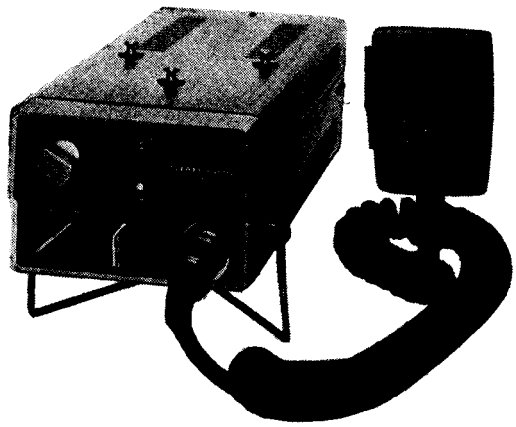
OPERATING INSTRUCTIONS

STANDARD

C140

144 MHz FM 10W
12CH + MEMORY CH



STANDARD RADIO CORP.
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Phone : 0427-43-1111
Cable : TLX 2872-210 DRADNATS TOKYO

Thank you for having purchased **STANDARD C 140**, the full solid state FM transceiver for the amateur radio in 144 MHz band. Your unit composed of the high-gain, high-efficiency transistors, crystal filters, and many other world top quality parts, has been developed by your STANDARD RADIO CORPORATION with unsparing applications of its traditionally held ultraminiaturization techniques and with its personal considerations given from the standpoint of hams as the actual users. STANDARD RADIO CORPORATION proudly presents **C 140** turned out from its modern facilities with its confidence that a number of the product's features and great reliability will provide you with satisfaction.

TABLE OF CONTENTS

1. Features of C 140

We know that lighter and smaller high-performance equipment creates new application, and this is quite true of **C 140**. Such features and many others of this Model as mentioned below will enable all of you—from beginners to veterans—to enjoy a broader scope of the usages as a sister version of **C 430**:

1. Small Size and Light Weight

   This new FM radio, smaller in volume than a half of the comparable products of this Company and as light as 0.96 kg, has succeeded in finding its installation space for mobile station use at vehicle driver's seat area instaed of assistant driver's which has been exclusively used for this purpose in the past, ushered in the debut of a new type mounting metal bracket.

2. Push-In/Pull-Out Metal Bracket

   This metal bracket has simplified the attaching and detaching processes of **C 140** on a single motion basis. For attaching, just snap your radio into the bracket. The reverse consequence can be obtained by simply snapping it off toward you. The bracket with the radio off therefrom is an evenly faced sheet metal, which therefore prevents rattling causable during the vehicle operation and also protects your feet against a possible hazard from a sharp projection.

   Such attaching and detaching processes do not require you to put in your hands on the sides of the rig. Thus, the attaching process brings the sides of the rig into a close contact with their corresponding parts. The rig's occupany of small space serves for the efficient employment of the limited interior room of the car.

3. Capacity of 12 Channels Plus 1

   C 140 contains an extra channel—" memory channel "—in addition to the regular 12. Place the crystal for a specific frequency in the crystal socket of this memory channel, and a shift to the memory channel will be possible, regardless of the position of the channel selector. The memory channel indicator lamp illuminates in orange color when the rig is operating on the memory channel.

4. Remote-Controlled Switching of Memory Channel

   The memory switch conveniently located on the handheld microphone can perform a quick " ON " operation of the memory channel.

5. Single Crystal System Commonly Used for Transmission and Reception

   The adoption of the single crystal system, in which one crystal is used for a common purpose of transmission and reception of signals, has opened the way to an economical addition addition of channels and the very expedient experiment or operation in joint use of multifarious external oscillators.

6. Professional-Minded Circuit Design

   FETs, silicon transistors and diodes are abundantly used in the circuatry designed with our professional mind and latest technical knowhow.

(a) Receiver

(1) High Sensitivity

High Sensitivity design as represented by the −4 dB QS sensitivity 20 dB and the over 35 dB S/N at 0 dB input.

(2) Excellent Cross-Modulation Characteristics

The excellent cross-modulation characteristics derive from the use of FETs for the radio frequency amplifier the first and second mixers, the removal of the first intermediate frequency (IF) amplifier, and the gains distribution made with our new technical approach.

(3) Ceramic Filter

The two ceramic filters in the second IF amplifying stage play a role for the alleviation of ripples within pass band and for better selectivity characteristics.

(4) Integrated Circuits

The second IF amplifying stage consistorized 3-stage amplifying unit plus the integrated circuitry showing very good limiter effect.

(5) Squelch Circuit

The squelch circuit is a noise rectifier type enjoying an established reputation for mobile station use, and the circuit operates securely, thanks to the high gains resulting from the 2-stage noise amplification.

(6) Squelch Time Constant

With the squelch unit (accessory) connected to the accessory terminal on the rear panel, the squelch time constant can be changed to the best suitable for respective uses as mobile and fixed stations.

(7) 4 W Output at Audio Frequencies

The maximum output at audio frequencies, being as much as 4 W, will permit the operation of your transceiver at an adequate sound level while in driving even on extraordinarily noisy expressways.

(8) "Busy" Indicator Lamp

The green lamp turns off and on in association with the squelch circuit, irrespective of the position of the volume control knob, to clearly indicate which rig is receiving the signal. This lamp is convenient in a parallel operation at 50 MHz, 430 MHz, and other bands.

