

FDK Multi 800 d 144 mhz FM 5-25 watt Car Mobile

SPECIFICATIONS

The followings are the specifications of MULTI-800D;

GENERAL

Frequency Range	144.000 to 147.995MHz
No. of Channels	800 (5KHz step)
Frequency tuning system	UP/DOWN Counter system
Mode	F3 (FM)
Antenna Impedance	50 Ohms, Unbalanced
Power Voltage	11V to 15V DC (13.8V DC as reference)
	Negative grounding
Current drain	6.5A maximum at transmit HIGH
	1.8A minimum at transmit LOW
	1.5A maximum at receive
	Approx. 1.0A at receive with no signal input.
Operation Temperature	-10° to +60°C
Semiconductors	Transistors 37
	FETs 9
	ICs 29
	Diodes 71
	LEDs 7
Dimensions	162mm (W)
	70.5mm (H)
	260mm (D)
Weight	Approx. 3.0Kg

Transmit Section

RF Output power	Approx. 1 to 25 Watts
Modulation	Variable Reactance Frequency Shift
Frequency Deviation	±5KHz
Spurious Radiation	Less than -60dB
Microphone	Dynamic Microphone with PTT switch, Impedance 600 Ohms

Receive Section

Circuitry	Double Superheterodyne
Intermediate Frequency	1st IF: 16.9MHz
	2nd IF: 455KHz
Sensitivity	More than 0.4μV at 20dB N/Q
Squelch Sensitivity	-5dBμ
Image Rejection	More than 60dB
Spurious Interference	More than 60dB
Selectivity	More than ±6KHz at -6dB
	Less than ±12KHz at -60dB
Audio Output Power	1.2 Watts across 8 Ohms load (10% Distortion)
Audio Output Impedance	8 Ohms, Unbalanced

FEATURES

MULTI-800D is designed with the FDK's advanced technology and assembled with the latest assembling techniques in order to satisfy the requirement of the amateur radio. MULTI-800D has the most advanced and sophisticated features available, and the featured are:

Built-in 800 channels; (5KHz Step)

Both Transmit and Receive on the whole 2M band from 144 to 147.995MHz on each 5KHz step. The Phase-locked-loop synthesizer is utilized in this set.

Dynamic UP/DOWN Counter; (5KHz step)

The counter dial changes frequency by 5KHz as a step from 144 to 147.995MHz. The frequency can be changed in single steps or variable scan rate. For scanning 3 different speeds (SLOW-MEDIUM-FAST), and a single tone oscillator which works in every 100KHz are provided for the operational efficiency.

Digital Frequency Display with Large LED's;

4 large LED's for frequency display give the prompt and accurate read-out of the frequency.

Memory;

A push switch selects 2 C-MOS LSI's. Memory switch together with the counter dial functions as 2 separate VFO's.

Free Split;

The transmitting and receiving frequency can be split just as in HF gear. Locate the function switch at FREE SPLIT, and the TX/RX frequency is to be automatically split with the PTT switch on the Microphone. The frequency display, too, is changed over.

External Frequency Display; (DD-800) Option

An external display sold separately with large green fluorescent 7-segments display tubes makes the read-out of the frequency much easier especially during mobile operation when sunlight makes reading red LED's difficult.

One Unit, One Function System;

The transceiver has the printed circuit boards in order to have a better serviceability. Each board has only one function so that the maintenance work may be made very easily.

Improved Cross Modulation Characteristics;

The 4 stage helical resonator in the RF section, and the dual gate MOS FET in the mixer give excellent cross modulation rejecting characteristics.

Detachable Handles;

The handles can also be used as the support stand for the set as a base operation. A Mobile mount for car installation is also provided.

ACCESSORIES

The equipment has the following accessories.

Please check that have all of them.

Microphone	1
Microphone bracket	1 set
(4mm screw 2, plain washer 2)	
DC power cord (with connector and fuse)	1
Mounting bracket	1 set
(Tapping screw 2, plain washer 2)	
Spare fuse (10A)	1
EXT. SP plug	1
Handle	1
Instruction Manual	1

Preparation for Operation

It is recommended to check the followings prior to attempting the operation.

Antenna

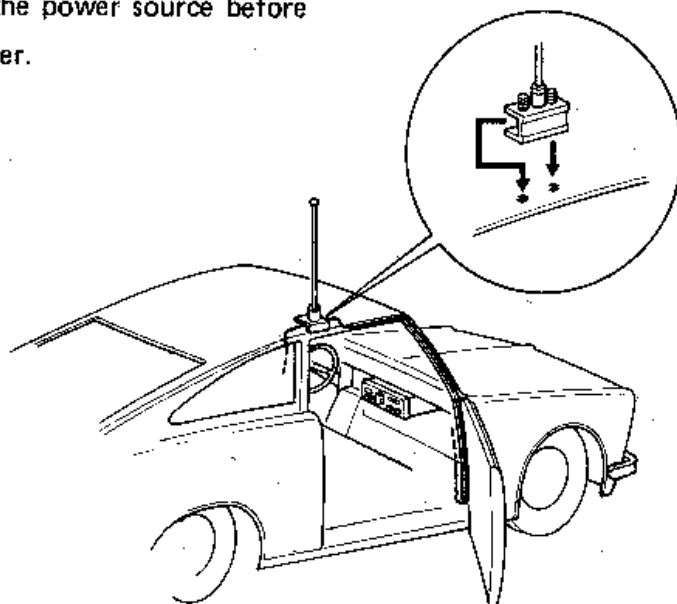
Never operate your transceiver without a properly matched antenna.

- a) As the output impedance of the set is 50 ohms, use 50 ohm coaxial cables.
- b) Many styles and types of Mobile antennas are available for installation in just about every type of vehicle, including boats and aircraft. You should discuss this with the dealer where you purchased the transceiver.
- c) The position of the antenna on a vehicle is very important as it will affect the directional characteristics (radiation pattern). The roof-top is usually considered the best location. (refer to FIG 1)
- d) For more details please consult the dealer.

Power Connections

- a) Be sure the transceiver power switch is in the OFF position before making any connections to the power source.
- b) The transceiver has a polarity reversal protection diode across the power input circuit. If the polarity of the power source is reversed, the fuse in the positive power lead will burn out. Check carefully the polarity of the power source before connecting to the transceiver.

