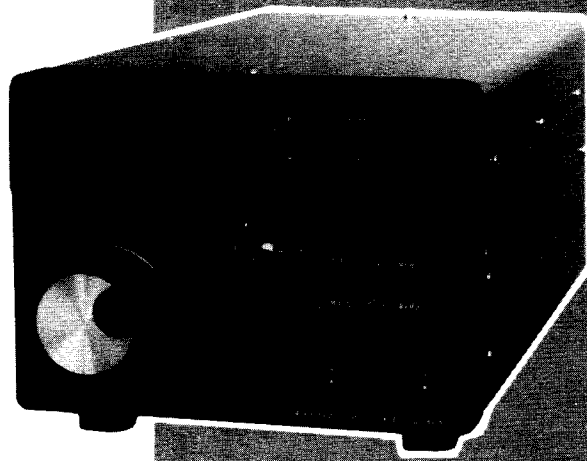


**KENWOOD**

**REMOTE VFO**

**Model VFO-230**



**INSTRUCTION MANUAL**

# FEATURES

## CONTENTS

1. FEATURES .....	2
2. PREPARATION FOR USE .....	3
3. Controls and their functions.....	3
4. OPERATION .....	5
5. SCHEMATIC DIAGRAM.....	6
6. SPECIFICATIONS .....	7

### 1. 20Hz-step digital VFO

The digital VFO uses a highly stabilized 10 MHz reference oscillator. Equipped with AN 8-bit microprocessor and digital control circuit, the VFO-230 shifts frequencies in 20 Hz steps similar to an analog VFO. Unlike conventional L/C oscillators, the digital VFO provides excellent frequency stability against temperature change. No warm-up is required.

### 2. 5 CH memory circuit

The VFO-230 has its own built-in memory circuit for further enhancing the capabilities of your transceiver. The memory circuit accepts frequency input from both the VFO-230 or the transceiver analog VFO. It is also possible to call back memory frequencies to the digital VFO.

### 3. Frequency locking mechanism

A frequency lock switch is provided to prevent the operating frequency from shifting when the frequency dial is accidentally turned during QSO.

### 4. Split frequency operation and transmit frequency setting.

Split frequency operation is possible between any of three frequencies: the remote VFO, transceiver or memory frequencies. The VFO-230 is also equipped with a T-F SET (transmit frequency setting) switch for checking transmit frequencies while in receive MODE.

## ACCESSORIES

The following accessories are furnished with the VFO-230:

Instruction manual (B50-2753-00) .....	1
Fuse (0.5A, F05-5011-05, in U.S.A.) (0.3A, F05-3012-05, in Europe).....	1
Remote cable (E30-1672-05) .....	1
Ground cable (E30-1635-05) .....	1
RCA-plug (E14-0101-05) .....	1
Auxiliary foot (J02-0049-14) .....	2
Auxiliary foot mounting screw (N30-4010-41).....	2