(9) High Sensitive Incoming Signal Meter

This incoming signal meter, containing a meter amplifier designed to swing the pointer in response even to weak incoming signal, can show in detail a change in the input voltage of the antenna.

(b) Transmitter

(1) High-Gain, High-Efficiency Transistors

Adoption of the newly developed high-gain, high-efficiency transistors, as seen in the final stage provided with the Toshiba made 2 SC 1242 A, gives sufficient margin to the operation.

(2) Offset Mixer Provided with FET

The MOS FET incorporated in the offset mixer of the signal transmitting section reduces the occurrence of spurious radiation.

(3) Direct FM Modulation System

The 21.4 MHz frequency from the offset oscillator undergoes direct FM

modulation. This system has succeeded is wiping out the difference in the modulation degree between the channels.

(4) Twisted Wire

Twisted wire is used for stable impedance conversion and wide bandwidth characteristics.

(5) Splatter Filter

The RC network filter and the transistor operated splatter filter provide high clarity and high average level of modulation, and cause no interference with other channels through expansion of the band occupancy.

(6) Microphone Gain Control

A semi-fixed resistor for microphone gain control is mounted on the main printed wiring board for transmitter.

(7) Transmitter Indicator Lamp and Meter

When the push button on the microphone is pressed, the red pilot lamp illuminates to show that the transmitter is in a transmitting mode. During the transmission, the meter indicates the relative value of the transmitting output.

7. Channel Selector with Short-Circuiting Ring

The channel selector of **C 140** is provided with a short-circuiting ring to preclude the possible interference caused when additional channel quarts crystals have been installed or when the frequencies of neighboring channels have been adjusted, thereby helping make the frequency alignment much easier during the installation of additional channel crystals. The trimmer capacitor for delicate alignment for both the transmitter and receiver can perform accurate adjustment of all the channel frequencies.

8. Uncasing Possible with No Help of Tools

Uncasing is possible with the two screws in the rear removed by the fingertip operation. This feature lends itself to the addition of the channel and other purposes.

9. Anodized Alminum Chassis

Anodized alminum is used for both the case and chassis. The main chassis is 2 mm thick for an adequate mechanical strength and designed to show good heat sink effect.

10. Green Lighting

Anti-dazzling green lights are employed for both the meter and channel indicators to avoid glariness otherwise caused during the nocturnal operation of **C 140** as a mobile station while in driving a car, thereby assuring a safer driving.

11. Antenna Connector

The M-shaped antenna connector screws have their pitches available commonly in both inch and millimeter.

12. Microphone Connector withe Speaker Terminal

A ♯4 pin connector is used for microphone connection. The audio frequency output linked to the ♯4 pin permits the connection to a telephone handsed as

well as the microphone.

13. Accessory Terminal (A. T.)

A 9 pin accessory terminal is available on the rear for different connections of accessory units from outside.

14. Wide Range of Operating Temperature

The operating temperature widely ranging from −30 degrees C to +60 degrees C is good enough for mobile operation even in severely cold environments.

15. Microphone withe Memory Switch

The memory switch on the microphone and the micro switch used as a push-to-talk switch help perform sharp switching from transmission mode to reception mode and vice versa. The Neoprene coil used as the microphone cord serves to maintain its flexibility even in the coldest season.

16. Attachable/Detachable Stand

The attachable/detachable stand furnished can facilitate the use of **C 140** as a fixed station.

17. Power Supply Protective Circuit

The power supply circuit is provided with a protective function so as to keep the internal circuit from any possible damage caused in wrong connection with reverse polarity of the power supply.

2. Cautions Prior to Use

The following precautions must be observed for the maximum performance of your **C 140** and for your enjoyment of better ham life:

1. DO NOT connect or disconnect the power supply cord while keeping the power supply switch at "ON" position.
2. DO NOT connect or disconnect the antenna or external speaker while keeping the power supply switch at "ON" position.
3. DO NOT Push the microphone switch with the antenna left disconnected.
4. BE SURE to replace the blown-off fuse with a new one of the designated 3 A rating.
5. Check to see the polarity of the electrical system prior to the power supply connection. **C 140** is constructed for negative grounding with the black lead to be grounded.