- c) Under no circumstances should a fuse of greater amperage than 10 amperes be used to replace a burnt out fuse. Also, never bypass the fuse with a jumper wire. In either case severe damage could result to the transceiver.
- d) Be sure that your vehicle is a negative grounded power system. Then connect the power lead with a fuse (RED) to the positive terminal of the power source (a battery in most vehicles) or to the accessory terminal on the ignition switch or to the accessory fuse on the fuse block. Connect the other power lead (BLACK) to the negative terminal of the power source or to the common ground connection. However, the direct wirings from the battery are recommended for noise elimination. (refer to Fig. 2) If the vehicle is positive grounded, you must insulate the set from the body. Please consult your dealer in that case.
- e) Only use 12V DC as the power source (Such as a battery in the vehicle)



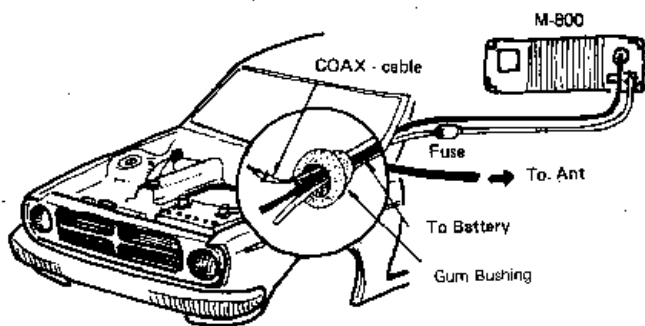


Fig. 2

Mobile operation

- a) Locate the transceiver under the dash board or on the hump of the vehicle. Do not position on top of the dash board or any location that will interfere the operation of the vehicle.

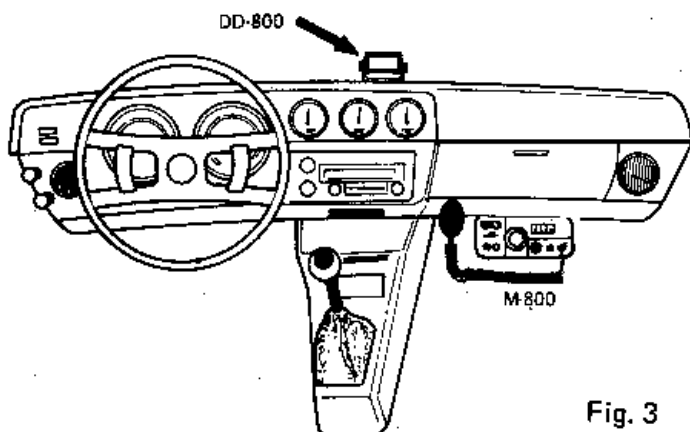


Fig. 3

- b) Position the transceiver in the mounting bracket for best view and accessibility to the front panel controls.
- c) Do not expose the set to direct sunlight.
- d) Avoid installing the set near the hot air exhaust outlet. (refer to Fig. 4).
- e) The vehicle mounting bracket can be used as a template to locate and mark the mounting holes. (refer to Fig. 5)

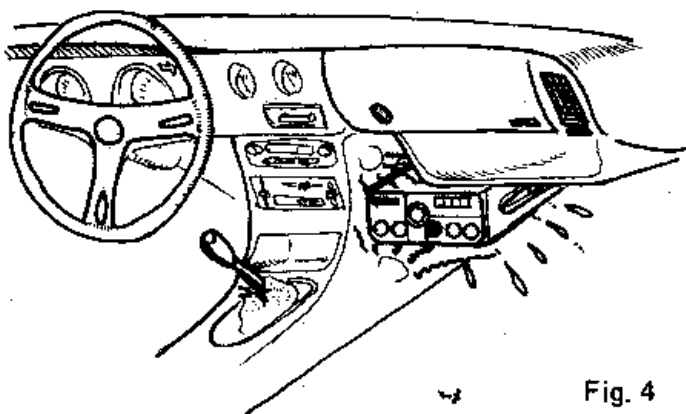


Fig. 4

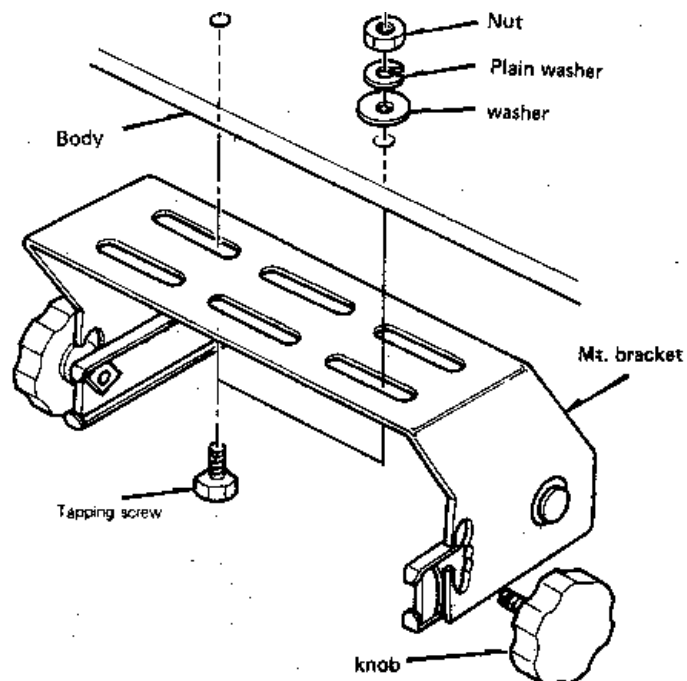


Fig. 5

Base operation

- a) The transceiver was basically designed for mobile operation. However, it may be used as a base station by addition of a 13.8V DC external power supply.
- b) Continuous transmission (more than 30 minutes) should be avoided as much as possible.
- c) Avoid using the set in hot, humid, dusty places, an airy, dry place is ideal for its operation.

