

N.C.G. CO.

**HF SSB/CW TRANSCEIVER
10/160 M**

Read these instructions completely before operating this set.

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FEATURES

■ Multiple number of frequency controls thanks to combination of PLL digital synthesizer with large-capacity microcomputer.

- Full coverage of amateur bands from 160 meters to 10 meters
- 1 kHz/100 Hz/25 Hz 3-step tuning
Tuning can be selected to any of 3 frequency steps. Fine adjustments are made at the 25 Hz step position while tuning can be rapidly advanced in 1 kHz steps at the 1 kHz position.
- Memory tuning system
This enables frequencies below the order of hundreds of kHz to be memorized in up to four memory channels. Memorized frequencies can be re-written into the VFO for easy change of the frequencies from the memory channels.
- Auto watch system
If frequencies between those memorized in memory channels CH 3 and CH 4 are automatically scanned repeatedly in 1 kHz steps and the signals are received, the frequency up to ± 3 kHz on either side of the received frequency is scanned slowly in 100 Hz steps for easy understanding.
- Automatic UP/DOWN tuning advance system
The frequency can be advanced automatically without rotating the tuning control.
- RX off-set system
This system enables an extra receiving frequency to be set up which is isolated from the transmission frequency in same meter band.
- Reception/transmission frequency reverse system
The reception and transmission frequencies can be reversed in an instant by depressing the TX/RX REV switch during operation with the RX off-set system.
- Tuning lock system
The lock system electrically locks the tuning control to prevent the frequency from changing even if the control is touched.

■ All-solid-state and adjustment-free design

This transceiver employs two high-output transistors in the final stage of the transmission section and it features a wide-band design to obviate the need for final, load and other troublesome adjustments which arise when the band is selected or the frequency is changed.

The receiving section is designed so that the signals pass through a wide-band band-pass filter, they are then amplified and are kept in an optimum state no matter what the frequency in the band.

■ Full complement of accessory circuits

- Receiver Section
 - [1] IF tuning circuit
This circuit shifts only the IF passing frequency by ± 1 kHz regardless of the receiving frequency.
Any interference in the IF band can be alleviated by shifting the IF passing frequency.
 - [2] CW filter
The CW AF filter is provided as a standard accessory at the CW narrow (CW N) position for crystal-clear CW reception. If narrower reception is required, it is possible to build in a narrow-band-only CW crystal filter with an option accessory.
 - [3] Noise blanker
The high-performance noise blanker circuit is employed to deal effectively with even low levels of noise.
 - [4] Δ F control
Whereas the RX offset system allows the reception frequency only to be changed anywhere in the band, the Δ F control is a function which finely adjusts only the reception frequency within ± 1 kHz.
- Transmitter Section
 - [1] Mic compressor
An audio compression amplifier is used for the mic compressor circuit and the SSB talk power is increased by the operation of the compressor which keeps the distortion to the bare minimum.
 - [2] VOX, CW side tone circuits
Built-in features as standard accessories are a VOX circuit (voice-operated relay), CW side tone circuit and CW semi-break-in circuit.
- Other miscellaneous features
 - 3-way, easy-to-read, large-sized S/RF/ALC meter
 - Self-contained 100 kHz crystal marker
 - 6-digit frequency display with mode indication
 - 2-step (FAST/SLOW) AGC time constant selector
 - Mic gain control and RF gain control
 - 2-way AC/DC power supply

BEFORE OPERATION

■ Installation location

Avoid installing the transceiver in direct sunlight or in a location exposed to high levels of moisture.

The heat-sink panel for the final-stage transistor cooling on the transceiver's rear panel should be kept as far away as possible from walls and other surfaces for proper ventilation. Do not place objects on top of the unit which will block the ventilation holes.

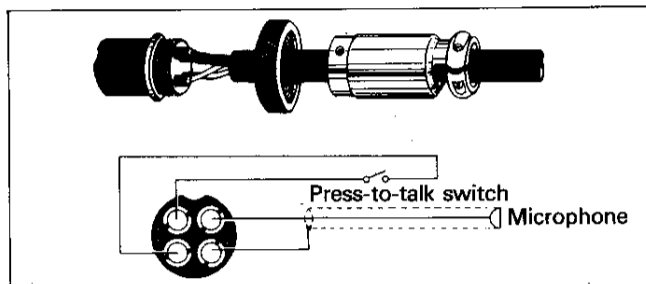
■ Antenna

The impedance of the transceiver's antenna is designed to be compatible with 50-ohm antennas.

Use a coaxial cable which yields an impedance of 50 ohms.

■ Microphone

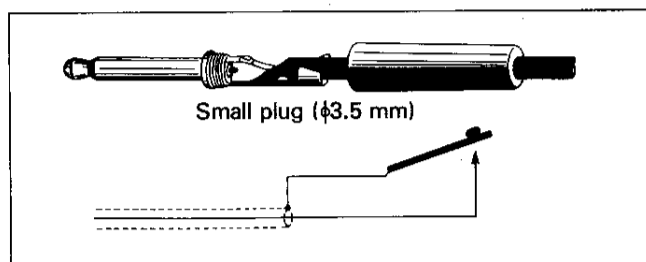
Use a microphone with an impedance of 600 ohms to 50 k ohms. Press-to-talk operations can be performed by using a microphone with a switch which is separate from the audio circuit. Refer to the figure on the right for the mic and mic plug connections.



■ Key

Connect the key, referring to the figure below.

Always use the key so that the contact on the key knob is set to the ground side.

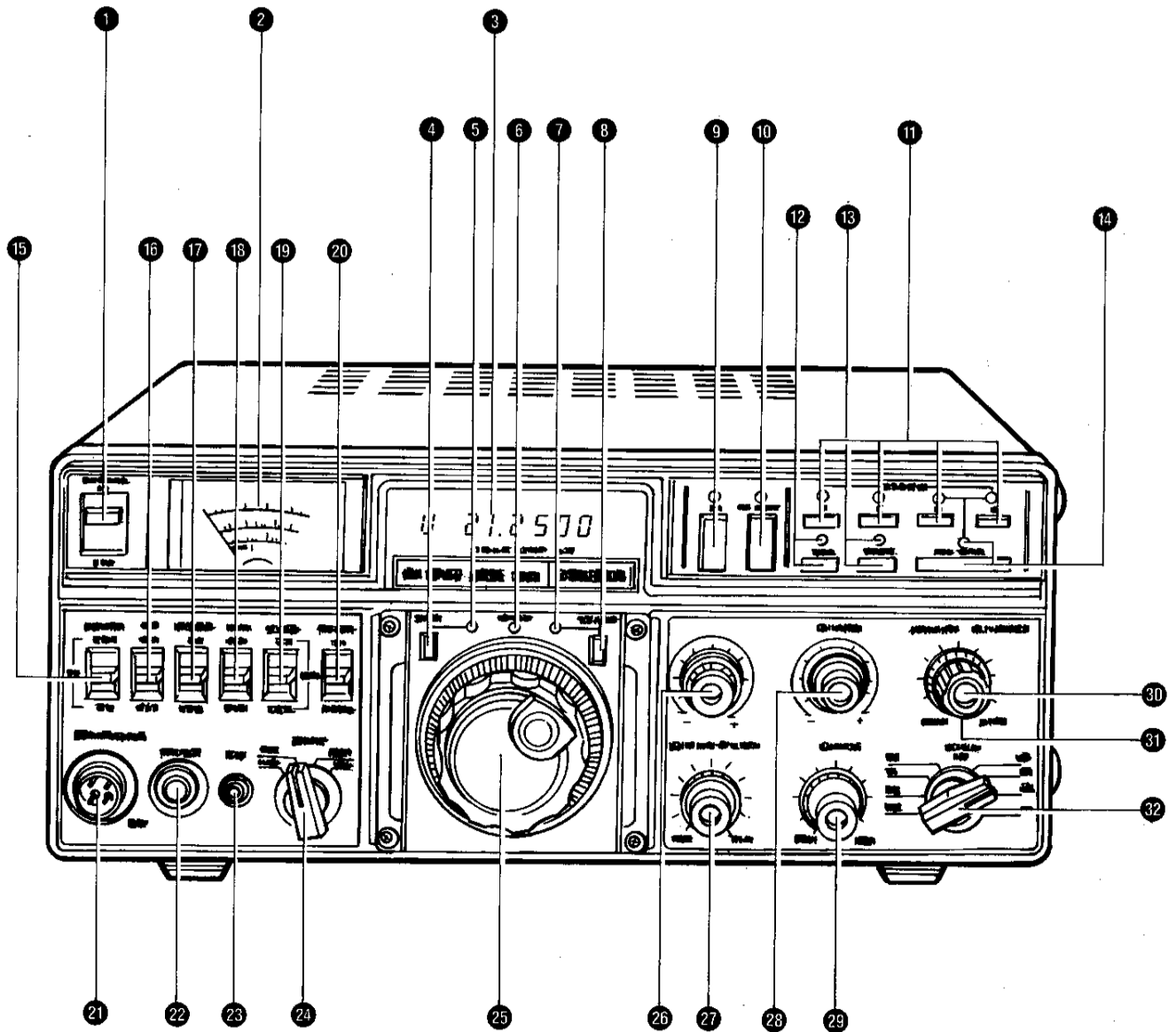


■ Reception/Transmission Frequency

This transceiver covers the reception/transmission frequency ranges given in the table below.

Meter Band	Frequency (MHz)
	f. min. ~ f. max.
160 m	1.7500 ~ 2.0500
80 m	3.4500 ~ 4.0500
75 m	
40 m	6.9500 ~ 7.3500
30 m	9.9500 ~ 10.2500
20 m	13.9500 ~ 14.4000
17 m	17.9500 ~ 18.2500
15 m	20.9500 ~ 21.5000
12 m	24.8500 ~ 25.1500
10 m	27.9500 ~ 29.7500

CONTROLS AND THEIR FUNCTIONS



1 Power Switch (POWER)

2 Level Meter

The meter indicates relative signal strength in S units when receiving. When transmitting, it indicates the RF output and ALC level which are selected by the Meter Selector Switch.

3 Digital Frequency Display

This indicates the transmitting or receiving frequency in 6 digits as far as the 100 Hz digit. The mode is indicated at the far left (mode displays: $\angle$... LSB, $\angle$... USB, $\angle$... CW).

4 Lock Button (LOCK)

When this button is depressed, the indicator lights, the tuning control is electrically locked and the frequency does not change even when the tuning control is rotated. Switching to the memory channel and use of the tuning UP/DOWN switch are operational.

5 Lock Indicator

6 Transmission Indicator (ON AIR)

This lights during transmissions.

7 TX/RX Reverse Indicator

8 TX/RX Reverse Switch (TX/RX REV)

This is used to reverse the receiving and transmitting frequencies.

9 $\angle$ F Switch/Indicator ($\angle$ F)

Press this switch when finely adjusting the receiving frequency within ± 1 kHz without changing the transmitting frequency with the $\angle$ F Control **26**.

10 RX offset Switch/Indicator (RX OFFSET)

When this switch is depressed, the indicator lights and when the Tuning Knob is rotated, the receiving frequency can be changed to any frequency in the same band without the transmitting frequency being changed.

11 Memory Channel Buttons/Indicators (MEMORY)

Up to 4 receiving and transmitting frequencies can be memorized in these buttons. When the Memory Channel Button containing the frequency to be recalled is depressed, the corresponding indicator lights and the frequency can be recalled in a single-action operation.

12 VFO Switch/Indicator (VFO)

Press this switch when the memory channel frequencies are not being used. The Indicator lights and the Tuning Control can be rotated for operation at the desired frequency.