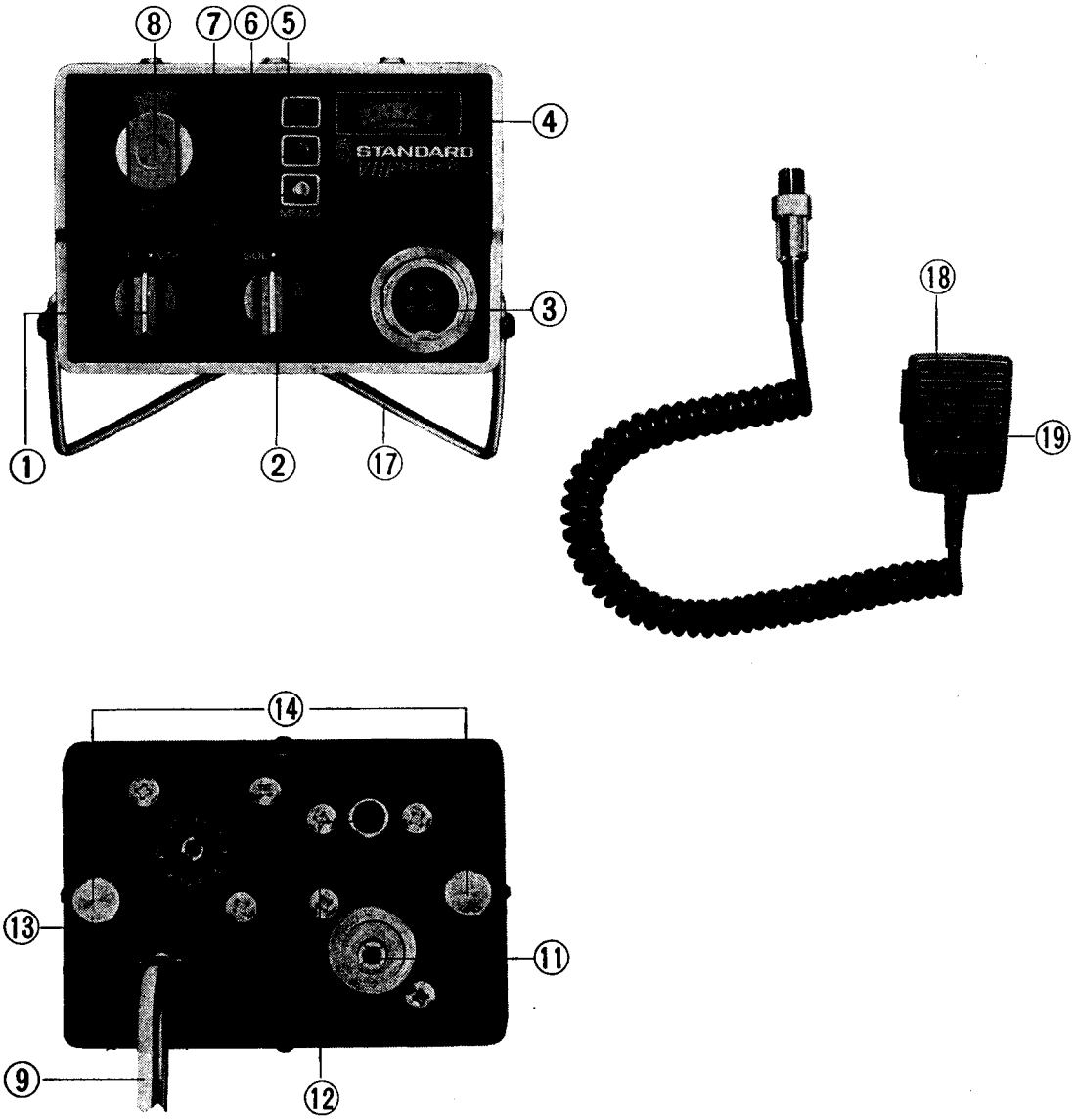


Figure 2-1

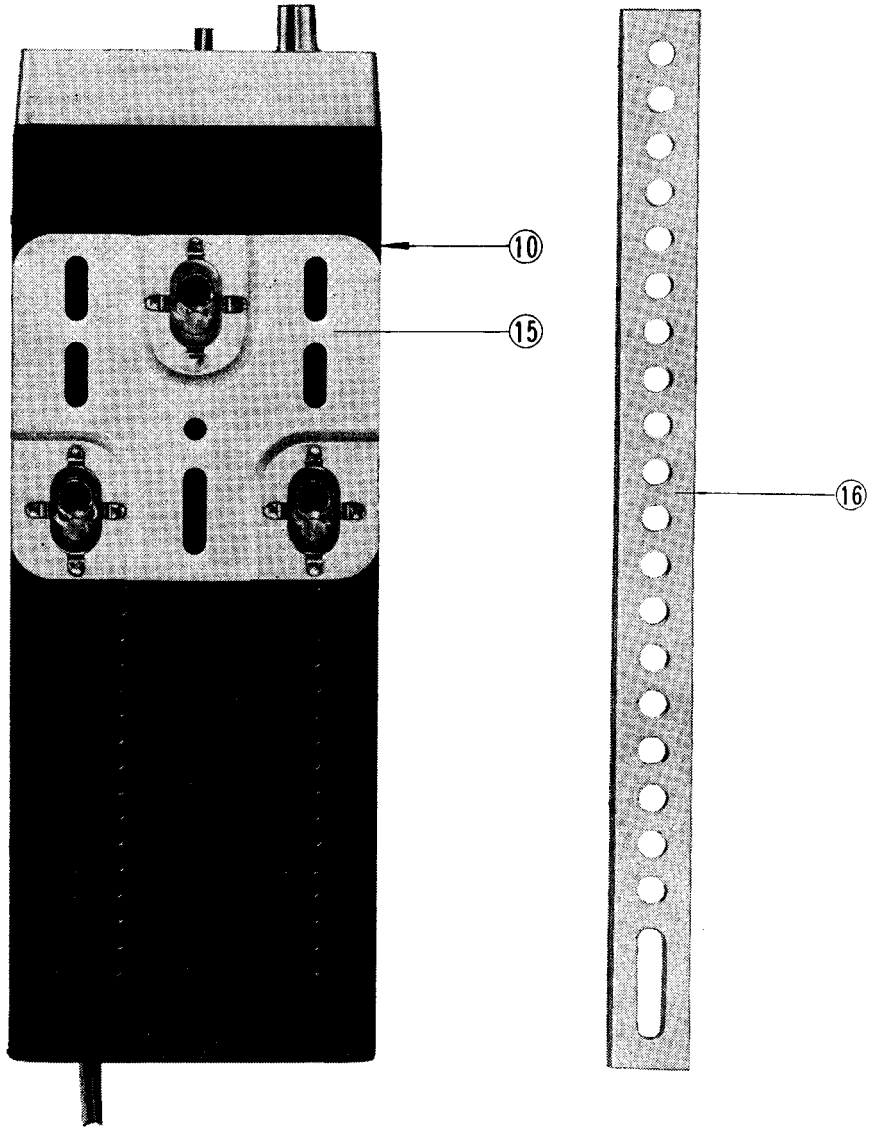


Figure 2-1

①	Volume Control Knob/ Power Switch	⑧	Channel Selector	⑮	Mounting Metal Bracket
②	Squelch Control Knob	⑨	Power Supply Cord	⑯	Auxiliary Mounting Metal Bracket
③	Microphone Connector	⑩	External Oscillator Connecting Terminal	⑰	Stand
④	Meter	⑪	Antenna Connector	⑱	Microphone
⑤	Signal Transmission Indicator Lamp	⑫	External Speaker Terminal	⑲	Memory Switch
⑥	"Busy" Indicator Lamp	⑬	Accessory Terminal		
⑦	Memory Indicator Lamp	⑭	Case Mounting Screws		

3. Installation Procedures

Determine the installation position with your heed paid to the following points prior to the installation:

1. Is there any unnatural posture required in the operation of the channel selector and other control knobs?
2. Are all the control knobs and meter scale face located in plain view?
3. Isn't the installation position of the rig for use as a mobile station impeding the general motions of the vehicle driver or the operator of **C 140**?
4. Specifically for use as a mobile station, make sure not to place the transceiver anywhere near a heater duct, air conditioner's exhaust mouth, air intake mouth and the like.
5. Refrain from mounting the radio on such places as exposed to rainfall and sea water. Although there is no restriction as to the installation posture of **C 140**, it is recommended that the body of the radio be set upright for use in yachts, commercial vehicles, etc.

Now, have you decided on the installation position of your radio? If you have, take the following installation procedures:

1. Take out the furnished mounting metal bracket ⑮ and attach it on the body of the radio.
2. Position the mounting bracket in predetermined installation place, make a bore for the bracket with a 5 or 5.5 mm drill, and secure it with the supplied screws and nuts, preferably at three or more places. Use wooden or tapping screws according to the mounting plane.
3. Set the body of the radio again on the mounting bracket.
4. Connect the power supply. At this time, again, make sure of the polarity of the electrical system.
5. Perfectly connect the antenna to the antenna connector ⑩ (See Figure 2-1).
6. Connect the microphone to the microphone connector ③ on the front of the radio, and fix the supplied microphone hanger on a convenient place for lifting the microphone. (See Figure 2-1).

The installation is completed. Now, yo are ready to start the communication.

4. Communication Procedures

1. Preparation for communication

   First, turn the SQL knob ② fully in counterclockwise, and then set the channel selector ⑧ to the channel you desire to use. For use of the main channel (144.48 MHz) located in the memory channel, turn on the microphone memory switch and turn off others than the main channel.