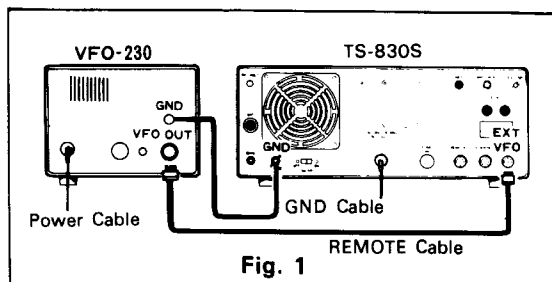
# PREPARATION FOR USE

## Connection to THE TS-830S (see Fig. 1)

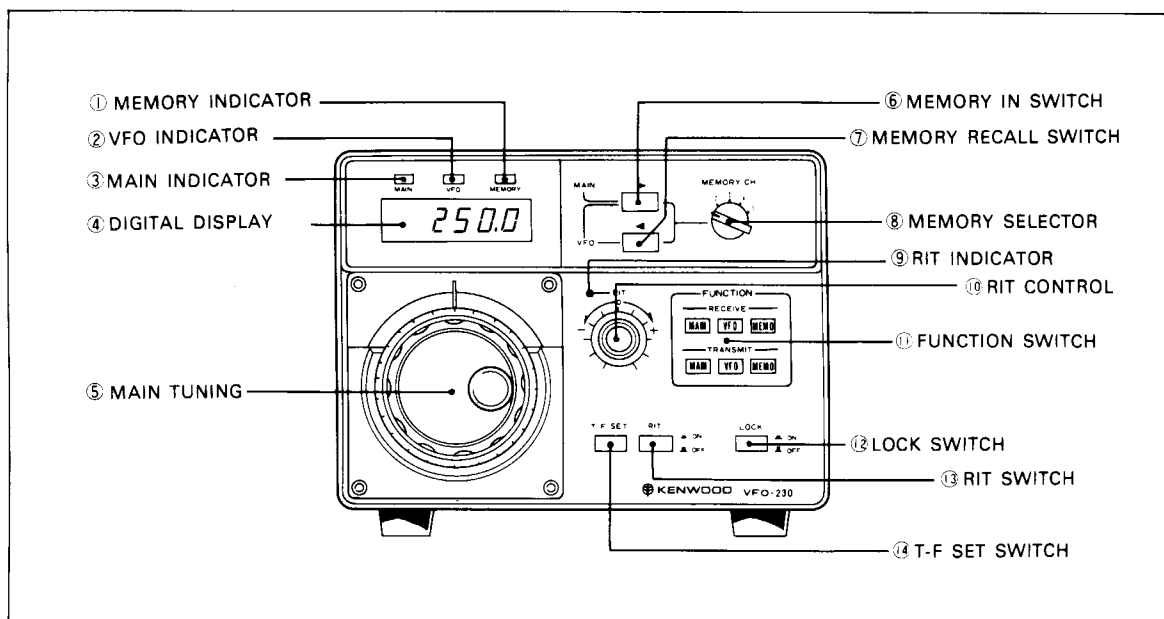
Connect the supplied Remote cable to the VFO-230 VFO OUT connector and to the TS-830S EXT VFO connector. Connect the ground cable to the GND terminals of both units.

### Note:

1. Ascertain that the TS-830S FIX switch is set to the VFO position (not depressed).
2. When disconnecting the remote cable, turn the TS-830S power switch OFF. This procedure MUST be observed for protection of both the TS-830S and VFO-230.



# CONTROLS AND THEIR FUNCTIONS



## FRONT PANEL

### 1. MEMORY indicator

This LED (light emitting diode) indicates the memory circuit is ON.

### 2. VFO indicator

This LED indicates the remote VFO is ON.

### 3. Main indicator

This LED indicates the TS-830S VFO is ON.

### 4. Digital display

The digital display indicates true operating frequency in the range of 100 KHz to 100 Hz order. In the case of upper zero blanking and 14,000 MHz, the lower frequency is displayed as L 999.9. When the frequency is lower than 3.5 MHz, it is displayed as L 499.9.

## 5 MAIN tuning

This control is used to select the desired operating frequency and changes the operating frequency by 25 KHz a turn. The scale on the control is calibrated at 1 KHz intervals. The control changes frequency in 20 Hz steps.

## 6. MEMORY IN switch

When FUNCTION switch is in the MAIN position, the Transceiver frequency is stored in the memory. In the VFO position the remote VFO frequency is stored in memory.

## 7. MEMORY RECALL switch

This switch is used to call-up the remote VFO stored frequency.

## 8. MEMORY selector

This switch selects the desired memory channel (channels 1 through 5). Frequency is stored in or recalled from the selected channel.

## 9. RIT indicator

This LED illuminates when the remote VFO RIT switch is turned ON.

## 10. RIT control (Receiver Incremental Tuning)

When the RIT circuit is ON, the receive frequency

can be varied approximately  $\pm 900$  Hz, independent of the transmit frequency. Use this feature when you party's transmit frequency is shifted or the transceiver is used for cross frequency QSO. The RIT functions only when the remote VFO or memory circuit are operating. The remote VFO frequency on the display remains unchanged even when the RIT adjusted.

## 11. FUNCTION switch

This switch is used for split frequency operation between one of three frequencies- The transceiver VFO, remote VFO or memory frequencies. Split frequency operation between memory frequencies is not possible.