13 Memory Write Button/Indicator (WRITE)

This is used when writing a desired frequency into the memory channel.

14 Auto Watch Button/Indicator (AUTO WATCH)

When this button is depressed, the range between the frequencies set in memory channels CH3 and CH4 is scanned automatically.

15 Stand-by Switch (STD BY)

This switch selects receiving and transmitting. "RX" refers to receiving but when the press-to-talk switch on the microphone connected to the unit is pushed, transmission is enabled.

"TX" refers to transmission. "VOX" refers to transmission only by speaking into the microphone. Transmission is also enabled by pressing the key with the Mode Selector Switch **24** at the "CW.W" or "CW.N" position.

16 Noise Blanker Switch (NB)

Set this to the "ON" position when pulsive noise disturbs the reception of signals from the transmitting station. This will reduce the noise and enable clearer communication.

17 Meter Selector (METER)

Use this to select the RF output and ALC level during transmission.

18 AGC Switch (AGC)

This is used to select the AGC time constant to slow or fast.

19 Tuning Step Selector Switch (STEP)

This is used to set the frequency step to 1 kHz, 100 Hz or 25 Hz when tuning using the Tuning UP/DOWN Switch **20** or Tuning Control.

20 Tuning UP/DOWN Switch (TUNING)

This is used to vary the frequency without using the Tuning Control.

21 Microphone Jack (MIC)

Connect a microphone with an impedance of 600 ohms to 50 k ohms to this jack.

22 Headphones Jack (PHONES)

Connect the plug on the headphones to this jack for use. This automatically cuts off the built-in speaker and external speaker terminal on the rear panel and the sound is heard only through the headphones.

23 Key Jack (KEY)

Connect the key here for CW operation.

24 Mode Selector Switch (MODE)

Set this to the desired mode.

25 Tuning Knob

This is used to change the operating frequency. When rotated clockwise, the frequency increases; when rotated counterclockwise, it is reduced.

26 $\angle$ F Control ($\angle$ F)

The receiving and transmitting frequencies coincide at the control's center position. When rotated to the left or right of this position, the receiving frequency can be changed by about 1 kHz.

27 Mic Gain/CW Carrier Control (MIC GAIN/CW CARRIER)

MIC GAIN: The gain of the mic amplifier with SSB operation is adjusted. Adjust it so that the ALC meter pointer deflection does not exceed the mark.

CW CARRIER: The carrier level with CW operation is adjusted.

28 IF Tuning Control (IF TUNE)

This enables tuning to be slid by the IF band width about 1 kHz without changing the receiving frequency. This serves to suppress the interference with adjacent signals.

29 Compressor Level Control (COMP)

This controls the amount of speech compression during transmission. Rotating it clockwise toward "MAX" increases the amount of compression. The control is used together with the Mic Gain Control.

30 Volume Control (AF GAIN)

This adjusts the volume.

31 RF Gain Control (RF GAIN)

This regulates the degree of amplification (gain) in the RF amplifier stage. The degree of amplification is reduced as it is rotated counterclockwise. Normally it is rotated to its rightmost "MAX" position for use.

32 Band Selector Switch (BAND)

This is set to the position corresponding to the operating frequency. It must not be set during transmission.

33 VOX Gain Control (VOX GAIN)/Marker Switch (MARKER ON)

This adjusts the operating point with VOX operation. The sensitivity increases when it is rotated clockwise and so should be set to the optimum position (it does not work in the CW mode).

When rotated to its leftmost position, a clicking sound is heard, indicating that the marker circuit has been switched ON. Refer to "Marker Oscillator Circuit Calibration" on page 11 for details on how to use the marker. The control should normally be set to any position except "MARKER ON."

34 Delay Time Control (VOX DELAY)

This varies the operating time of the VOX. Rotating it clockwise increases the switching time from transmitting to receiving. Set it to the most convenient position.

35 Anti-VOX Gain Control (ANTI VOX)

This controls adjusts the VOX so that it cannot be activated by voice from the speaker (it does not work in the CW mode).

Set it to the most suitable position for the location of the microphone and the volume of the sound from the speaker.

36 Antenna Terminal (ANT)

Connect the receiving and transmitting antenna here.

37 Accessory Connector (ACC)

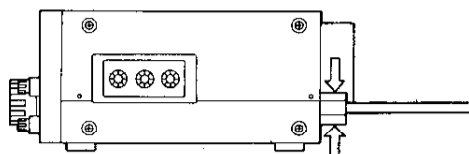
This connector's pins ① ② ④ can be used as a switch that selects for transmitting or receiving. Pin ⑤ is the external ALC input pin which is connected to RF block connector CP56 pin ①. PIN ③ is grounded.

Control voltage of A.L.C is required with negative voltage. Use this connector for controlling a linear amplifier.

38 Fuse Holder (FUSE)

39 Power Socket

Connect the power cord to this socket and insert it until the cord's connector is locked into position. To disconnect, push on both sides and pull out.



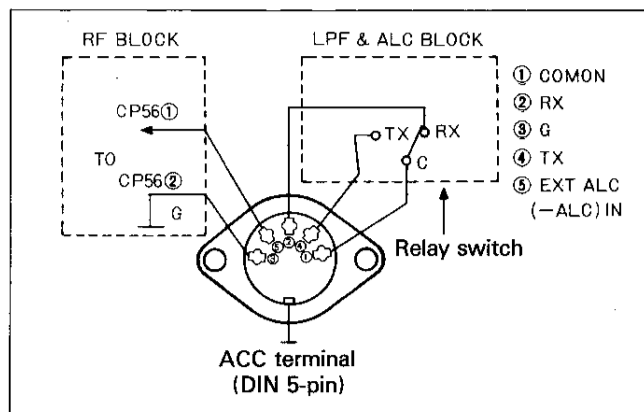
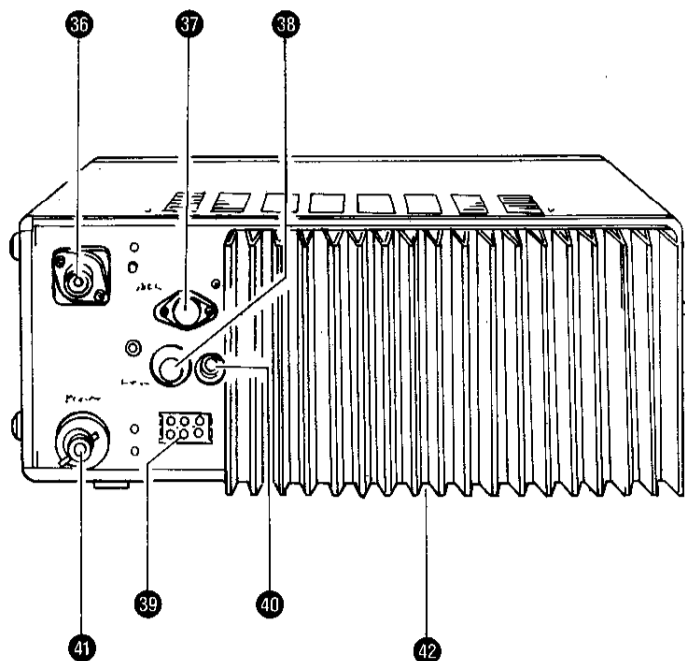
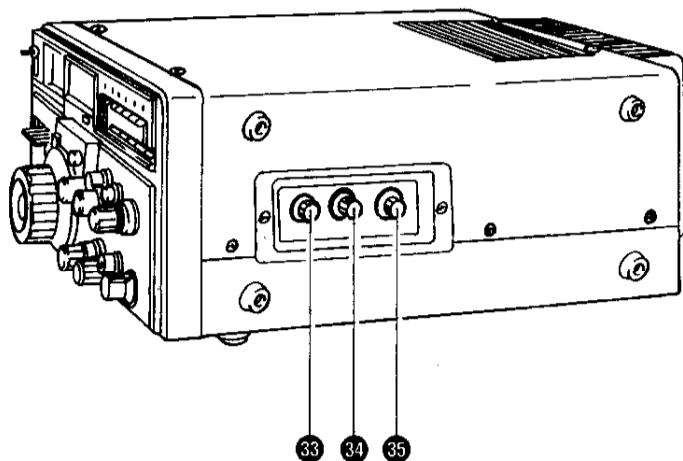
40 External Speaker Jack (EXT SP 8Ω)

Connect the plug on an external speaker (8-ohm impedance) to this terminal for use. The built-in speaker is automatically disconnected.

41 Ground Terminal (EARTH)

To prevent TVI and BCI, etc. make a connection from this terminal to ground in the shortest distance possible.

42 Heat-Sink Panel



Before Operation

■ Initial Settings of Microcomputer

The microcomputer is initially set as below when the unit's power cord is connected to an AC or DC 13.8V power supply. These initial settings are always made whenever the power cord is connected after it has been disconnected, regardless of the front panel Power Switch position.

Frequency: "Lower limit frequency (fmin) + 50 kHz" in the band designated by the Band Switch (see frequency table on page 3).

Memory: Set to VFO.
VFO and memory channels 1-4 frequencies are set as above.

RX Offset Switch: The receiving and transmitting frequencies are made to tally regardless of the ON/OFF position of this switch.

■ Frequency Setting with Band Switching

(This applies to VFO and memory channels 1 - 4.)

- 1) The difference between the frequency displayed before the Band Selector Switch is operated and the "fmin" of that band is basically kept constant even in the band after switching.

Example: 3.5200 Band switching → 7.0200

(3.4500 + 0.07) (6.9500 + 0.07)

- 2) When the value produced by adding "fmin" of the band to be switched to the frequency displayed in the present band minus the "fmin" of that band exceeds "fmax" of the band to be switched, the displayed frequency is "fmin" of the band to be switched + 50 kHz.

Example:

28.6500	Band switching →	24.9000	(24.8500 + 0.05)
		21.0000	(20.9500 + 0.05)
		18.0000	(17.9500 + 0.05)
		14.0000	(13.9500 + 0.05)
		10.0000	(9.9500 + 0.05)
		7.0000	(6.9500 + 0.05)
		3.5000	(3.4500 + 0.05)
		1.8000	(1.7500 + 0.05)

- 3) MHz units are ignored with band switching from 29 MHz and operation is identical to that involved in switching from 28 MHz.

Example: 29.1200 Band switching → 21.1200

29.6500 Band switching → 21.0000

Note: Refer to the table (page 3) giving the ranges of the frequencies permitting transmission and reception for "fmax" and "fmin".

NOTE:

When the AC cord is connected to the power outlet with the unit's Power Switch at OFF and then this switch is set to "ON," a frequency outside the ham band may be displayed or two memory indicators may light on very few occasions. This is due to the initial settings of the microcomputer and will correct itself once the AC cord is re-connected with the switch at "ON."

■ Operation Procedure

1. Using the Tuning UP/DOWN Switch

The frequency is automatically increased (UP) or reduced (DOWN) in accordance with the step selected by the Tuning Step Switch.

2. Using the IF TUNE Control

(Used to reduce interference)

● LSB mode

Rotating the IF Tune Control clockwise yields a high-cut sound and reduces the interference from the low range of the receiving frequency.

Rotating it counterclockwise yields a low-cut sound and reduces the interference from the high range of the receiving frequency.

● USB mode

Rotating the IF Tune Control clockwise yields a low-cut sound and reduces the interference from the low range of the receiving frequency.

Rotating it counterclockwise yields a high-cut sound and reduces the interference from the high range of the receiving frequency.

● CW mode

Same effect as in USB mode.