2. Turn on the power supply switch

   Revolve the VOL. OFF knob ① in clockwise until it clicks and actuates the power supply as indicated by the lighting of the channel selector and meter indication lamps.

3. Adjust the volume

   As you go on rotating the VOL. OFF knob ① in clockwise, yon will come to a point where a rustling noise—or the conversation in the case someone is talking over the channel—becomes audible. Set the knob to appropriate volume as you are listening to such noise or conversation over other station.

4. Setting of Squelch Control

   Turn the channel selector, and set the SQL knob ②, uing a disengaged channel. Revolve the knob slowly in clockwise until you come to a point where a noise suddenly extinguishes. Set the SQL knob on this point, and you will hear no noise but the incoming signal alone through the speaker. In this condition, the signal is of very poor clarity even when the squelch circuit turns off and on to the incoming signal. If this is disturbing, turn the SQL knob slightly further to the right and set it at an appropriate position.

5. Transmission

   Take up the microphone, press the microphone push button, and start talking slowly and distinctively in neither too loud nor too low a voice but at normal vocal level. At this time, the red lamp in the front illuminates to show the transmitting status as long as the push button remains pressed. Simultaneously, the meter indicates the comparative value of the transmission power. Now, your voice is out on the air.

5. Memory Channel

C 140 contains one memory channel in addition to the regular 12 channels. The transmitter and receiver are equipped with the completely independent crystal oscillators for the 12 channels and the memory channel respectively. In the actuation of the 12 channels, the oscillation is suspended with the interrupted base bias of the memory channel oscillator, whereas in the actuation of the memory channel, the emitter of the 12 channels oscillator is reversely biased for halt of oscillation. This switching is implemented with the transistor switch operated by the memory switch on the microphone. Therefore, if the memory switch is set at "ON" position, shift to the memory channel takes place, no matter on which position the channel selector is placed. During the operatioh of the memory channel, the memory indicator lamp on the front panel illuminates in orange color.

WARNING: This Company made microphones without the memory switch (CMP 01, CMP 07, and CMP 08) perform automatic switchover to the memory channel and reject the switchover to the regular 12 channels.