## 12. LOCK switch

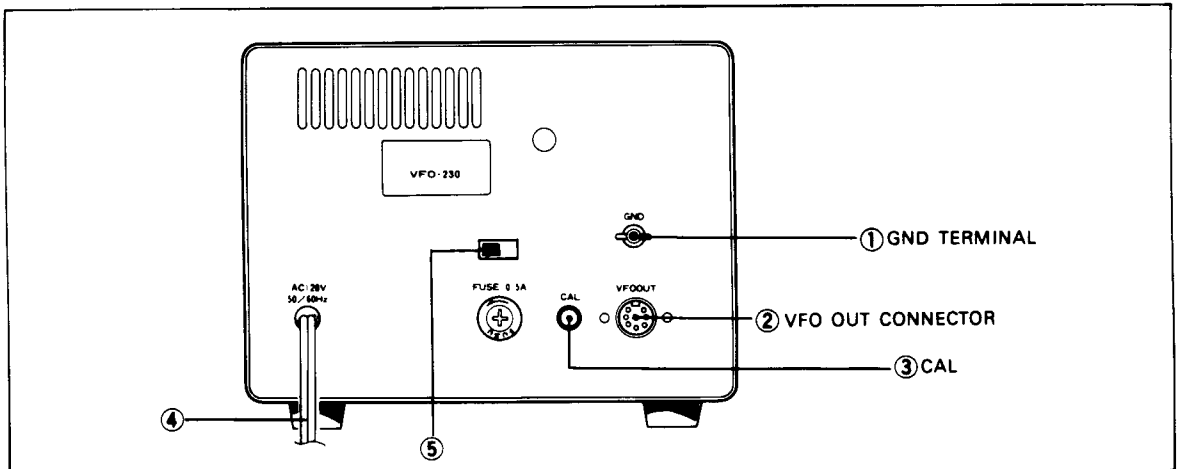
With this switch ON, the operating frequency can not be changed. The dial has no effect.

## 13 RIT switch

The RIT switch turns the RIT circuit ON and OFF.

## 14. T-F SET switch

This switch is used to receive on your transmit frequency. For details, refer to "T-F SET Switch", page 5.



## REAR PANEL

### 1. GND Terminal

This terminal should be grounded to the TS-830S GND terminal.

### 2. VFO OUT Connector

This terminal should be connected to the TS-830S EXT VFO terminal using the supplied cable.

### 3. CAL

Connect this terminal to the TS-830S antenna terminal when calibrating the remote VFO oscillator against WWV.

### 4. AC power cable

In U.S.A.... 120 VAC, 50/60Hz

In Europe... 220/240 VAC, 50/60Hz  
(Selectable)

### 5. AC voltage selector (Only in Europe area)

This switches the power transformer primary, selecting 220 VAC and 240 VAC windings.

# OPERATION

## FUNCTION SWITCH

The FUNCTION switch has three positions, MAIN (TS-830S), VFO (remote VFO) and MEMO (memory) for transmission and reception. Its use is shown in TABLE 1.

**NOTE:** \_\_\_\_\_  
 VFO-230 is not equipped with the power switch.  
 This VFO turns ON automatically when the transceiver power switch is turned ON after cabling.

RX = Receive  
 TX = Transmit

FUNCTION switch ON		TS-830S	VFO-230	MEMORY
Receive	Transmit			
MAIN	MAIN	TX and RX	—	—
MAIN	VFO	RX	TX	—
MAIN	MEMO	RX	—	TX
VFO	MAIN	TX	RX	—
VFO	VFO	—	TX and RX	—
VFO	MEMO	—	RX	TX
MEMO	MAIN	TX	—	RX
MEMO	VFO	—	TX	RX
MEMO	MEMO	—	—	TX and RX

Table 1 FUNCTION Switch Operation

## RIT CONTROL

By using the RIT control, the receive frequency can be shifted by about  $\pm 900$  Hz without changing the transmit frequency.

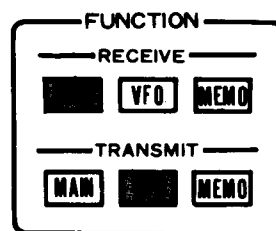
If the frequency of the station you are working changes, your receive frequency can be reset by turning the RIT switch ON and adjusting the RIT control.

