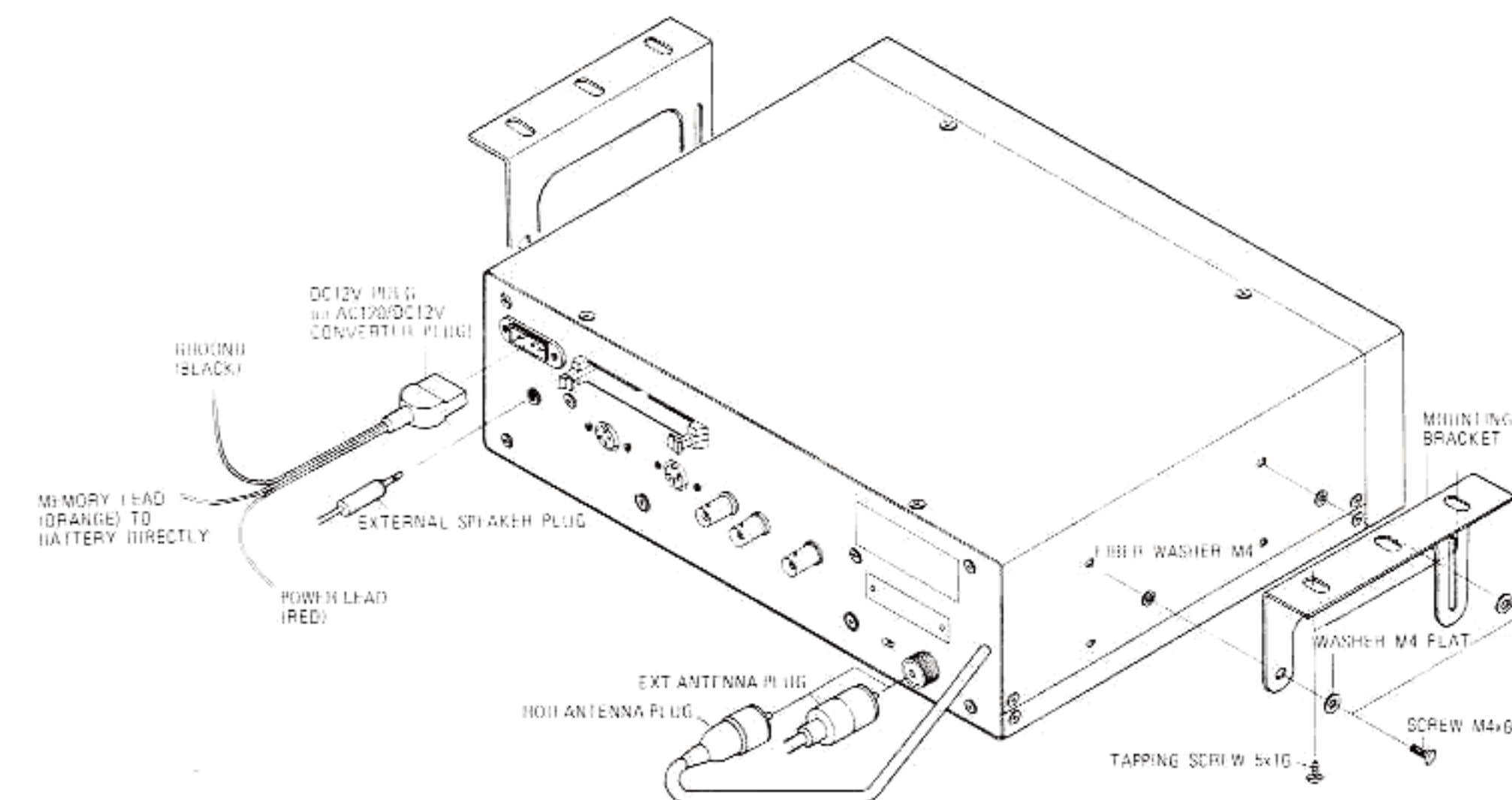


13. OUTPUT for EXTERNAL SPEAKER

9. AUTOMOBILE INSTALLATION PROCEDURES

Make sure that your vehicle or boat has a 12 volt negative-ground system. Then,

1. Attach the mobile mounting brackets to the scanner as shown below.
2. Select a location under the metal dash to hold the scanner and mark the location for mounting holes on each of the top bracket. Drill the four mounting holes of approx. 9/56" (4 mm).
3. Remove the bracket from the scanner. Secure the top bracket to the dash using two 11/56" (5 mm 5x16) self-tapping screws (provided) for each bracket.
4. Mount the scanner with the four screws (M4x6), fiber washers (M4) and flat washers (M4) (PROVIDED).
5. Tilt the scanner to the desired angle, and fasten the screws securely.
6. Connect the DC power cable to the insulated terminal on the rear panel of the receiver; attach memory lead (orange) on the other end of the cable to the car battery DIRECTLY, power lead (red) to one of the fuse circuits which is disconnected by the vehicle ignition switch, and ground lead (black) to the car metal body. Be sure that radio cabinet is well-grounded to the car metal.
7. Connect an appropriate mobile monitor antenna designed for multi-band coverage to the scanner.



10. OPERATION HINTS

Your SX-400 is versatile instrument. The following operation hints will help you use all of its features.