Use either the special channel for your club use or the calling channel as the memory channel. **C 140** is shipped from the factory with the crystal oscillating unit of the calling channel (144.48 MHz) set in the memory channel.

6. "Busy" Indicator Lamp

The green "busy" indicator lamp on the front panel turns off and on under the voltage of the Q 307 emitter varied to the "OFF" and "ON" operation of the squelch circuit. This indicator lamp, which is independent of the audio output, illuminates in green to show that transmitted signal is being received, even if the volume control is turned down, and when in parallel use of the rigs for 50 MHz, 430 MHz and others, the green lamp tells from which rig the sound is being received.

7. Meters

Meter ④ indicates the strength of the incoming signal in the receiving process, and the comparatite value of transmission power in the transmitting process. During reception of transmitted signal, the magnitude of the incoming signal to swing the pointer 8 graduations is equivalent to about 5 μV (14 dB). The indication of the output of the transmitted signal is arranged in about 8 graduations. See Figure 7-1 for the relationship between the incoming signal in reception and the scale of the merer.

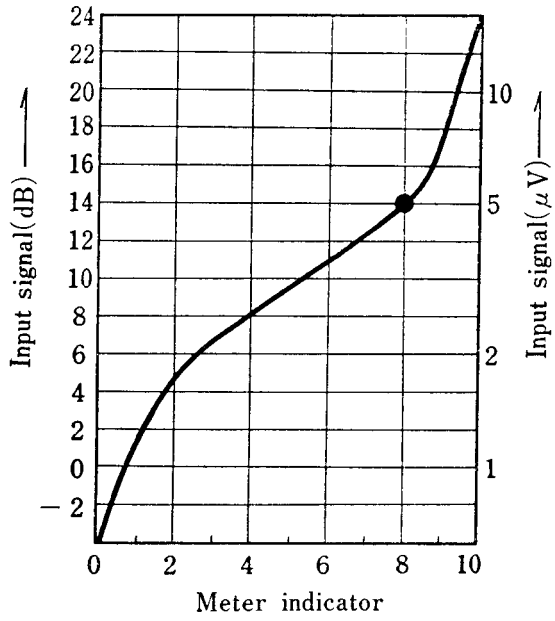


Figure 7-1

8. External Oscillator

C 140 can be operated with an external oscillator, using the external oscillator connecting terminal connected as shown in Table 8-1 below:

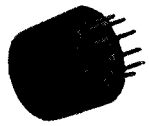
Terminal No.	Connection
1	Grounding
2	Microphone input terminal, common with the microphone connector ♯1
3	Memory channel oscillator output
4	
5	First local oscillating input
6	FM detector output, common with accessory terminal (A. T.) ♯6
7	Memory channel oscillator input
8	+13.8 V in signal transmission
9	+13.8 V, Power supply after the power switch has been turned on

Table 8-1

The external oscillator is suitable to actuate **C 140** with the memory switch on the microphone instead of the memory channel oscillator. For the respective input frequencies at the external oscillator input terminals, see Section 14 Channel Increase.

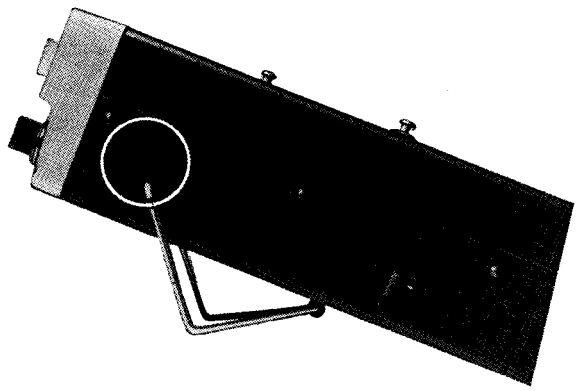
9. Squelch Unit

The squelch time constant for the body of **C 140** is made short. For longer squelch time constant, it is recommended that the furnished squelch unit be inserted in the accessory terminal. The squelch unit is designed to allow the connection of a chemical capacitor to #1 and #4 pins of the accessory terminal. #4 pin, connected to the base of the SQL SW Q 311, lengthens the time constant in parallel with C 357. Replace the chemical capacitor of the squelch unit, and change to your desired time constant.



10. Stand

C 140 is provided with the stand ⑰ for use as a fixed station. Insert the stand into the small bores on both sides of the case as shown in the photo below.



11. Adjustment of Microphone Sensitivity

The microphone sensitivity is adjusted to best meet the purposes of mobile and fixed stations. However, any further adjustment of the sensitivity will be made by means of the semi-fixed resistor R 301 as shown in Figure 11-1 below.

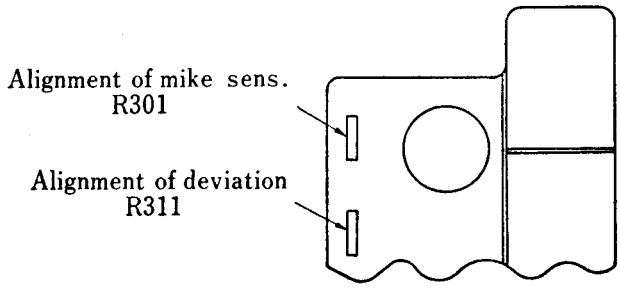
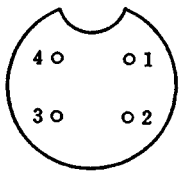


Figure 11-1

12. Microphone Connecsor

Microphone connection will be made as indicated in the Figure below.