Other information

- a) The transceiver has been factory adjusted and calibrated. It is no longer under warranty if any adjustment or calibration are made by unauthorized person.
- b) The detachable handle can be conveniently used when carrying this set. (refer to Fig. 6)

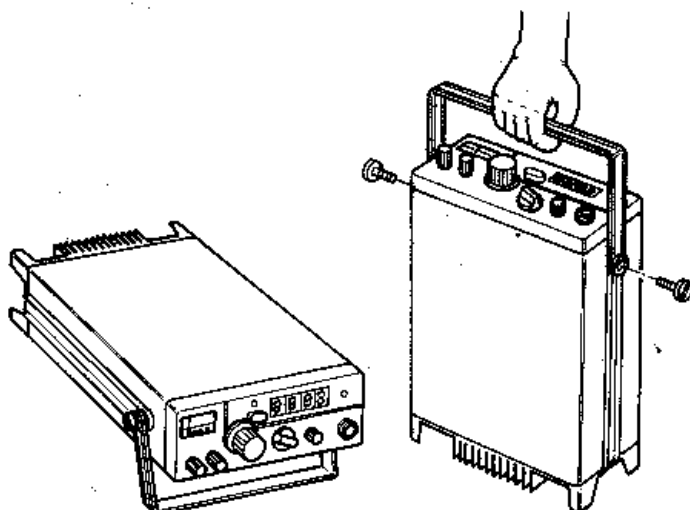
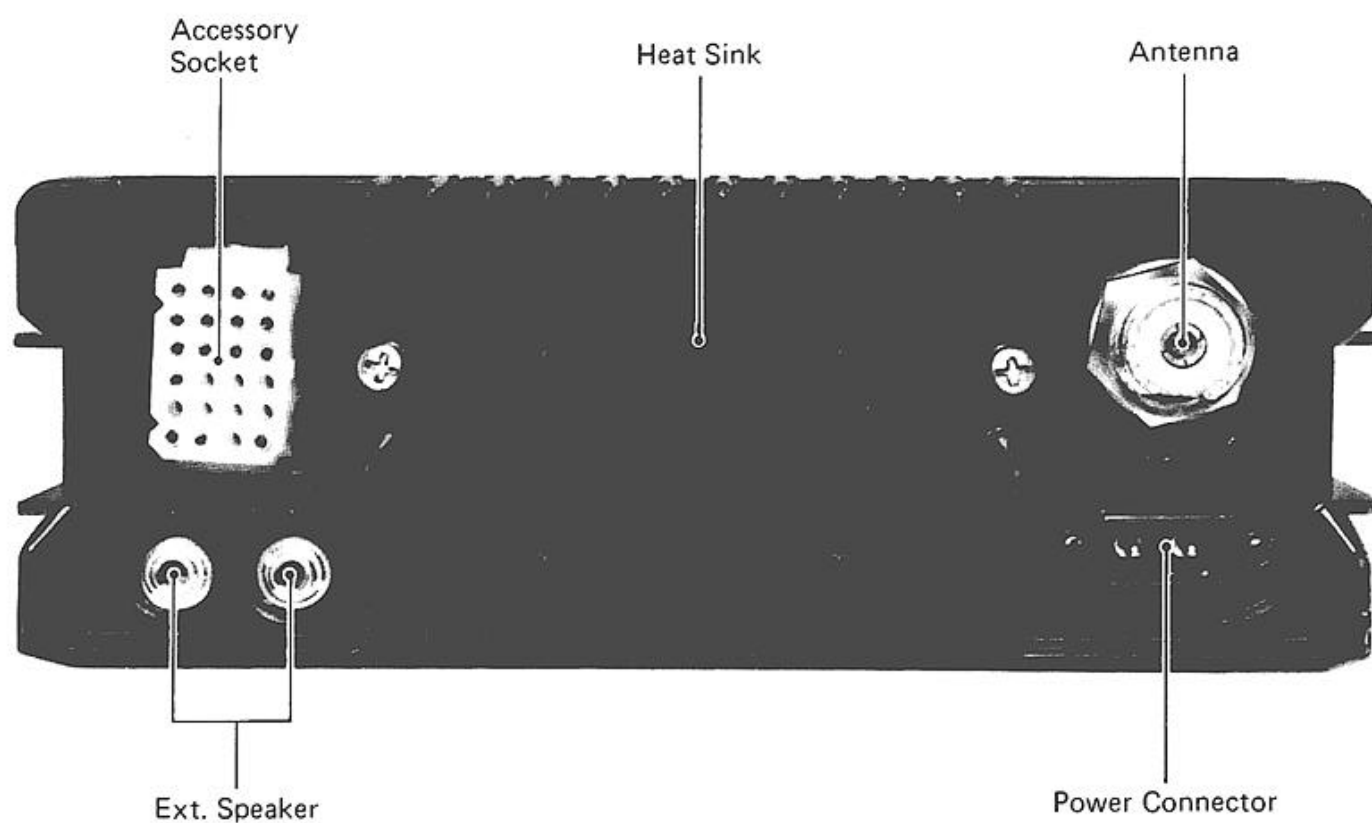
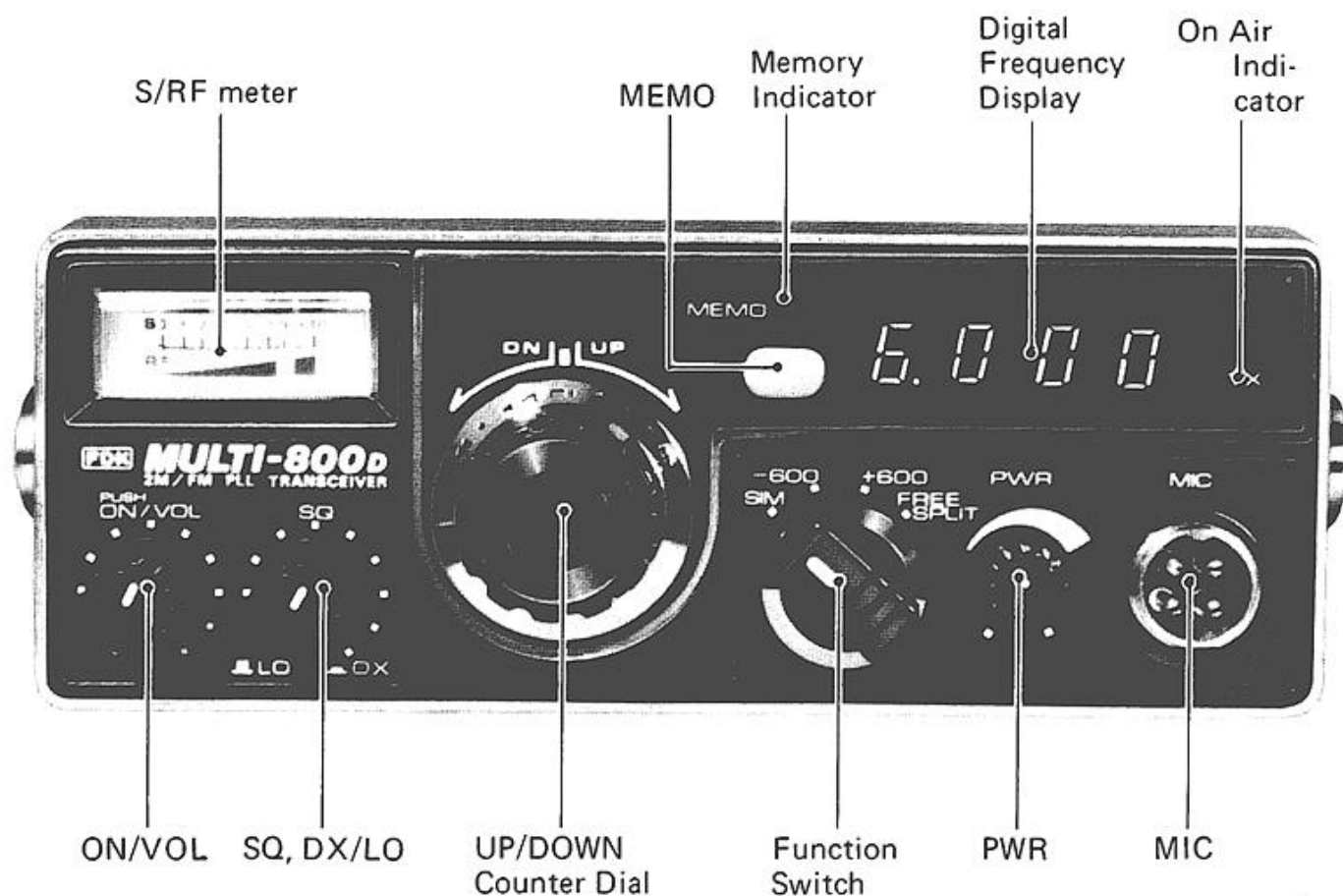