3. Using the RF Gain Control

This is used to adjust the degree of amplification in the receiver's RF stage and when rotated clockwise, this degree is increased. At its leftmost position the meter indication goes beyond full scale and no sound is heard.

4. Using the AGC Switch

This switch selects the AGC (automatic gain control) time constant:

FAST: For receiving CW signals and tuning with the Tuning Control.

SLOW: For receiving SSB signals.

5. Using the NB (Noise Blanker) Switch

Set this switch to "ON" to reduce noise when pulsed noise (such as the ignition noise from vehicles) impairs reception of the signals.

6. Using the RX Offset Switch

This allows only the receiving frequency to be changed regardless of the transmitting frequency. Push the RX Offset Switch and use it while the indicator is lighted. When the indicator is not lighted, the receiving and transmitting frequencies tally.

- 1) Normally this switch is kept at OFF.
- 2) When the frequency of the other station fluctuates during communication, push this switch and tune in the frequency with the Tuning Control.
 - Regardless of the position of the RX Offset Switch, the receiving frequency is displayed during reception and the transmitting frequency is displayed during transmission.
 - The RX offset function is operational both with VFO and memory channels 1 - 4.
 - Caution with memory channel operation with RX Offset Switch at ON: When a shift has been made from VFO to a memory channel, from a memory channel to VFO or from one memory channel to another memory channel in cases where the RX Offset Switch is set to ON and the receiving frequency is shifted for operation, the previous RX offset frequency is canceled.

This system is featured on this unit in order to cancel the RX offset frequency forcibly (so that there is no mistake of the operator forgetting to cancel it himself) with memory channel operations.

7. Using the TX/RX Reverse Switch

If this switch is pressed during operation with the RX offset system, the transmitting and receiving frequencies can be reversed.

This switch is operational only when VFO is used; it does not work when memory channels are used.

8. Using the ΔF Control

- 1) The ΔF Control is made operational when the ΔF Switch (9) is pressed and the LED indicator lights.
- 2) The ΔF Control can be used to vary only the receiving frequency by about ± 1 kHz regardless of the transmitting frequency.

NOTE:

The frequency display does not change even when the ΔF Control is operated.

9. Using the Memory Channels

• Memorizing (frequency writing)

- 1) Select the frequency to be memorized by rotating the Tuning Control.
 - 2) Press the Memory Write Button.
The indicator lights to show that the frequency can now be memorized.
 - 3) Press the Memory Channel Button corresponding to the channel into which the frequency is to be memorized.
The memory channel indicator lights to indicate that the frequency has now been memorized in that channel.
- * Four memory channels are provided. Steps 1) - 3) are performed for each channel. Once a frequency has been memorized in one channel, press the VFO Switch to return to manual tuning.

• Shifting the memory channel frequency to VFO

- 1) Press the Memory Channel Button in which the frequency has already been memorized.
- 2) Press the Memory Write Button.
- 3) Press the VFO Button.
The VFO Indicator lights to show that the memory channel frequency has shifted to VFO.
The above writing operation is also valid from one memory to another memory. The receiving frequency is memorized with RX offset operation.

NOTE:

Frequencies below the order of hundreds of kHz are memorized in the memory channel and when the band is switched, the display of frequencies at the order of 1000 Hz (1 MHz) change in accordance with the band.

• Memory Tuning (frequency recall)

- Memory channel frequencies can be tuned in simply by pressing the corresponding Memory Channel Button.
- To memorize a new frequency, perform the steps under "Memorizing" and write that frequency into a memory channel already containing a frequency. This previous frequency is erased and the new frequency is memorized.

A back-up circuit is provided to retain the frequencies memorized in the memory channels and also to restore the status established before the power was switched off, when the power is switched on again. However when the power cord is disconnected from the AC power outlet, all the memory contents are erased. (This applies to DC operation when the DC cord is disconnected.)

10. Auto Watch Function

When the Auto Watch Switch is set to "ON," scanning is automatically performed between CH3 and CH4 in 1 kHz steps. However, when signals stronger than the level set by the RF Gain Control are supplied, the frequency is automatically reduced by 3 kHz and scanning (slow) is continued in 100 Hz steps. After a frequency range of 6kHz has been scanned in 100 Hz steps, scanning starts again in 1 kHz steps.

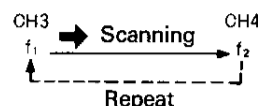
• Auto Watch Operation

- 1) Auto watch range setting
The frequencies (f_1 , f_2) at either end of the auto watch frequency range are memorized in memory channels 3 and 4.
- 2) Input signal level setting of slow Scanning step selection level setting
The RF Gain Control is used to set the input signal level at which the steps during scanning are switched from 1 kHz to 100 Hz. As the control is rotated clockwise, the scanning speed changes even with weak signals; as it is rotated counterclockwise, only the strong signals are detected and the scanning steps are switched.

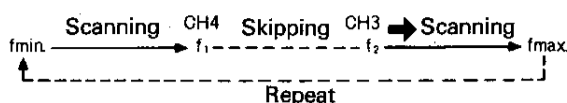
NOTE:

The auto watch function is not operational at a signal level where the S (signal strength) meter pointer does not move.

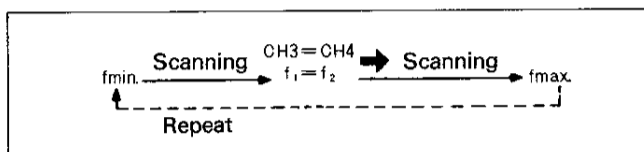
- 3) Auto watch start
Press the Auto Watch Button. The indicator lights and scanning starts moving up the frequency range commencing at the frequency set in CH3.
- 4) There are 3 auto watch operations, depending on the settings of the frequencies memorized in memory channels CH 3 and CH 4.
 - ① Scanning between CH3 and CH4
Memorize the low frequency in CH3 and the high frequency in CH 4.



- ② Scanning with the range between CH3 and CH4 skipped
Memorize the high frequency in CH3 and the low frequency in CH4.



- ③ Scanning all the bands
Memorize the same frequency into CH3 and CH4.



* f_{min} and f_{max} are the lower and upper limit frequencies in the set band. Refer to the frequency table on page 3.

5) Auto watch stop

Perform any of the operations given below:

- ① Press the Auto Watch Switch again.
- ② Press the VFO Switch.
- ③ Press the Memory Channel Button.
(In this case, the frequency is switched to that in the memory channel corresponding to the depressed button.)
- ④ Change the operating band.

11. CW Reception

- 1) Set the Mode Selector Switch to "CW.W" or "CW.N."
- 2) Tune in the frequency.

There are two CW modes, wide and narrow. In the WIDE mode, the IF filter performance is the same as the SSB filter (2.2 kHz/-6 dB pass bandwidth); in the NARROW mode, the CW AF (Audio Frequency) filter is added so that the bandwidth is narrowed (600 Hz/-6 dB) and reception is improved.

12. Standard Wave Reception

- 1) Set the Band Switch to "10."
- 2) Use the Tuning Knob for tuning so that the frequency display is set to "10.000.0."

Transmission

■ Cautions with transmitting

- Use an antenna with an impedance of 50 ohms after having adjusted the SWR to less than 1.5.
- When the SWR cannot be reduced to less than 1.5 even after the antenna has been adjusted or when using an antenna which does not have an impedance of 50 ohms, insert an antenna coupler between the antenna and unit and adjust so that the SWR is made less than 1.5.
- Since this is an SSB/CW transmitter, always turn down the CW Carrier Control to less than 50% of the rated output when transmitting continuously on CW. (Continuous key down.) Continuous transmitting at 100% of the rated output may damage the final transistor, power supply etc. by the unusual rising of the temperature.
- Turn down the Mic Gain Control in the same way to less than 50% of the rated output for RTTY and SSTV.
- Do not attempt transmissions without the antenna connected.
- Do not change the position of the Band Selector during transmissions.
- The Tuning Control is electrically locked during transmission so that the frequency does not change even when the control is touched. However, note that the Tuning UP/DOWN Switch is not locked.

■ Transmitter Operation

■ SSB Transmission

- 1) Connect the Microphone to the Microphone Jack on the front panel.
- 2) Change the Mode Selector Switch to the "USB or LSB" position.
- 3) Set the Stand-by Switch to the TX position and speak into the microphone to transmit.
- 4) Turn the Microphone Gain Control clockwise and adjust it to minimum ALC Meter deflection.

NOTE:

Don't exceed the ALC Zone area.

- 5) Return the Stand-by Switch to the RX position to receive.

For push-to-talk operation, set the Stand-by Switch to the RX position, press the push-to-talk switch and speak into the microphone. This unit will return to the receive mode when the push-to-talk switch is released.

■ VOX Operation

To use the voice operation relay (VOX).

- 1) Set the stand-by switch to the VOX position.
- 2) Adjust the VOX GAIN Control, ANTI VOX Control and VOX DELAY Control as follows.

• Using the VOX Gain Control

For VOX operation, speak normally into the microphone and use this control to adjust the level at which the shift is made to transmission. Rotating the control clockwise increases the sensitivity and permits the shift to transmission with low level speech. If the VOX gain is increased too much, malfunctioning will result because of extraneous noise. The MARKER ON mode is established when the control is rotated to its leftmost position.

• Using the Anti-VOX Gain Control

This control serves to prevent the VOX circuit malfunctioning with the sound from the unit's speaker. Adjust it so that the VOX is not activated by the speaker sound during reception at the optimum volume level.

• Using the Delay Time Control

This control serves to adjust the time during which the VOX circuit is activated and the transmission mode is maintained. Speech may be interrupted for short periods only during normal conversation. This means that if the time is set on the short side, a return will be made to the receiving mode each time speech is interrupted. For natural operation, rotate the control clockwise, try speaking into the microphone at the normal pace and adjust so that the transmission is maintained.

■ Microphone Compressor

The Microphone Compressor circuit can be used to increase the average power of the audio signal with a subsequent increase in the average RF output power.

Adjustment of Compressor Level.

- 1) Rotate the Compressor Level Control clockwise while applying modulation in the transmission mode. This activates the compressor and the ALC meter pointer deflection is reduced or the pointer ceases to deflect.
- 2) Use the Mic Gain Control to increase the level so that the meter pointer deflects to the same extent as before.

NOTE: Increasing the compressor level too much will reduce the clarity of the communication and result in a poorer transmission quality.

■ CW Transmission

- 1) Connect the Key to the Key Jack on front panel.
- 2) Change the Mode Selector Switch to "CW.W" or "CW.N" position.
- 3) Change the Meter Select Switch to the "RF" position.
- 4) Set the Stand-by Switch to the "TX" position.
- 5) Key down.
- 6) Turn the CW Carrier Control clockwise and adjust it to the appropriate level with the RF meter deflection.
- 7) Return the Stand-by Switch to the RX position.

• Semi-break-in operation

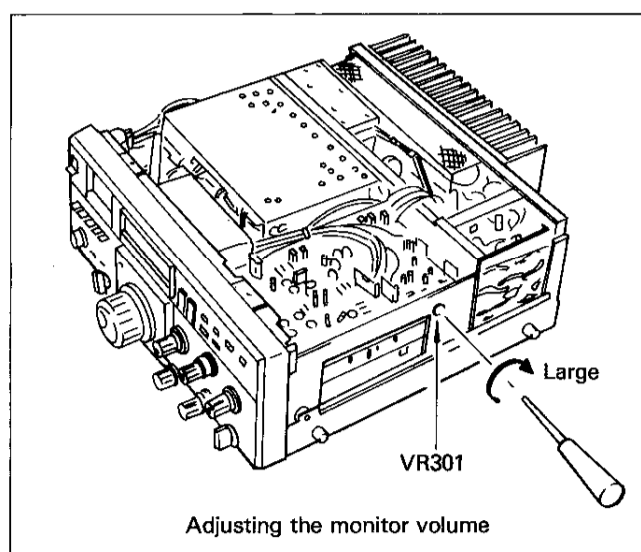
Semi-break-in refers to switching automatically between transmitting and receiving using the key. Set the Stand-by Switch to VOX for this operation. Adjust the delay time as for SSB so that transmission is not interrupted during the key operation. There is no need to adjust the VOX Gain Control and the Anti-VOX Gain control during CW operation.