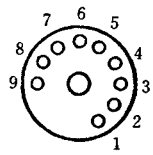
Figure 12-1



#1. Hot microphone terminal (common with AT-2)
#2. Grounding terminal (common with AT-1)
#3. Microphone push-button switch terminal common with AT-3)
#4. Audio output terminal (common with AT-7)

13. Accessory Terminal

The accessory terminal connection will be made as shown in Table 13-1. You can devise various accessory connections, using this terminal.



AT

Terminal No.	Connection
AT-1	Grounding
AT-2	Microphone input terminal, common with the microphone connector ♯1
AT-3	Push-to-talk switch, common with the microphone connector ♯3
AT-4	Squelch output, connected to the base of Q311
AT-5	
AT-6	FM detector output
AT-7	Audio frequency output, external speaker auxiliary terminal
AT-8	+13.8 V, Power supply before power supply switch has been turned on
AT-9	+13.8 V in signal reception

14. Channel Increase

1. Specification of Crystal Oscillating Unit

Use the crystal oscillation unit in the size of HC 25/U.

The same formula for the computation of the frequency of the regular two-crystal basis crystal oscillating unit for signal reception is applicable to **C 140**, whose signal reception and transmission are made commonly on single crystal basis.

The first local oscillating frequency of **C 140** multiplies by 8 times, and the first intermediate frequency is 21.4 MHz. Therefore, the frequency of the crystal oscillating unit can be obtained from the formula:

fo=fr−21.4/8, where fo represents the frequency in MHz of crystal oscillating unit, and fr stands for the desired transmitting and receiving frequency in MHz.

The transmitting frequency is made into 144 to 146 MHz with the first local oscillation mixed with the offset oscillation (21.4 MHz) and the offset mixer. Therefore, the first local crystal oscillating frequency is 122.6 to 124.6 MHz. Over-tone system is not adopted for the crystal oscillating unit.

In your order for the crystal oscillating unit, specify the frequency as, for instance, 144.72 MHz for STANDARD RADIO's VHF use.

2. Crystal Oscillator Installation Procedures

When the crystal oscillating unit of your desired frequency is ready, take out the chassis of this transceiver from the case by removing the two case-mounting screws from the rear. For the arrangement of the socket of the crystal oscillating unit, see Figure 14-1 below.

CRYSTAL LOCATION

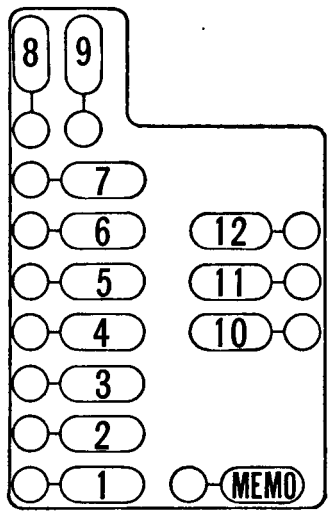


Figure 14-1

3. Frequency Adjustment

The offset oscillator of **C 140** and the frequencies of the actually loaded channels have been subjected to strict adjustments.

However, be sure to conduct yourself the necessary channel frequency adjustmen on any added channels. Although absence of the frequency counter would make the frequency adjustment a fairly big job, you can easily complete the frequency adjustment in the following procedures, thanks to the single crystal basis adopted and the accessory terminal available on your **C 140.**

First, connect a 30 to 50 μA amperemeter to the accessory terminal ♯1 and ♯6 pins, utilizing the tester and other apparatuses, before you are going to take the below mentioned steps.

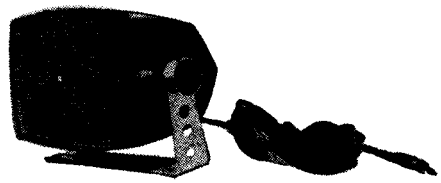
(a) Align the receiving frequency of your station with tne frequency of your opponent's station. While in reception of the signal from your opponent's station, adjust the trimmer capacitor in the crystal oscillating circuit so that the connectec amperemeter can indicate zero graduation. If you hear any distorted or no sound from the other station even with the amperemeter pointing to zero in the said process, then make a further adjustment on the trimmer capacitor till you get proper adjustment.

(b) Have Your Opponent Adjust His Frequency with Yours

On the primises of the fine adjusting circuit for transmitting frequency, necessarily provided at your opponent's station, have him adjust this transmitting frequency in the same manner.

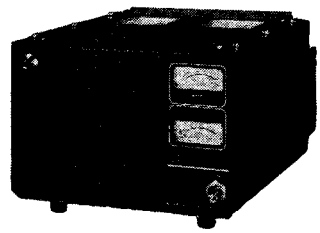
15. Accessory parts

The following accessory parts are available for **C 140**:



C 205 K SPEAKER BOX (4 ohms)

AC POWER SUPPLY
C 12/230-5 13.8 V 3 A



AC POWER SUPPLY
C 12/230-2 9-16 V 6.5 A

16. Connection of External Speaker

In the event that the sound volume from the internal speaker is not sufficient, connect external speaker to SPK terminal on the rear panel, and you will find only the external speaker operating with the internal one non-operating.

NOTE: Use an external speaker with 4 to 8 ohm impedance. This Company made speaker box (C 205 K), containing a large oval speaker cone with 4 ohm impedance, will best meet this purpose.