Fig. 6



Panel Descriptions

Front Panel

S/RF meter

The meter indicates the signal strength of receiving signal and the output power in transmitting.

Memo (Memory) Switch

Push ON and OFF switch is used for memory ON/OFF (refer to the **Memory operation**).

Memory indicator

The green LED is to be illuminated when the memory is ON.

ON/VOL

Push ON and OFF type switch for power supply. Turning it clockwise fully, you will get maximum audio level from the speaker.

SQ, DX/LO switch (Squelch, RF ATT.)

The function of SQ is to make the back ground noise silent. The maximum "SQUELCH" is obtained when the control is in full clockwise position, Minimum "SQUELCH" when in counter clockwise position.

Pull this control out when receiving excessive local signal, and push in to release for distant or weak stations. In case the optional tone burst is to be used, this switch turns for the circuit functioning ON/OFF instead of changing over DX/LO.

UP/DOWN Counter Dial

Changes the frequency by 5KHz step from 144.000 to 147.995MHz either manually or scan. The 3 different scan speeds are available. (refer to **UP/DOWN Counter Dial operation**)

Function switch

For simplex operation use "SIM" position, -600 is for repeater use (Transmit frequency is 600KHz lower than receive frequency), +600 is also repeater use (Transmit frequency is 600KHz higher than receive frequency), and FREE SPLIT. Frequency can be UP/DOWN by the counter dial when the switch is in "SIM", -600 and +600 positions. FREE SPLIT

enables QSO with split frequency from simplex to 4MHz. (refer to **FREE SPLIT operation**)

On Air Indicator

The LED will be illuminates in Transmission.

PWR (Output Power) Control Knob

The output power can be continuously changed by this knob from approx. 1 to 25 Watts output. The maximum power is to be obtained when the knob is in full clockwise position and the minimum power when in counter clockwise position.

Digital Frequency Display

4 large LED's for frequency display give the prompt and accurate readout of the frequency. (refer to **Reading of Operating Frequency**)

Mic Jack

For the connection of microphone.

Rear Panel

Accessory socket

The socket for the optional external frequency display (DD-800).

Speaker

- Both the internal and external speaker will be driven.
- Only the external speaker will be driven.

Heat Sink

For effective heat radiation of the final transistor.

Antenna

For 50 ohms impedance antenna connection.

Power Connector

Supply 11 to 15V DC (13.8V DC as reference) with the attached BLACK/RED code to this connector. RED for the POSITIVE, and BLACK for the NEGATIVE.

OPERATION

Reception

- 1 Push the power switch ON.
The S/RF meter will be illuminated and the digital frequency indicator will show the operating frequency.
- 2 Turn the SQ knob fully counter clockwise.
- 3 Turn the VOL knob for clockwise direction up to point where the noise will disappear and set the knob at the best position.
- 4 Locate a channel where there is no signal and turn the SQ from fully counter clockwise to a point where the noise just stops.
- 5 Turn to the UP/DOWN Counter Dial to the desired channel.

Transmission

- 1 DX/LO Switch to DX. (or tone burst switch to OFF)
- 2 Function Switch to SIM.
- 3 MEMO Switch to OFF.
- 4 UP/DOWN Counter Dial to the desired channel.
- 5 Press the PTT switch on the Microphone and speak into the Microphone. Replace the transmit switch to listen to the reply.
- 6 Observe that the On Air Indicator is illuminated and the S/RF meter indicates the RF output power when transmitting.

The Counter Dial operation

Locate the function switch select SIM position. The frequency is to be moved up when the dial is turned clockwise, and is moved down when turned counter clockwise. QSY can be done either manually or automatically. (3 speeds are available)

The clicked dial steps in every 15 degrees.