**NOTE:** \_\_\_\_\_

1. The RIT shift is not displayed on the remote VFO but it can be read on the TS-830S digital display.
2. When the transceiver's MODE switch is set to TUNE, the RIT control of the remote VFO does not function.

## T-F SET SWITCH

Depress this switch and you will receive on the transmit frequency without using the FUNCTION switch. Use this feature during split frequency operation. For example, when the FUNCTION



SWITCH IS SET AS SHOWN BELOW! IT IS POSSIBLE TO RECEIVE ON THE REMOTE VFO frequency by pressing the T-F SET switch. This enables you to check or listen on the transmit frequency during receive operation. The T-F SET switch is a non-locking (Momentary) switch. When it is released, the transceiver is automatically reset as selected by the FUNCTION switch, thereby preventing misoperation. This switch is also useful in quickly setting the optimum transmit frequency for DX operation. The T-F SET switch does not function during transmission.

## BACK-UP OF REMOTE VFO

With the power cable connected to power source, the micro-processor of the VFO-230 keeps operating even when the transceiver power switch is OFF.

**NOTE:** \_\_\_\_\_  
If the VFO-230 frequency display is abnormal, disconnect the AC power cable and after around 1 minute reconnect it.  
The display shows 0.0 and the VFO starts correct operation.  
\_\_\_\_\_

## NOTES ON MEMORY OPERATION

When the transceiver's MODE switch is set to TUNE or when the VFO frequency is stored during CW transmit mode, a frequency which is shifted by about  $\pm 800$  Hz is stored in the memory. This is caused by the frequency which is shifted by about  $\pm 800$  Hz in the VFO TUNE or CW mode. To prevent this, when storing a frequency, set the MODE switch to a position other than TUNE or set the unit to reception mode during CW operation. In the remote VFO operation mode, a correct frequency can be stored. During SSB operation, a correct frequency can also be stored.

# SPECIFICATIONS

Oscillation frequency .....	5.40 ~ 6.10 MHz
Output voltage .....	0.2V $\begin{matrix} +3 \\ -1 \end{matrix}$ dB
Frequency stability .....	Within $\pm 1 \times 10^{-5}$ at room temp within $\pm 3 \times 10^{-5}$ at 0 — 50°C.
Power consumption .....	13W
Power requirement .....	AC 120V 50/60Hz (in U.S.A.) AC 220V/240V (Selectable) 50/60Hz (in Europe)
Semiconductors used .....	CPU LSI ..... 1 FET..... 1 IC..... 29 Transistors ..... 55 Diodes ..... 57
Dimensions .....	180 (182) W 133 (147) H 287 (330) D mm (Figures in ( ) include projections.)
Weight .....	Approx. 3 kg

- Specifications are subject to change without notice for technical improvement.