17. Antennas and Coaxial Cables

The quality of the antennas and coaxial cables gives an affect to the performance of your **C 140**. Pay your attention to the following when you buy the antennas and coaxial cables:

Antennas

1. Use the antenna having a matched impedance of 50 ohms.
2. Install the antenna at a maximum height possible. Roof top is recommendable for installation of the antenna for mobile station.
3. Use the antenna with good performance.

Coaxial Cables

1. Use the coaxial cable having a matched impedance of 50 ohms. Do not use 3 C-2 V, 5 C-2 V, etc., because of their matched impedance of 75 ohms.
2. We recommend as thick coaxial cables as possible for this purpose.
   In the case of less than 5 m, use RG-58 U, 5 D-2 V, etc.
   In the case of 5 m or more, use RG-8 U, 8 D-2 V, 10 D-2 V, etc.
   See Figures 17-1 below.

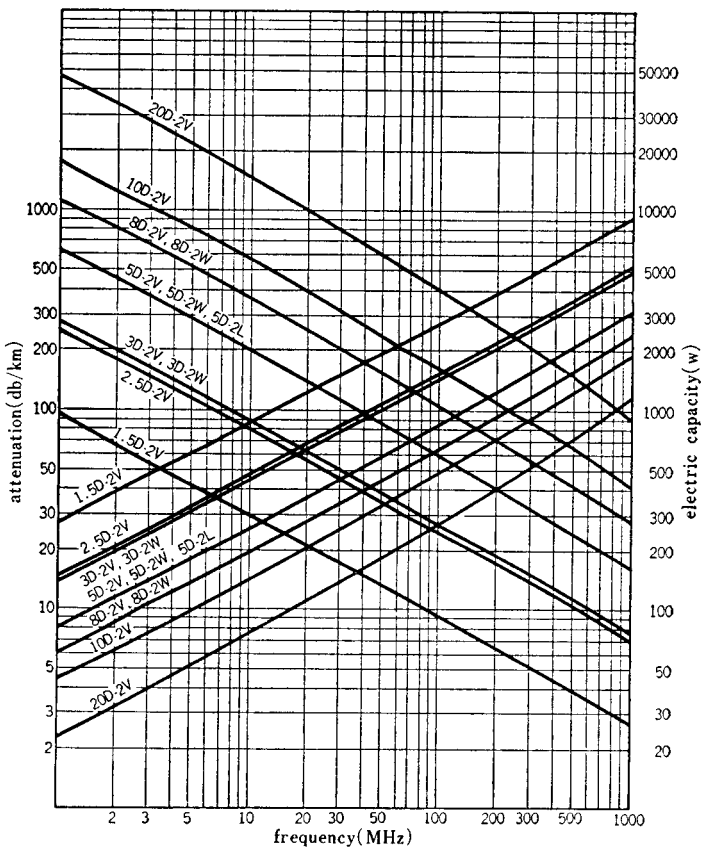


Figure 17-1

NOTES (1) The standard attenuations are evaluated at 20 degrees C.

(2) The power capacities are evaluated at the maximum temperature of 80 degrees C, ambient temperature of 40 degrees C, and at VSWR=1.

18. Noise Prevention Measure for Use as Mobile Station

Previously, we mentioned the precautions for installation of this transceiver in cars and other transportation. The following measures will be effective for installation in specific types of cars and motor-boats whose engines my produce extraordinarily big noises:

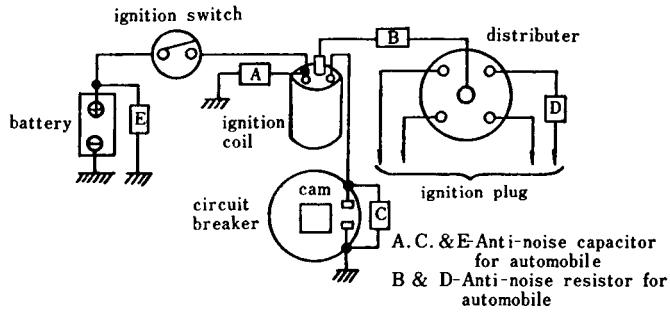


Figure 18-1

The anti-noise capacitors and resistors may be inserted in the places shown as A, B, C, D, and E in Figure 18-1 above. In some cars, the noise can be prevented with such insertion at only one place. In some cases, noise can be decreased if **C 140** is powered by the power supplies of cars, motorboats, etc. with direct, complate, independent wiring from the power supply of such transportation to that of the transceiver.

19. C 140 Specification

Generai

1.	Application	144 MHz band FM amateur transceiver
2.	Number of Channels for Transmitter/Receiver	12 channels plus 1 channel (memory channel) 3 actually loaded channels
3.	Frequency Range	144.0 to 146.0 MHz
4.	Operating Temperature Range	—30 degrees C to 60 degrees
5.	Microphone	Microphone with dynamic type memory switch (with Neoprene coil cord)
6.	Speaker	6 cm permanent dynamic speaker (8 ohms)
7.	Power Supply Voltage	13.8 V DC±20% (negative grounding)
8.	Power Consumption	In transmission : 2.5 A In reception (Max. Output) : 0.6 A In standby : 0.2 A
9.	Semi-Conductor	37 transistors, 20 diodes, and1 IC
10.	Outer Dimensions	84(W)×58(H)×235(D) (in mm)
11.	Weight	0.96 kg