• Monitoring the sound

This unit contains a CW side tone circuit which allows an oscillating tone of about 800 Hz to be heard through the speaker or headphones as the key is operated. When the Stand-by Switch is set to RX and the key is pressed, CW can be practiced (there is no transmission).

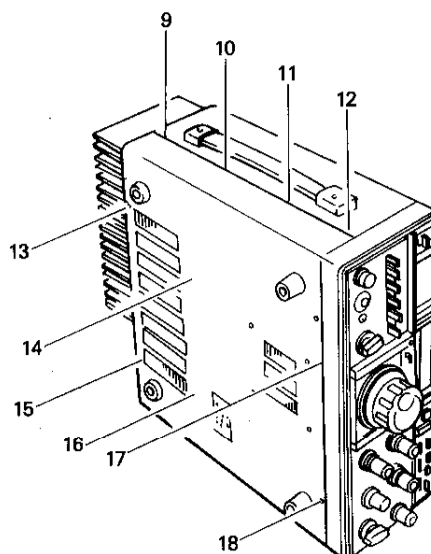
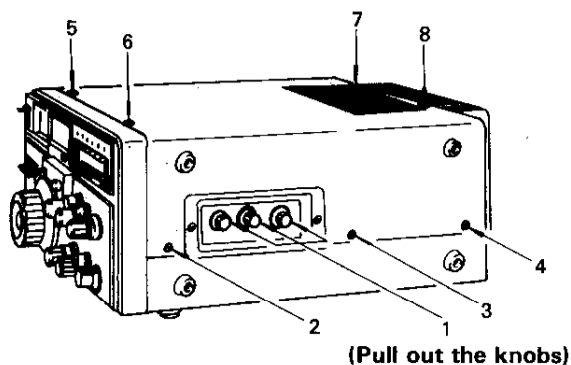
• Adjusting the monitor volume

- ① Remove the top panel of the unit, referring to the figure on the left of page 10.
- ② Connect the key.
Set the Mode Switch to "CW.W" or "CW.N."
Set the CW Carrier Control to "MIN."
Set the Stand-by Switch to "RX."
Press the key.
- ③ Rotate semi-fixed resistor VR301 indicated in the figure below to adjust the volume. The monitor sound increases as it is rotated clockwise.



METER ADJUSTMENTS, NOISE BLANKER CIRCUIT LEVEL ADJUSTMENTS

Remove the control knobs and screws in the numbered sequence indicated below and then remove the top and bottom panels.



■ Meter Adjustments

● S meter adjustment

Set the RF Gain Control to "MAX."
Set the Band Selector Switch to "14MHz."
Use a signal generator for the same frequency.
Connect the signal generator's output lead to the unit's Antenna Terminal.
Set the signal generator output to 40 db (0 dB = 1uV).
Rotate semi-fixed resistor VR201 (IF block) shown in the figure on the right to adjust the S meter pointer to "S9"

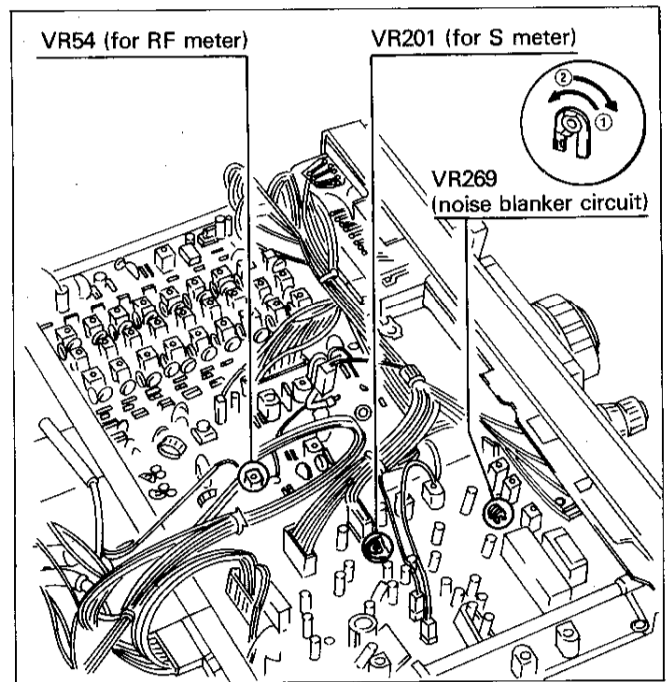
● RF meter adjustment

Adjust VR54 so that the RF meter pointer deflects to the appropriate position during transmission.

■ Noise Blanker Level Adjustment

The operation level of this unit's noise blanker can be varied in accordance with the noise level of reception state. Adjust it optimally using semi-fixed resistor VR269 shown in the figure on the right. This level increases as VR269 is rotated in the direction of arrow ① and decreases as it is rotated in the direction of arrow ②.

NOTE: The noise may be increased if the operating level is made too high.



FREQUENCY CALIBRATION

■ Marker oscillator circuit calibration

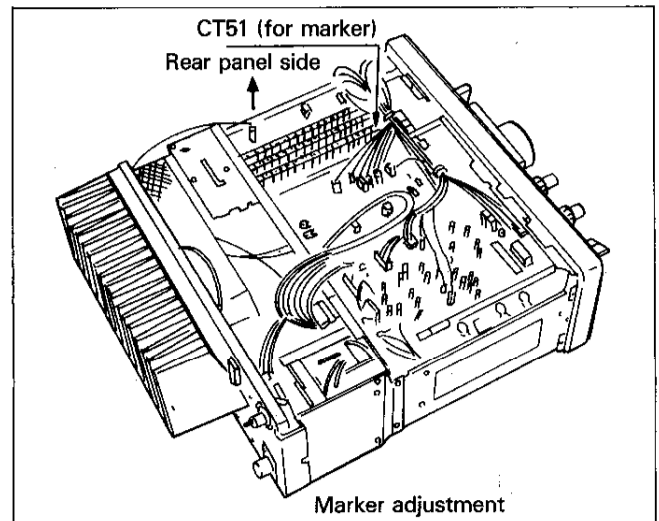
- 1) After having removed the bottom panel and set the unit to the receiving mode, connect the key to the Key Jack.
- 2) Set the Mode Selector to "CW.W" or "CW.N."
- 3) Set the Band Selector to "10 MHz."
- 4) Set the ΔF Switch to "OFF."
- 5) Set the Tuning Step Selector to "25 Hz."
- 6) Set the Stand-by Switch to "RX."
- 7) Press the key.

A monitoring tone (CW side tone) of about 800 Hz can be heard through the speaker upon completion of settings 1) -7).

Next, receive a 10.000 MHz standard wave and tune in by tuning control so that the carrier and monitor sound have zero beat. Increase the output using the key; cancel out the monitor sound so that only the standard wave sound remains. When the VOX Gain Control on the side panel is set to "MARKER ON," the marker circuit is activated and a double beat sound is generated.

Now rotate RF block trimmer CT51 (see figure) and adjust for zero beat. The marker's oscillation frequency is now accurately adjusted.

Always set the VOX Gain Control to any position except "MARKER ON" after the adjustment.



■ Band frequency adjustments

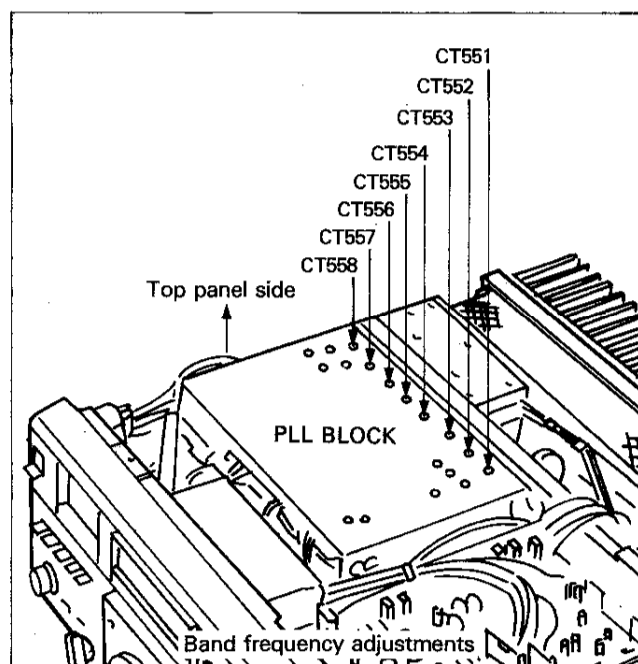
Adjust the oscillation frequency in each band with the controls set as below during reception.

- 1) Set the Mode Selector Switch to "CW.W" OR "CW.N."
- 2) Set the ΔF Switch to "OFF".
- 3) Set the VOX Gain Control to "MARKER ON."
- 4) Set the Tuning Step Selector Switch to "25 Hz."
- 5) Set the Stand-by Switch to "RX."
- 6) Press the key

Display each of the band frequencies given next and adjust the trimmers so that the monitor sound and marker beat have zero beat.

Band selector	Displayed frequency (MHz)	Trimmer
3.5	3.500.0:00	CT551
7	7.000.0:00	CT552
10	10.000.0:00	CT553
14	14.000.0:00	CT554
18	18.000.0:00	CT555
21	21.000.0:00	CT556
24	24.900.0:00	CT557
28	28.000.0:00	CT558

NOTES: :00 is not displayed. The 1.9 MHz band is adjusted simultaneously when the 3.5 MHz band is adjusted.

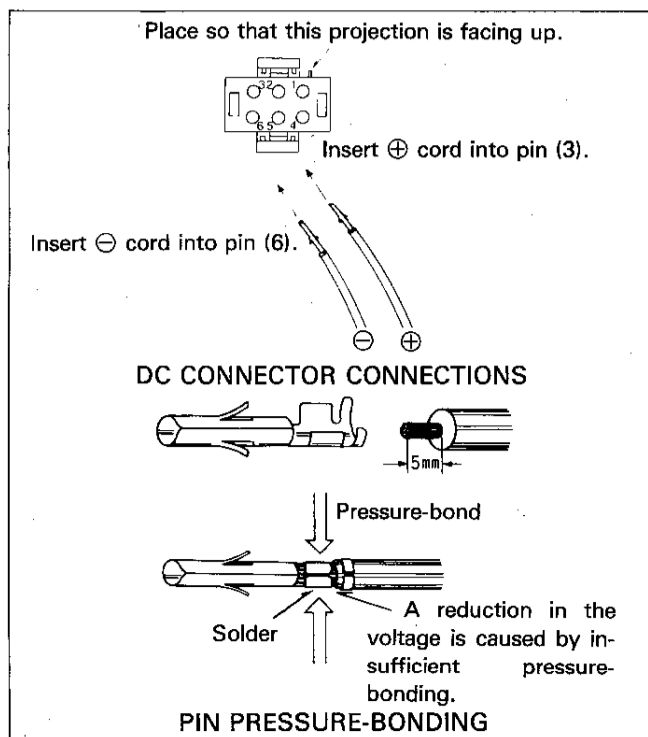


DC POWER OPERATION

This transceiver operates on AC or DC power. The supply voltage is 13.8V for DC operation.