STOP

MANUAL

SLOW

MEDIUM

FAST

MANUAL 5KHz shifting can be made by positioning the dial to MANUAL and STOP repeatedly.

Furthermore, automatic scanning with 3 different speeds can be utilized as in Fig. 7

The scanning speeds are as follows.

SLOW Approx. 20KHz/sec.

MEDIUM Approx. 100KHz/sec.

FAST Approx. 500KHz/sec.

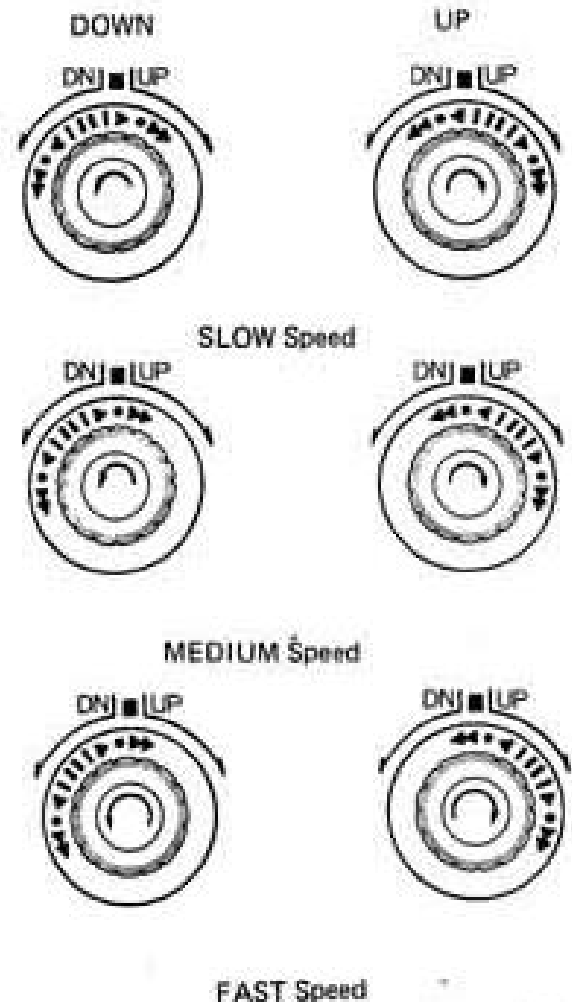


Fig. 7

The Dial will be back at 11 (STOP) position when you let it go, and frequency shifts no more.

The frequency can be changed from 144.000MHz to 147.995MHz. When the dial is at UP position, 147.995MHz is followed by 144.000MHz. When it is at down, 144.00MHz to 147.995MHz.

Tone Burst operation

The Tone Burst for the repeater use is available for this set. When this Tone Burst is to be used by pulling DX/LO switch, the DX/LO change over switch turns ON/OFF the Tone Burst circuit instead.

The MEMO (memory) Switch operation

On and OFF switch is used for memory. The green LED is to be illuminated when the memory is ON.

The operation of this switch is as follows.

- 1 Set the frequency on 145.000MHz select "SIM" with the counter dial. This frequency is for calling up other station.
- 2 Move to other channels for QSO when you find a station. Push ON the MEMO switch, and look for the clear channel with the counter dial.
- 3 145.270MHz might be found clear. Push OFF the MEMO switch to go back to 145.000MHz and let the other station know that you are going up to 145.270MHz.
- 4 Push ON the MEMO switch again and you will be on 145.270MHz. Then have a QSO.

Example: Either the MEMO switch ON or OFF however, the switch functions just the same when it begins with the switch ON. ON/OFF switching of MEMO is equivalent to changing over 2 VFO's. The frequency is to be memorized unless the code is disconnected to a battery even when the power switch of the set is turned OFF. Even when you pull out the power code or turn OFF the power for the set, the frequency is still memorized for 20 to 30 minutes.

The FREE SPLIT operation

Then the function switch is in FREE SPLIT position, transmitting and receiving frequency can be split as follows;

- 1 Set the frequency for both MEMO ON and OFF.
For example; MEMO ON 145.040MHz
MEMO OFF 145.680MHz
- 2 You transmit on the frequency you have set with MEMO ON when you receive with MEMO OFF.
- 3 When receiving with MEMO ON, the transmitting frequency is to be the one with MEMO OFF.

Now the set is ready for operation. Locate the counter dial, VOL, and SQ as required. Hold the press-to talk switch on the microphone down, and speak in a normal tone and level of voice. The red LED indicates that you are "ON THE AIR".

Reading of Operating Frequency

The frequency can be read on digital frequency indicator provided with light-emitting diodes for optical indication.

The digital indicator can indicate an operating frequency. As illustrated in Fig. 8, 4 light emitting diodes are provided to indicate a frequency under reception in the 1MHz, 100KHz, 10KHz and 5KHz digits.

At the Time of using repeater shift ($\pm 600\text{KHz}$), frequency displayer, indicates the same frequencies of transmission or reception respectively.

Example

145.000MHz (The operating frequency)

↑

Equivalent

↓

5.000 (Multi-800D's frequency indicator)

The operating frequency is 145.425MHz when MULTI-800D's Frequency indicator is indicated at 5.425.