1. Your SX-400 accepts 4 digits after decimal for entry and display. The micro computer of your SX-400 will raise or cut to the nearest frequency if an odd frequency to the channel space setting is selected.
2. When programming or selecting a frequency, you may ignore decimal if the last four digits are all zeros or last numbers are zeros, as they will be entered automatically. Thus, program 39.0000 as 39 or 125.30000 as 125.3.
3. If you make a mistake during selecting or programming a frequency, simply depress **ENT** key, then start again.
4. If you depress a memory channel key by mistake during programming channel numbers for SCAN-B memory, depress the memory channel key in sequence or depress **LOCKOUT** key. Lockout arrow (←) appears in the 1st space of the display panel. When a memory channel is manually selected and if no lockout arrow appears, the channel is stored in the SCAN-B memory. Thus you may visibly check with the lockout arrow which channels are stored in or locked out of SCAN-B memory.
5. If you want to enter a new frequency into a channel previously programmed, simply enter the new frequency into the channel. The former frequency is erased and the new frequency is entered into the channel.
6. AM or FM modulation has been set at factory on each of the 12 frequency blocks. The modulation is manually altered when a signal is received. Also, the AM or FM modulation is programmed into 1-20 memory channels, and your SX-400 scans each channel as programmed. When normal seeking, AM or FM modulation alters automatically in accordance with the factory-set modulation. When limit seeking, AM or FM modulation alters automatically as well, unless otherwise either modulation is programmed for the entire limit seek range. When a signal is received during seeking or scanning, the modulation can be manually switched by depressing **AM** or **FM** selector key. SX-400 will resume seek in accordance with the factory-set modulation, or limit seek in the programmed modulation mode, if in case.
7. IF Filter Bandwidth (NARROW or WIDE) is manually selectable on FM, not programmable. IF Filter Bandwidth on AM is always in NARROW mode. FM "WIDE" is mainly for commercial/TV broadcasts, etc. FM and AM "NARROW" are mainly for telecommunications. WIDE signals are cancelled during scanning or seeking in NARROW mode. (Scanning or seeking may stop on WIDE signals but will resume the operation after a pause by DELAY control setting.) When voice of a signal manually selected is of distorted and raspy quality with the unit in NARROW mode, the transmission may be in WIDE mode. Then push **WIDE** selector key to alter the IF Filter Bandwidth. When output of a signal received with the unit in WIDE mode is significantly low considering the volume control setting, the transmission may be in NARROW mode. Then push **NARROW** selector key to alter the IF Filter Bandwidth. Scanning or seeking in FM WIDE mode may stop on NARROW signals, which can be detected with very low output of the signal.
8. When very weak signals are received, the marginal nature will sometimes allow to seek or scan to resume before the transmission is complete. This may be remedied by advancing squelch control manually to slightly below the noise threshold (its most sensitive setting.)
9. This receiver has high noise immunity because of quieting squelch system. However, in case of strong interfering noise or signals, set RF Attenuator switch on the rear panel to "10 dB" to attenuate the strength of incoming noise or signals. (It is also advisable to set this switch at "0 dB" in ordinary case.) Or, it may be desirable to reduce the length of the antenna to reduce noise pick-up below a critical level.
10. DELAY: When the receiver is scanning or seeking, it will remain on a particular channel as long as a signal is received. As soon as the signal goes off, the receiver resumes to the programmed operation. Also, if it is a "DUPLEX" channel, you will want to scan quickly to the next channel which you may have programmed to receive the reply. If a repeater is being monitored, the signal usually stays on the air long enough for both sides of the conversation to be heard. However, many transmissions are "SIMPLEX"; both transmitters are on the same channel. By setting DELAY control rotating clockwise, maximum 4 second pause will occur after the signal goes off the air before the receiver resumes its scan or seek function. You can vary the DELAY time as long as you want between 0 and 4 seconds.
11. Your SX-400 has a very precise clock, and hour and minute are displayed in the display panel. Also, you can adjust second to "00" by depressing **ENT** key, though seconds are not displayed. It is advisable to set time very accurately using the second-clear **ENT** key.

12. Your SX-400 has no birdie-interruptions, and enables sequential reception of signal:
 - a. If you want to receive all of the signals including carrier, set STOP MODE switch at Position 1. Scan or seek will stop upon receipt of a signal until the signal goes off, and resume its programmed operation depending on DELAY control setting. If you do not like noise of carrier signals, turn MUTE ON/OFF Switch ON by sliding it up. You can confirm the presence of carrier signals with BUSY indicator and SIGNAL METER even when the carrier signals are muted and the receiver is silent.
 - b. If you want to receive signals with modulation (voice) and also want to confirm the presence of carrier signals, set STOP MODE switch to Position 2. Scan or seek will stop upon receipt of a signal and stay on the channel as long as modulation (voice) on it, and resume its programmed operation depending on the DELAY control setting.
 - c. If you want to scan or seek only the signals with modulation (voice), set STOP MODE switch to Position 3. Scan or seek will stop only on the signals with modulation (voice).
13. As shown before, your SX-400 is installed in a vehicle. If the receiver picks up AM Pulse noise, turn AUTOMATIC NOISE LIMITER (ANL) switch on in the switch compartment to minimize the noise.
14. If power supply is used other than P-1A, make sure that it is regulated one of more than 1.0 ampere. Attach the connector cord (provided) to the power supply, with power lead (red) and memory lead (orange) of the connector cord to the power lead, ground lead (black) to the ground lead of the power supply.