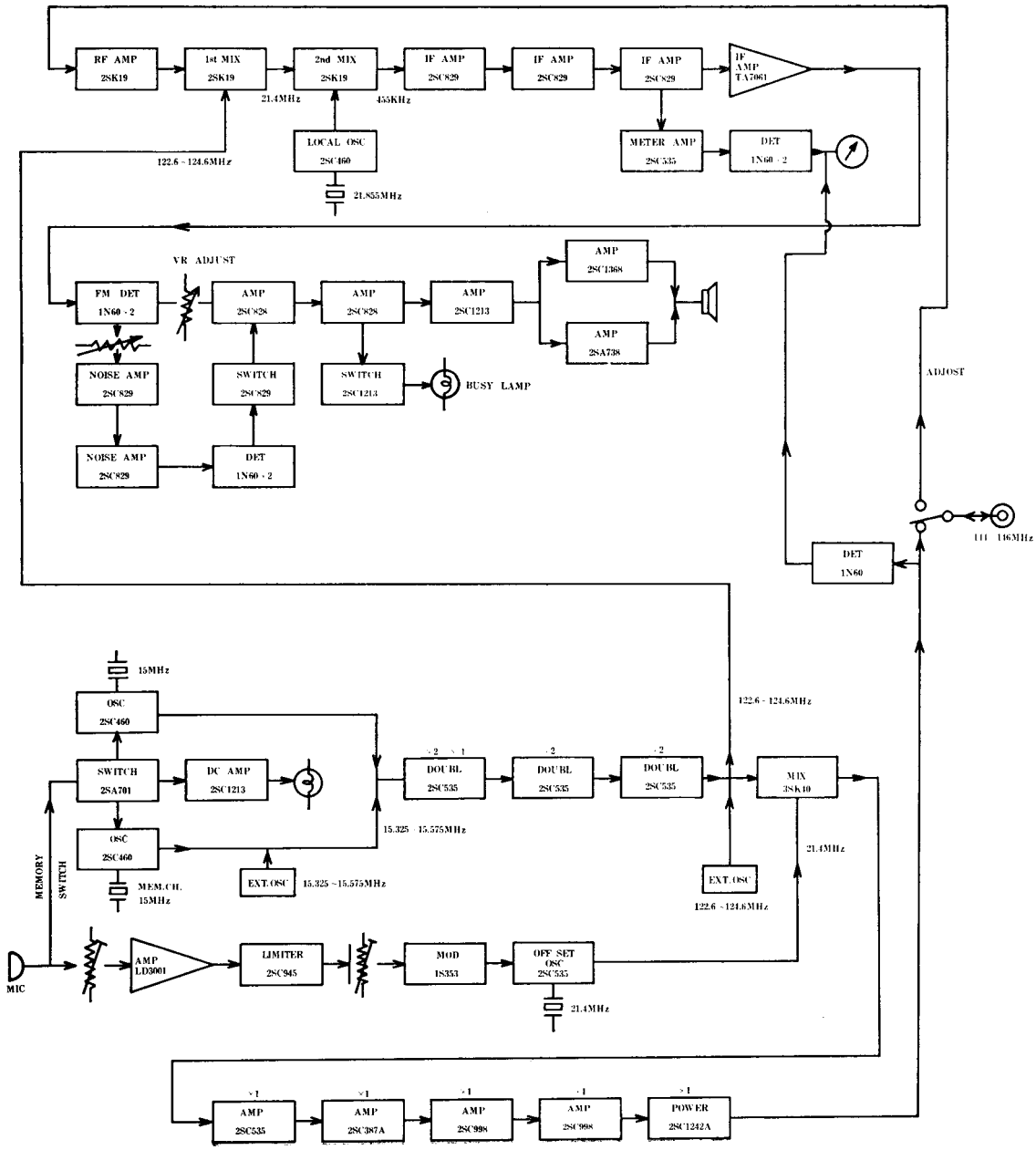
Transmitter

1.	Transmitting Radio Wave	F 3
2.	Transmitting Output	10 W (at 13.8 V)
3.	Output Impedance	50 ohms
4.	Maximum Frequency Deviation	±5 KHz
5.	Modulation System	Direct FM modulation by offset oscillator
6.	Frequency Stability	Less than 0.002%
7.	Frequency Multiple	8 times, 1 heterodyne
8.	Modulation Distortion	Less than 6%
9.	S/N	45 dB or more

Receiver

1.	Receiver Model	Double conversion superheterodyne
2.	Intermediate Frequency	First IF-21.4 MHz Second IF-455 KHz
3.	First local Oscillating Frequencp Multiple	8 times
4.	Frequency Stability	Less than 0.003%
5.	Sensitivity (20 dB QS)	Less than —4 dB (0 dB=1 μV)
6.	S/N at 0 dB Input	35 dB or more
7.	Squelch Threshold Sensitivity	Less than —10 dB
8.	Bandwidth	35 KHz or more
9.	Selectivity	75 dB or more (in adjustment at 40 KHz)
10.	Spurious Response	70 dB or more
11.	Allowable Maximum Frequency Deviation	±7 KHz
12.	Audio Frequency Output	Internal Speaker (8 ohms)-Max. Output 1.8 W External Speaker (4 ohms)-Max. Oudput 4 W

20. C 140 Block Diagram



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SCHEMATIC DIAGRAM OF SR-C140