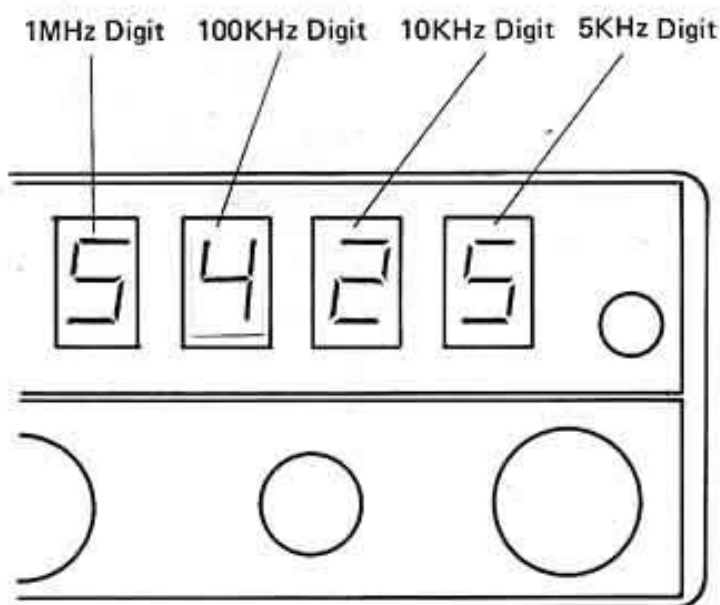
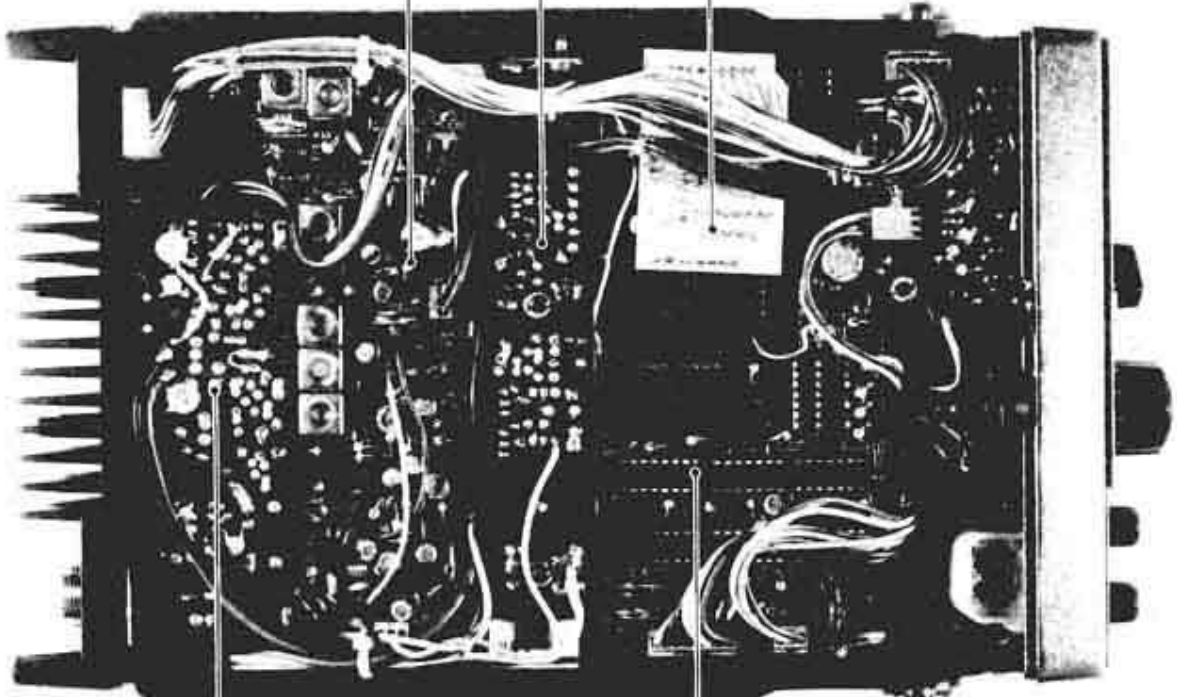


Fig. 8



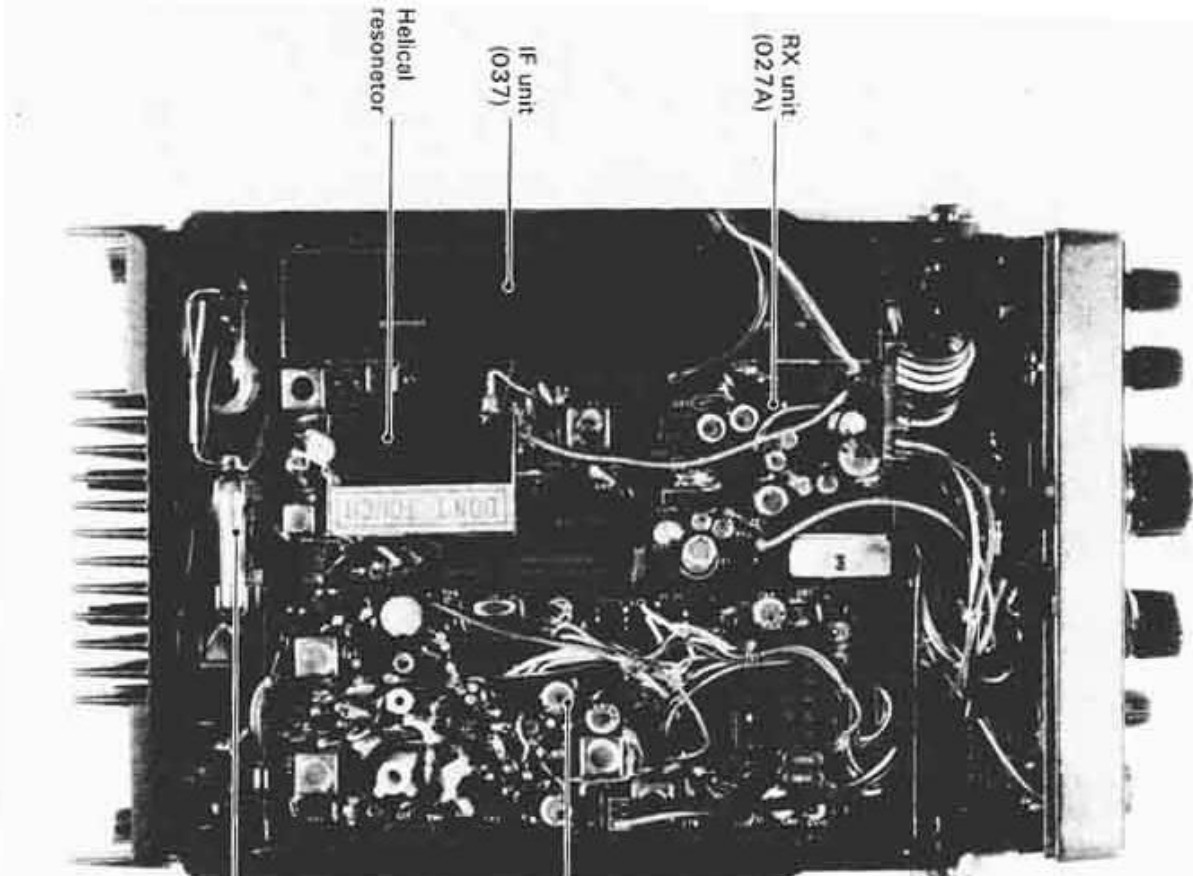
REPEATER
unit(054A)