DC cord connections

Connect the accessory connectors to the DC cords as shown in the figure below. Use #3 (3SQ) DC cords and make them as short as possible.

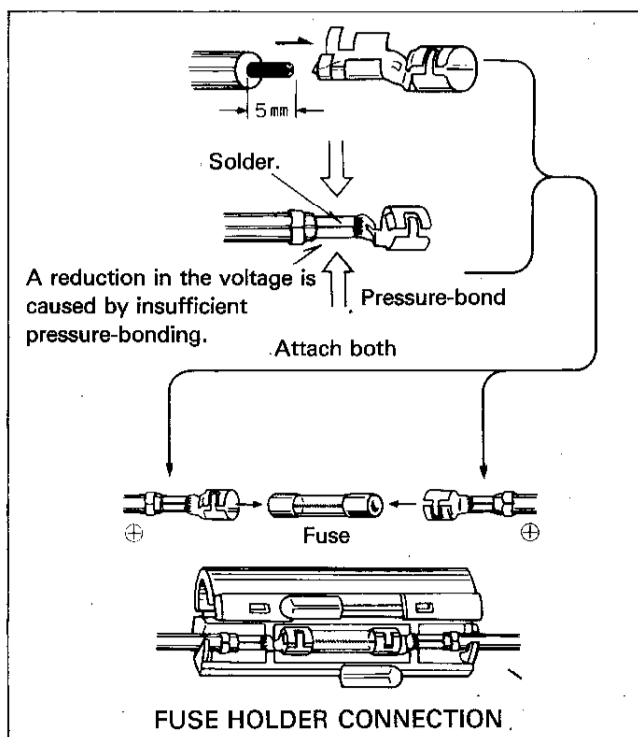


* "3SQ" means that the total cross section area of the conductor is 3 mm².

Fuse connection

Connect the accessory fuse holder to the ⊕ cord as shown in the figure below.

Use the accessory fuse. A reduction in the voltage is caused by insufficient pressure-bonding.

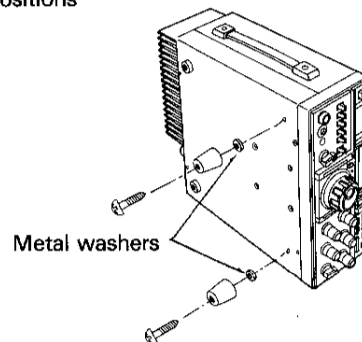


MOUNTING THE FEET

Supplied with the unit are feet which alter the tilt at which the unit is installed. Use them as required by the installation location to facilitate operation.

- 1) Remove the two feet (small) at the front. The metal washers are freed with this operation. Use them when attaching the accessory feet.
- 2) Use the screws just removed to mount the metal washers together with the accessory feet (large).

Mounting positions

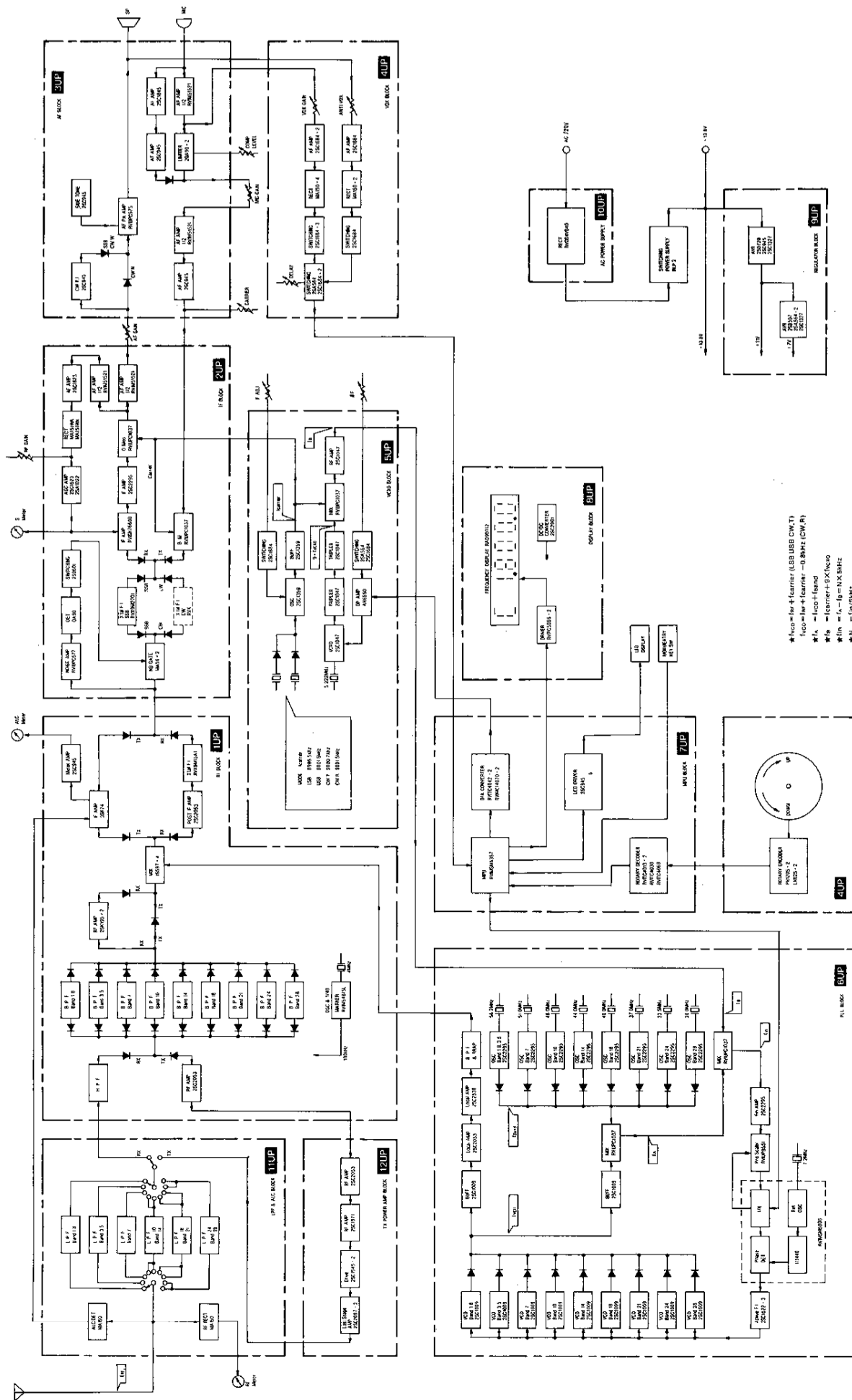


SCHEMATIC DIAGRAMS

BLOCK DIAGRAM	14
SCHEMATIC DIAGRAM	15
RF & BPF Module	16
IF & GENERATOR Module	17
AF & VOX Module	18
VCXO & CAR. Module	19

PLL Module	20
MPU & DISPLAY Module	21
REGULATOR Module	22
AC POWER SUPPLY Module	23
LPF & ALC Module	24
TX POWER AMP. Module	24

BLOCK DIAGRAM



This block diagram is subject to change without notice.