DC POWER
unit(030)

TX unit
(026A)

UP/DOWN
unit
(029)

TX PWR
unit
(039) / (C



RX unit
(027A)

IF unit
(037)

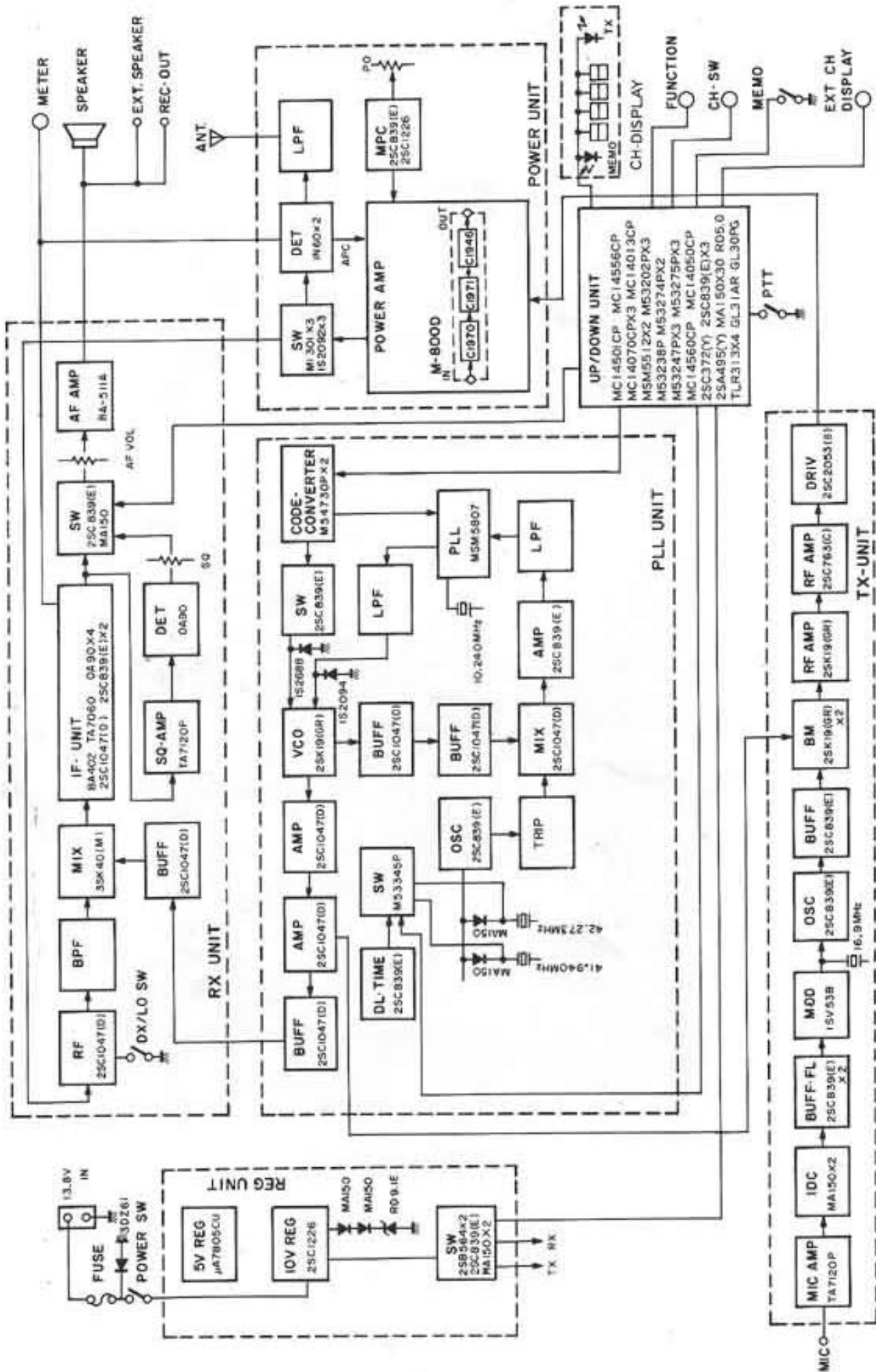
Helical
resonator