RF & BPF Module

QTY 1
MA56
SWITCHING

QTY 1
RVMS481SL
MARKER

QTY 1
MA56
SWITCHING

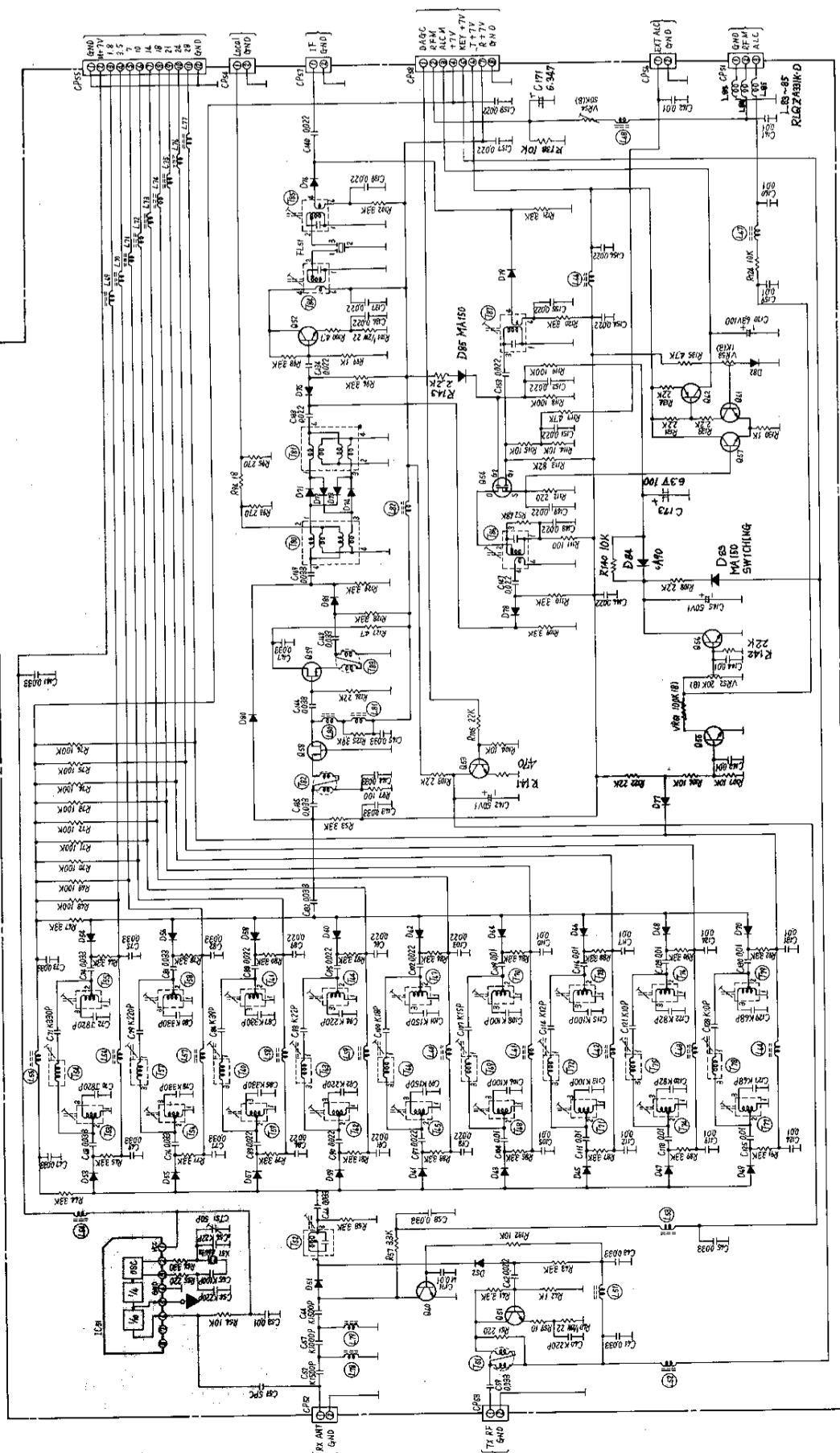
QTY 1
2SK195
RF AMP

QTY 1
RV013597
JAN

QTY 1
2SK174
RF AMP

QTY 1
2SC2053
RF AMP

QTY 1
MA56
SWITCHING



QTY 1
2SC2053
RF AMP

QTY 1
2SC1959
SWITCHING

QTY 1
MA150TA
SWITCHING

QTY 1
2SC945
AFC AMP

QTY 1
2SC945
SWITCHING

QTY 1
2SC945
AFC AMP

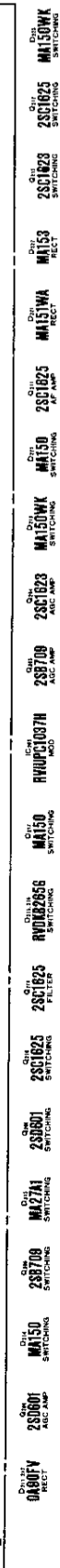
QTY 1
MA56
SWITCHING

QTY 1
2SC945
DC AMP

QTY 1
2SC945
DC AMP

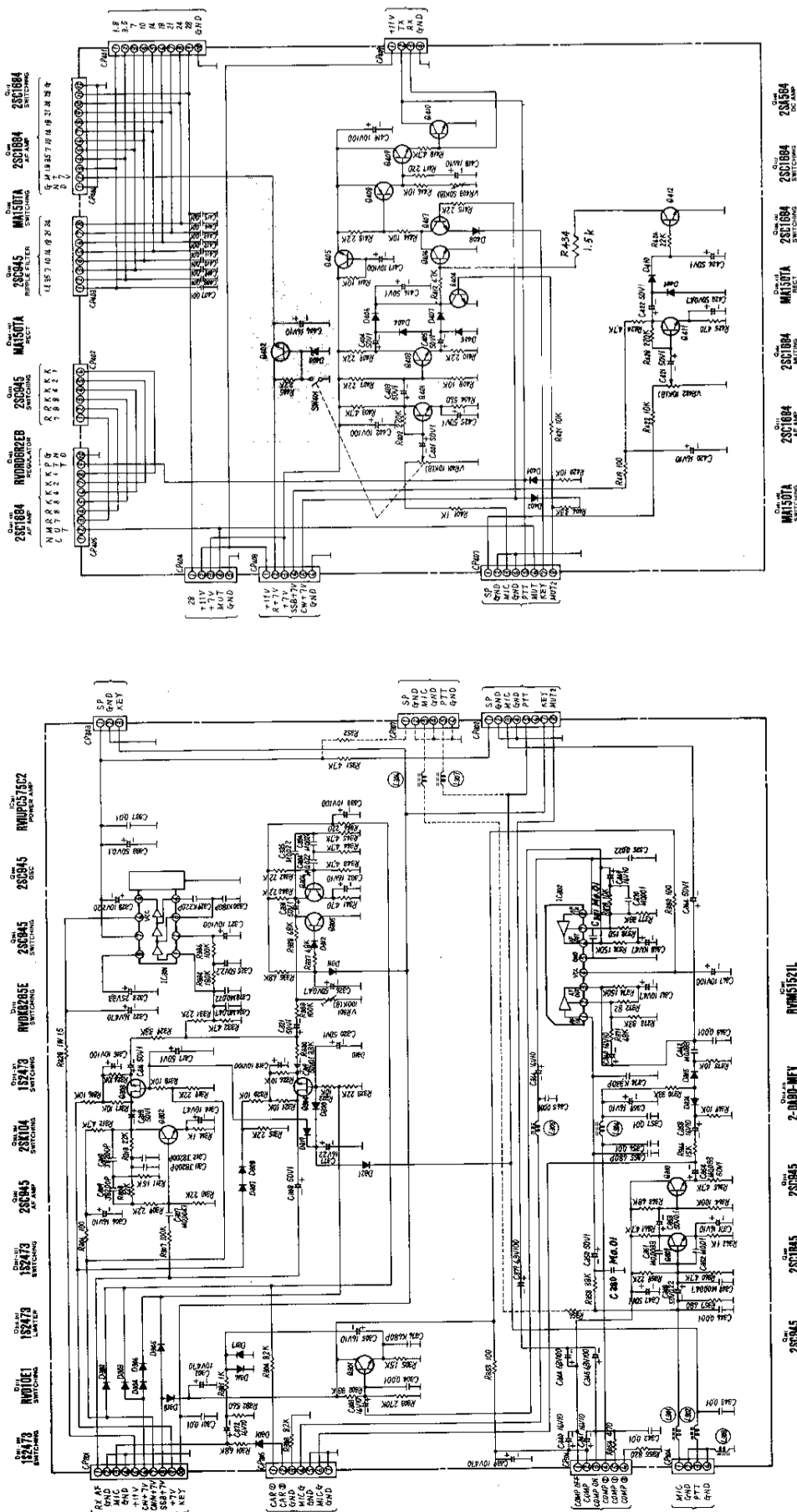
QTY 1
MA27A2
ACC

This schematic diagram is subject to change without notice.

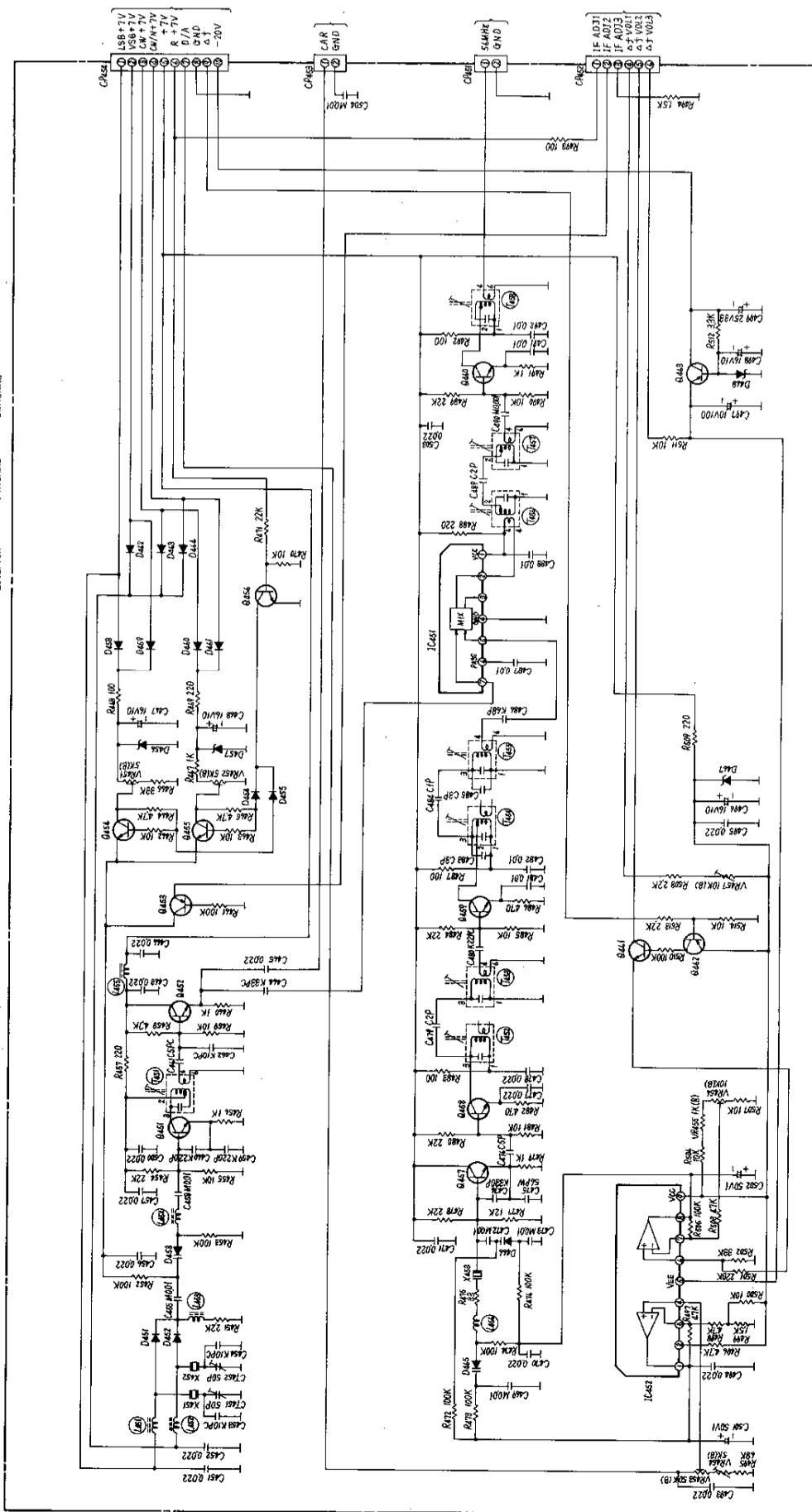
[illegible]

-17-

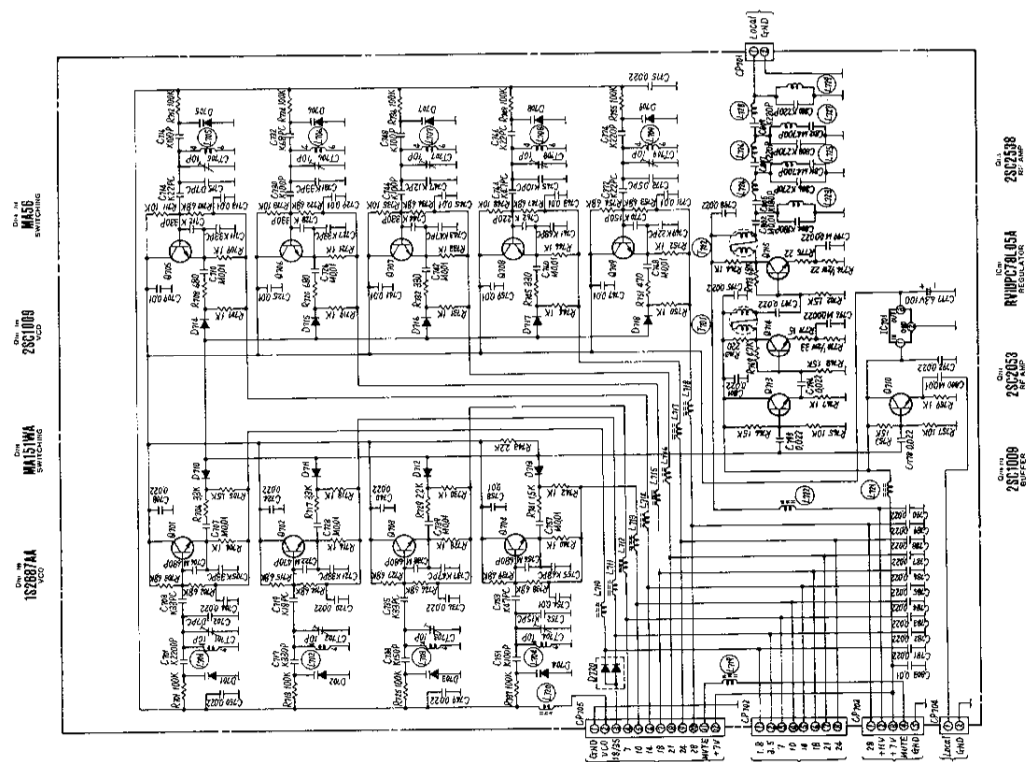
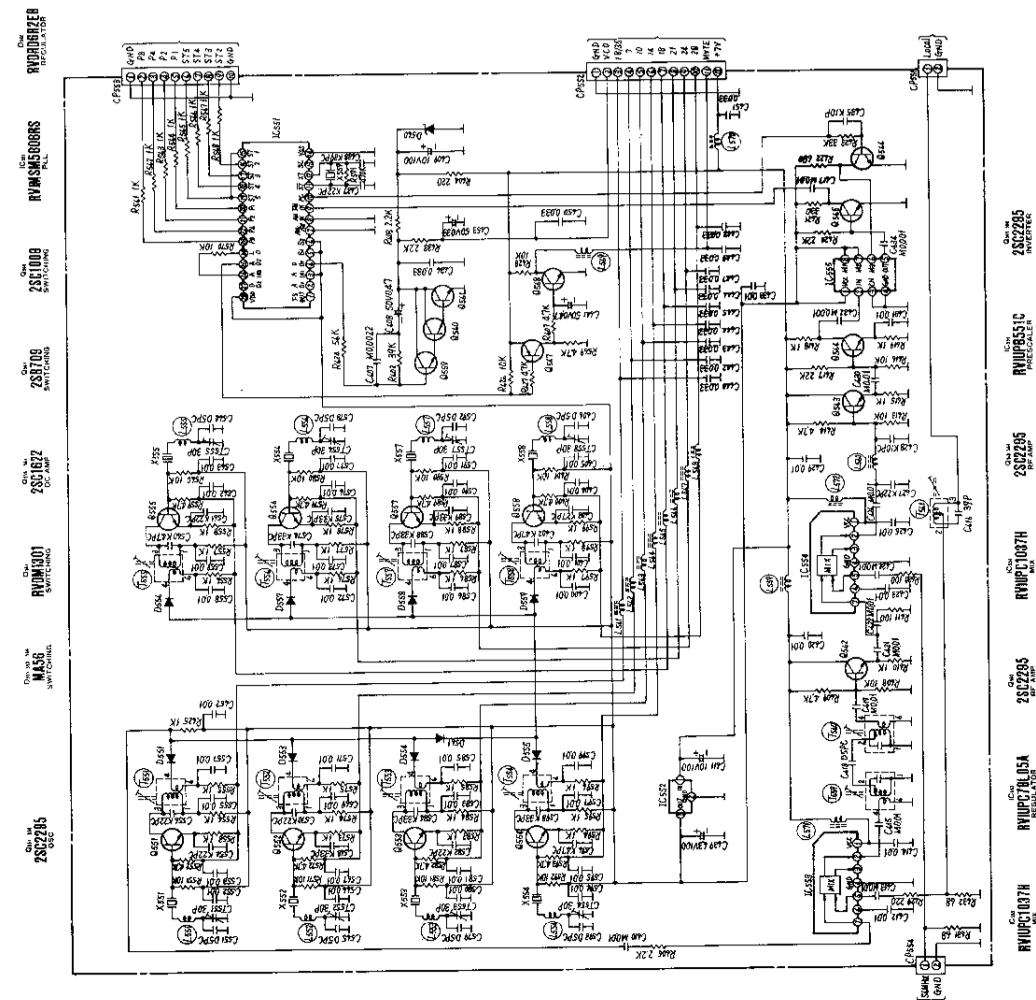
AF & VOX Module



This schematic diagram is subject to change without notice.

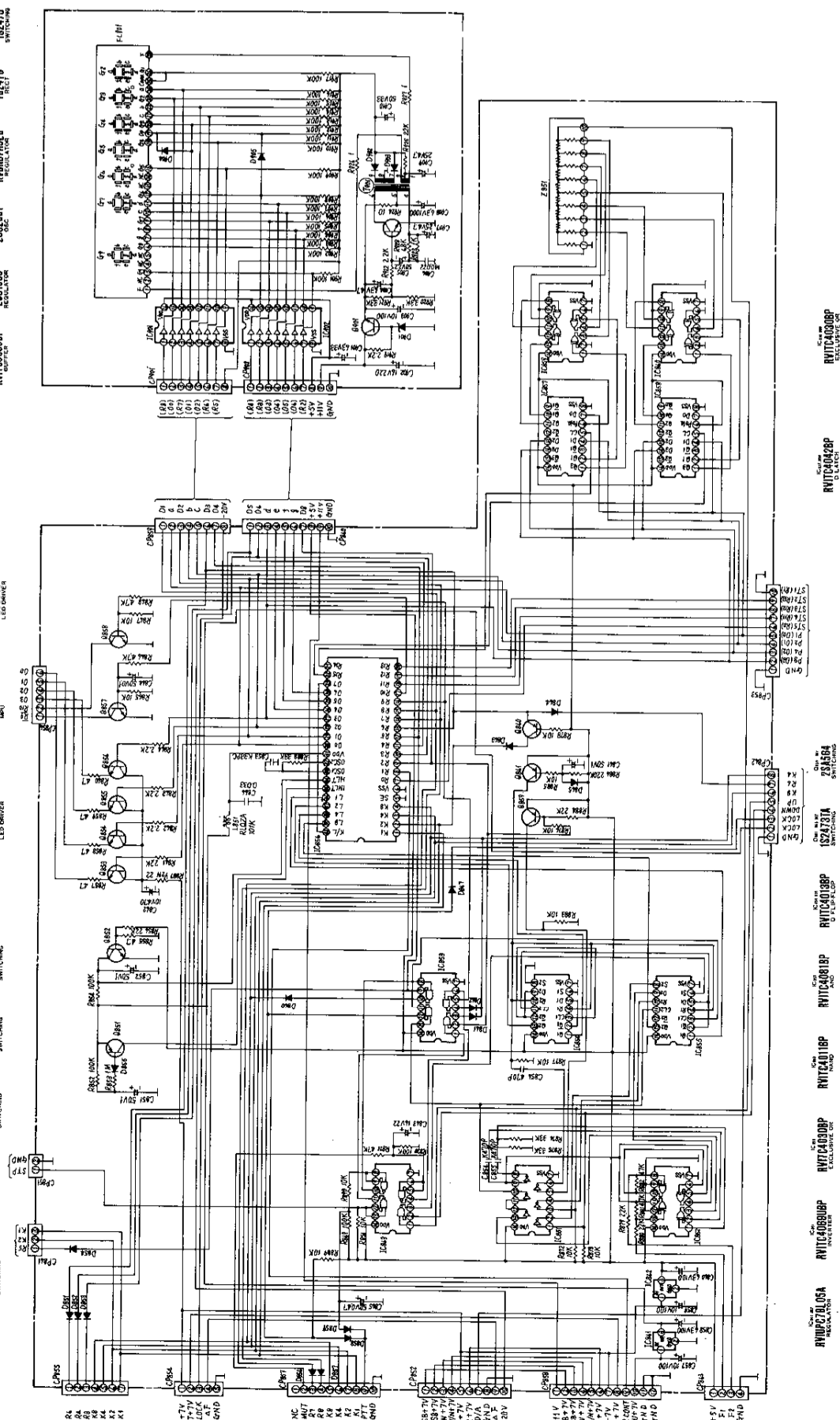
[illegible][illegible]

PLL Module



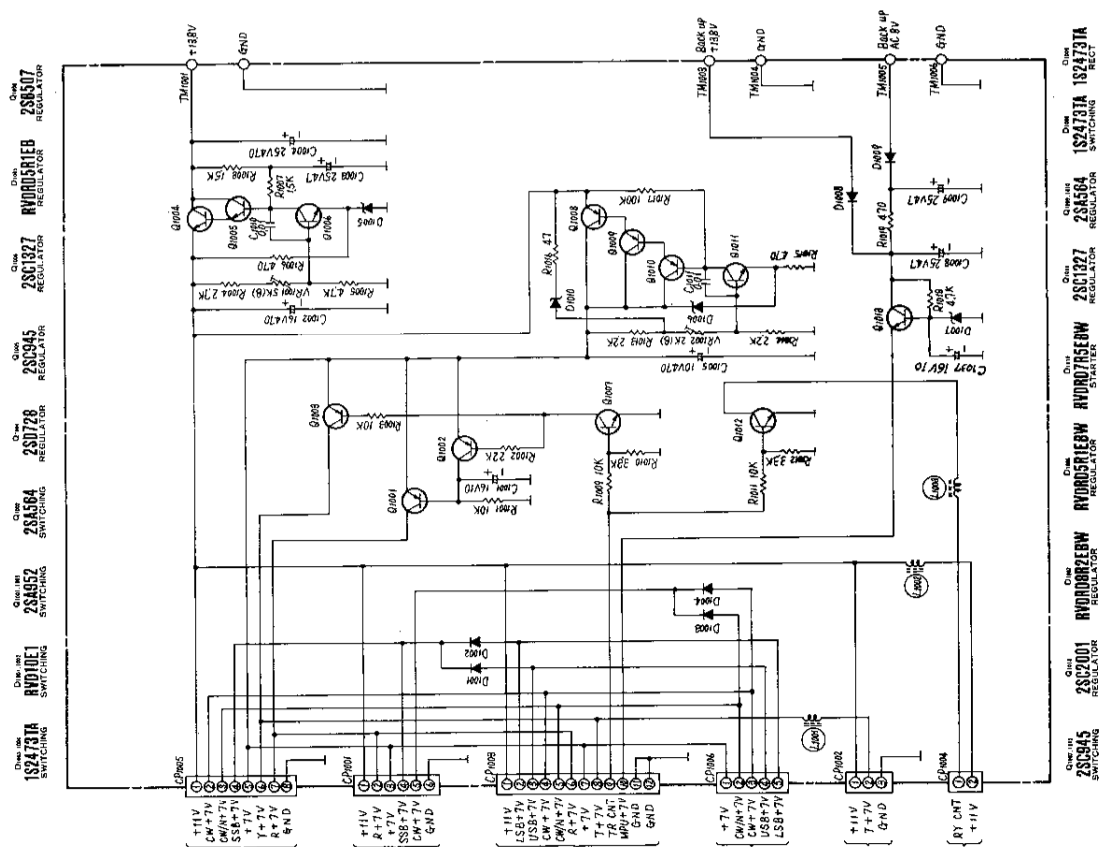
This schematic diagram is subject to change without notice.

Part No.	187171A
Description	SWITCHING
Q'ty Reqd	1
Part No.	RVD06295B
Description	SUPPLYING
Q'ty Reqd	1
Part No.	ZSC945
Description	SWITCHING
Q'ty Reqd	1
Part No.	ZSC945
Description	LED DRIVER
Q'ty Reqd	1
Part No.	RVMF3381
Description	(MCM)
Q'ty Reqd	1
Part No.	ZSC2001
Description	LED DRIVER
Q'ty Reqd	1
Part No.	RMTS1506P
Description	BUFFER
Q'ty Reqd	1
Part No.	ZSC1558
Description	REGULATIVE
Q'ty Reqd	1
Part No.	RMD0745E
Description	RECT.
Q'ty Reqd	1
Part No.	187473
Description	SWITCHING
Q'ty Reqd	1