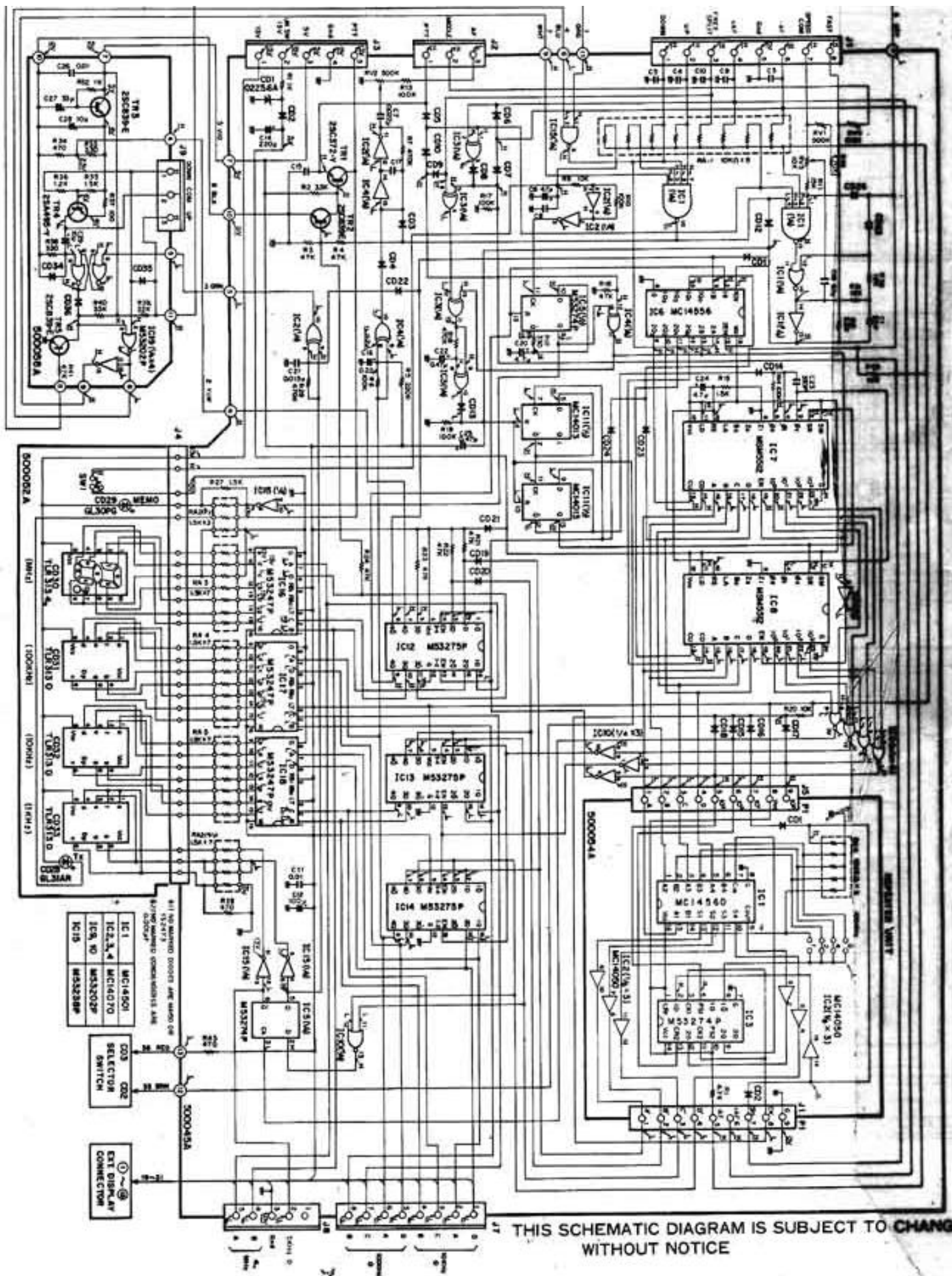
PLL
unit
(028)

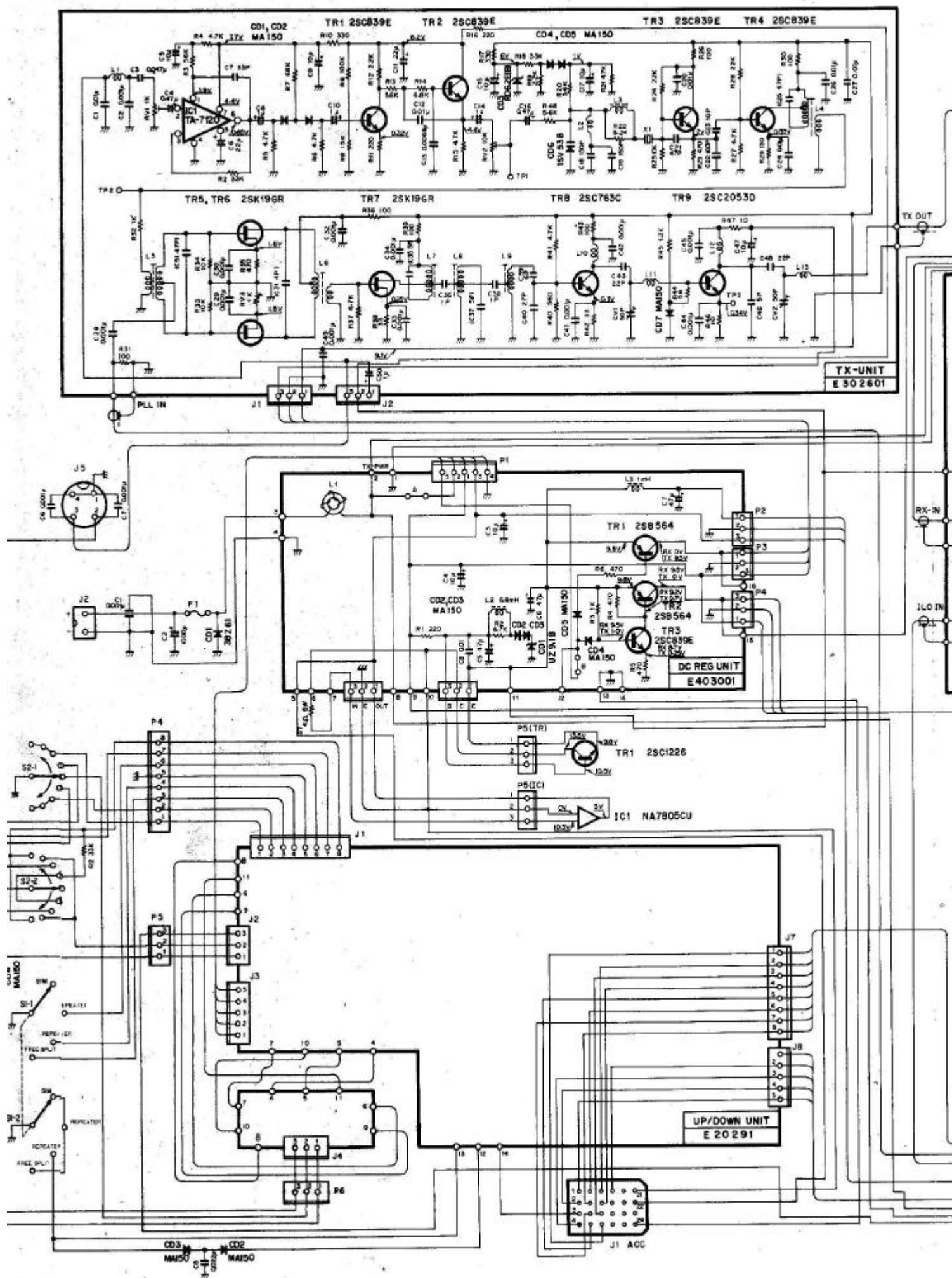
Fuse

BLOCK DIAGRAM

3







THIS SCHEMATIC DIAGRAM IS SUBJECT TO CHANGE WITHOUT NOTICE.