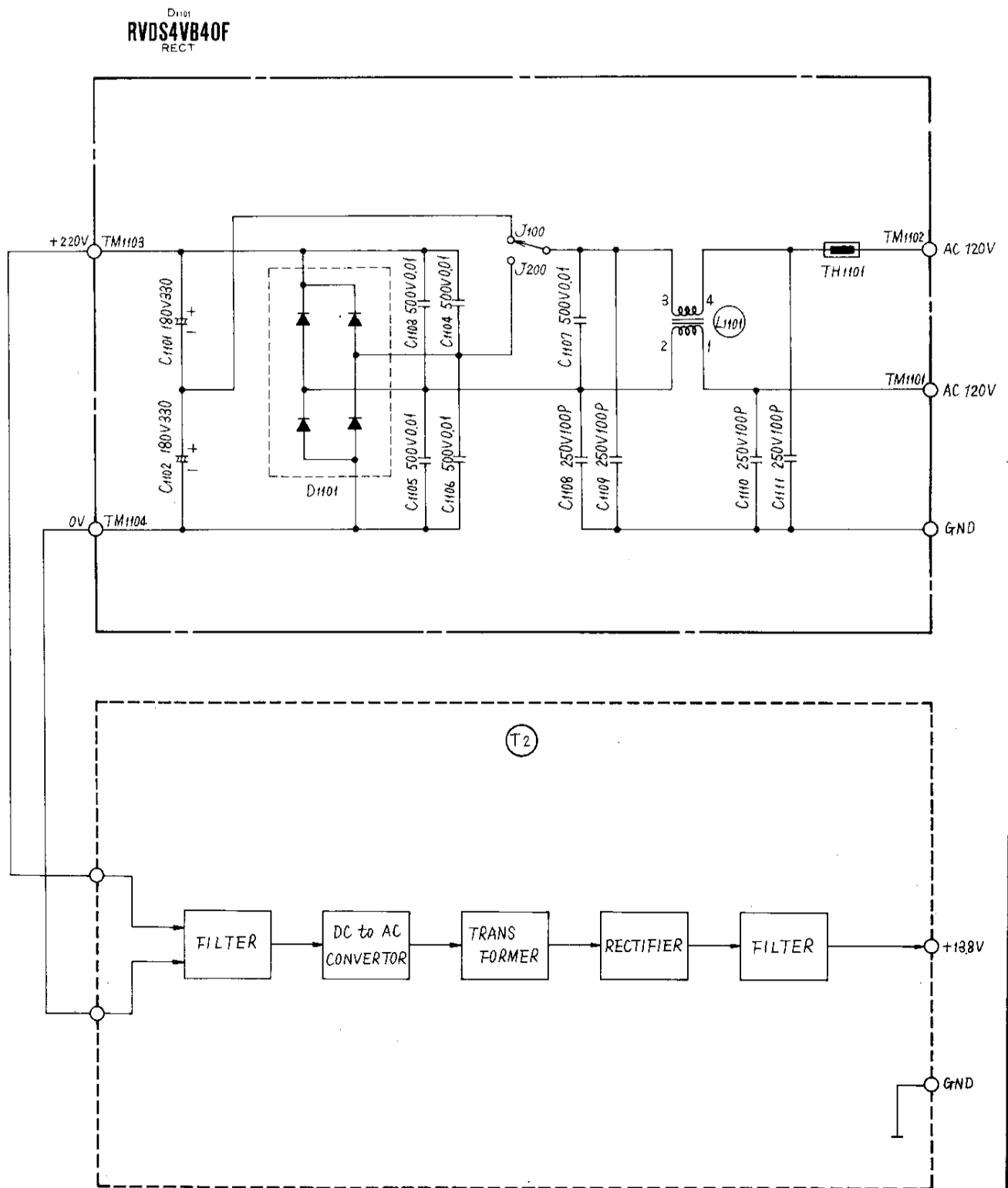
—21—

REGULATOR Module



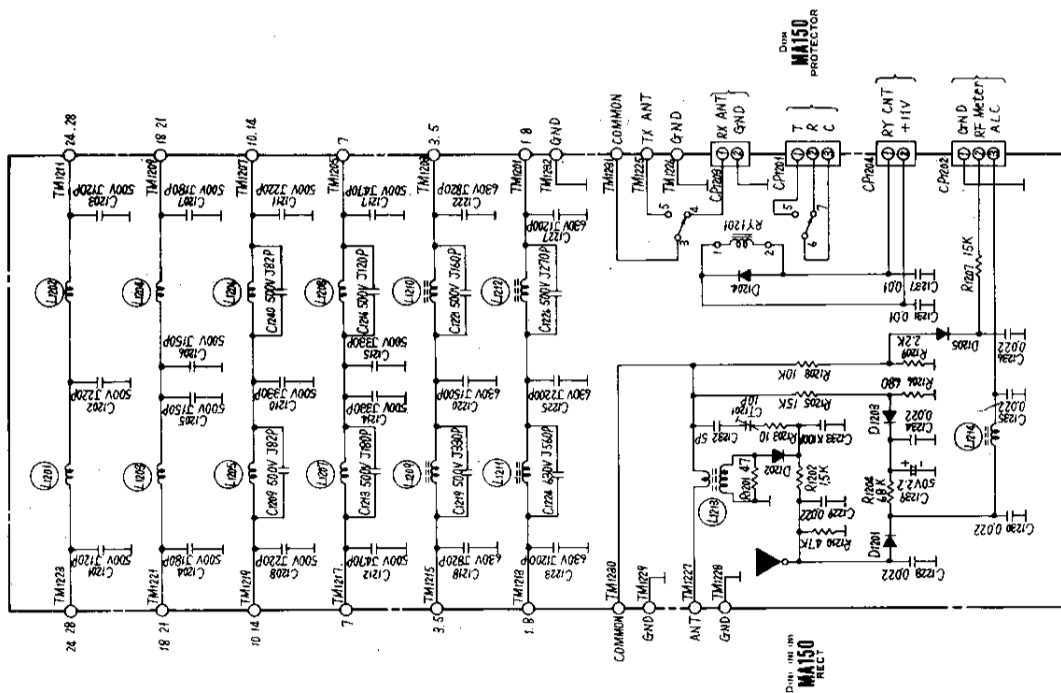
This schematic diagram is subject to change without notice.

AC POWER SUPPLY Module



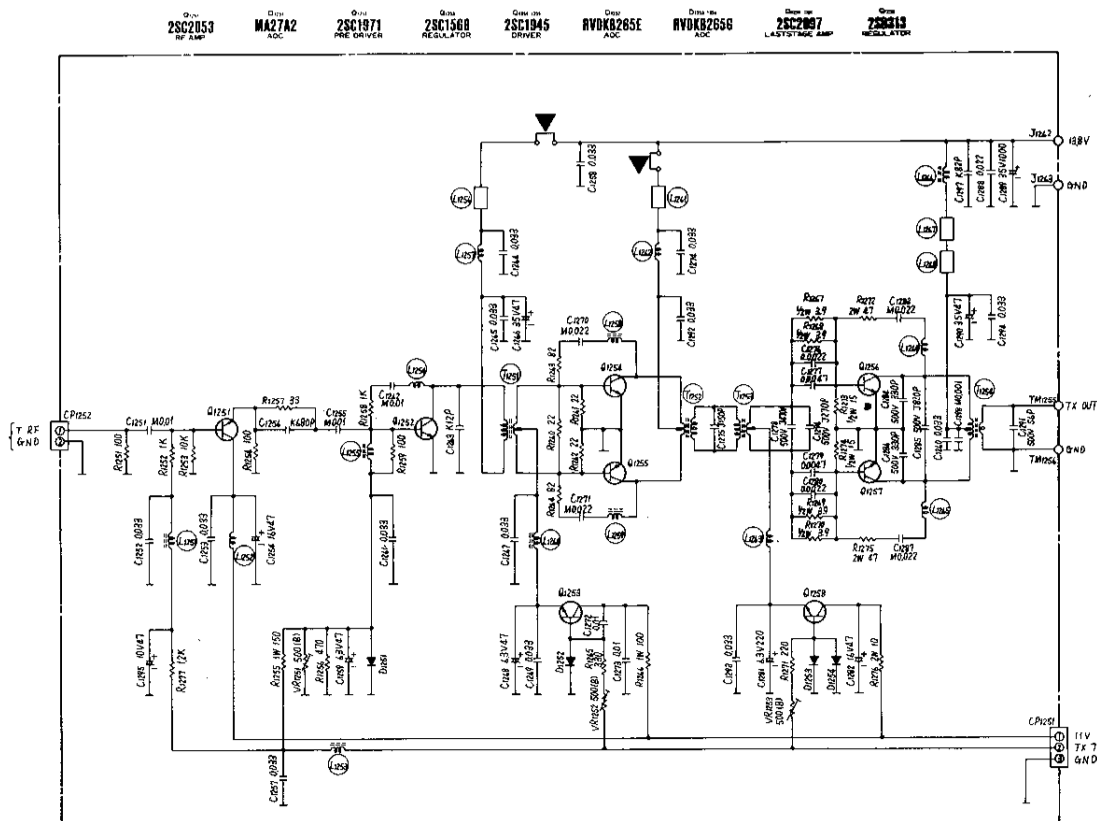
This schematic diagram is subject to change without notice.

LPF & ALC Module



This schematic diagram is subject to change without notice.

TX POWER AMP. Module



This schematic diagram is subject to change without notice.

MEMO

MEMO

SPECIFICATIONS

GENERAL

• Frequency Range	160 m Band	1.8 — 2.0 MHz
	80 m Band	3.5 — 4.0 MHz
	40 m Band	7.0 — 7.3 MHz
	30 m Band	10.0 — 10.15 MHz
	20 m Band	14.0 — 14.35 MHz
	17 m Band	18.068 — 18.168 MHz
	15 m Band	21.0 — 21.45 MHz
	12 m Band	24.89 — 24.99 MHz
	10 m Band	28.0 — 29.7 MHz
	A3j (SSB) A1 (CW)	
• Mode		
• Tuning Speed	3-step (1 kHz/100 Hz/25 Hz)	
• Stability	Less than ± 200 Hz within 1 Hour	
	Less than ± 20 Hz after 1 Hour	
• Power Supply	AC 120 V 60 Hz	
	DC 13.8 V Minus Ground	
• Power Consumption	AC Transmitting 550 VA	
	AC Receiving 50 VA	
	DC Transmitting 20 A	
	DC Receiving 0.6 A	
• Antenna Impedance	50 Ω	
• Number of Semiconductors	30-IC, 6-FET, 124-TR	
• Dimensions (Max.) mm	322(341)W, 132(139)H, 316(402)D	
• Weight	9.5 kg	

TRANSMITTING

• Final Stage Input (PEP)	200 W (160 m~12 m), 100 W (10 m)
• Modulation Method	Balanced Type
• Carrier Suppression	More than 40 dB
• Side-Band Suppression	More than 50 dB
• Spurious Radiation	Less than -40 dB
• Microphone Impedance	600 Ω ~ 50 k Ω

RECEIVING

• Circuit Type	Single Superheterodyne		
• I.F Frequency	SSB 9.0000 MHz		
	CW 9.0007 MHz		
• Sensitivity	Less than -12 dB μ (0.25 μ V)		
• Selectivity	SSB, CW Wide		CW Narrow
	-6 dB	More than ± 1.1 kHz	± 200 Hz
	-20 dB	Less than ± 1.5 kHz	± 500 Hz
	-60 dB	Less than ± 3.0 kHz	± 800 Hz
	Note... CW Narrow is required to install option CW Filter.		
• Spurious	Image Ratio	More than 60 dB	
	I.F Rejection	More than 60 dB	
	Other Spurious Ratio	More than 70 dB	
• Delta F Range	More than ± 1 kHz		
• I.F Tune Range	More than ± 1 kHz		
• Audio Ouput Power	Internal Speaker 0.5 W (10% THD)		
	External Speaker 1.0 W (10% THD)		
• Audio Ouput Impedance	8 ohm		

Specifications are subject to change without notice.

HOW TO OPERATE THE RTTY AND FAX

Regard to ENCODER built-in RTTY and FAX, it is possible to use as AFSK (Audio Frequency Shift Keying). In this case, AFSK signal is input into the unit's mic jack and operate on SSB mode (LSB or USB).

NOTE:

Turn down the Mic Gain Control less than 50% of the rated output power for RTTY and FAX. Continuous transmitting at 100% of the rated Output may damage the final transistor, power supply etc. by the unusual rising of the temperature.

CW Filter & Hand Microphone Included

RQT4341ZA

N.C.G. CO.

1275 NORTH GROVE ST. ANAHEIM, CALIF. 92806

RQX4112ZA F128210

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