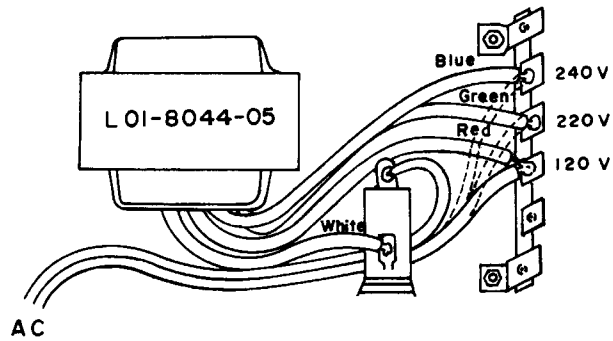
# S

## ● MODIFICATION for 240V AC operation (u.s.a.type)

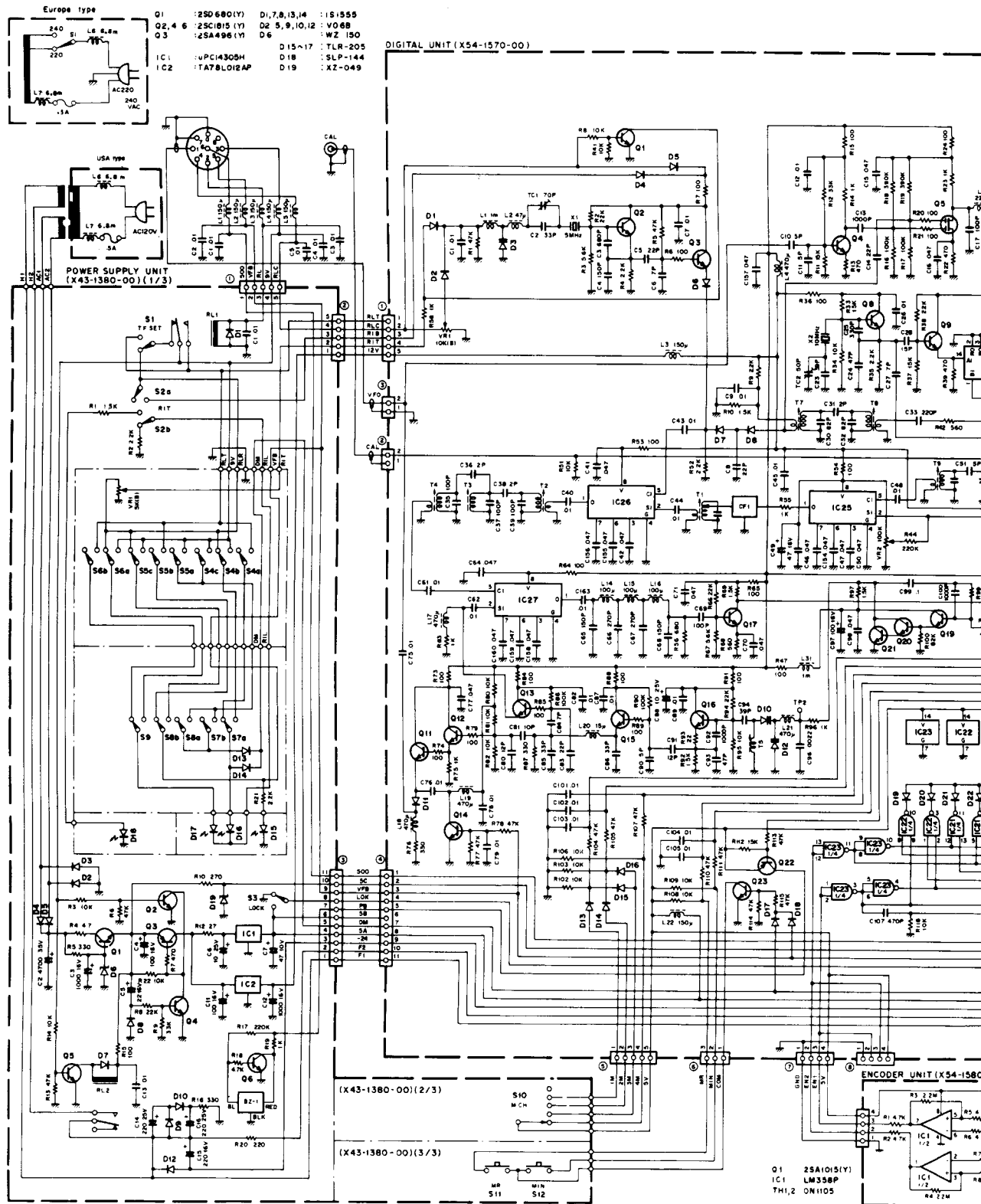
To operate the VFO-230 on 240V AC, the power transformer primary tap must be rewired from 120V to either the 220V or 240V tap.

1. Unplug the AC power cable and VFO interconnecting cable.
2. Remove the top cover.
3. Move the AC line from the 120V (Red) to either the 220V (Green) or 240V (Blue) transformer winding.

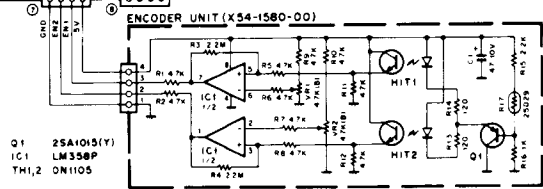
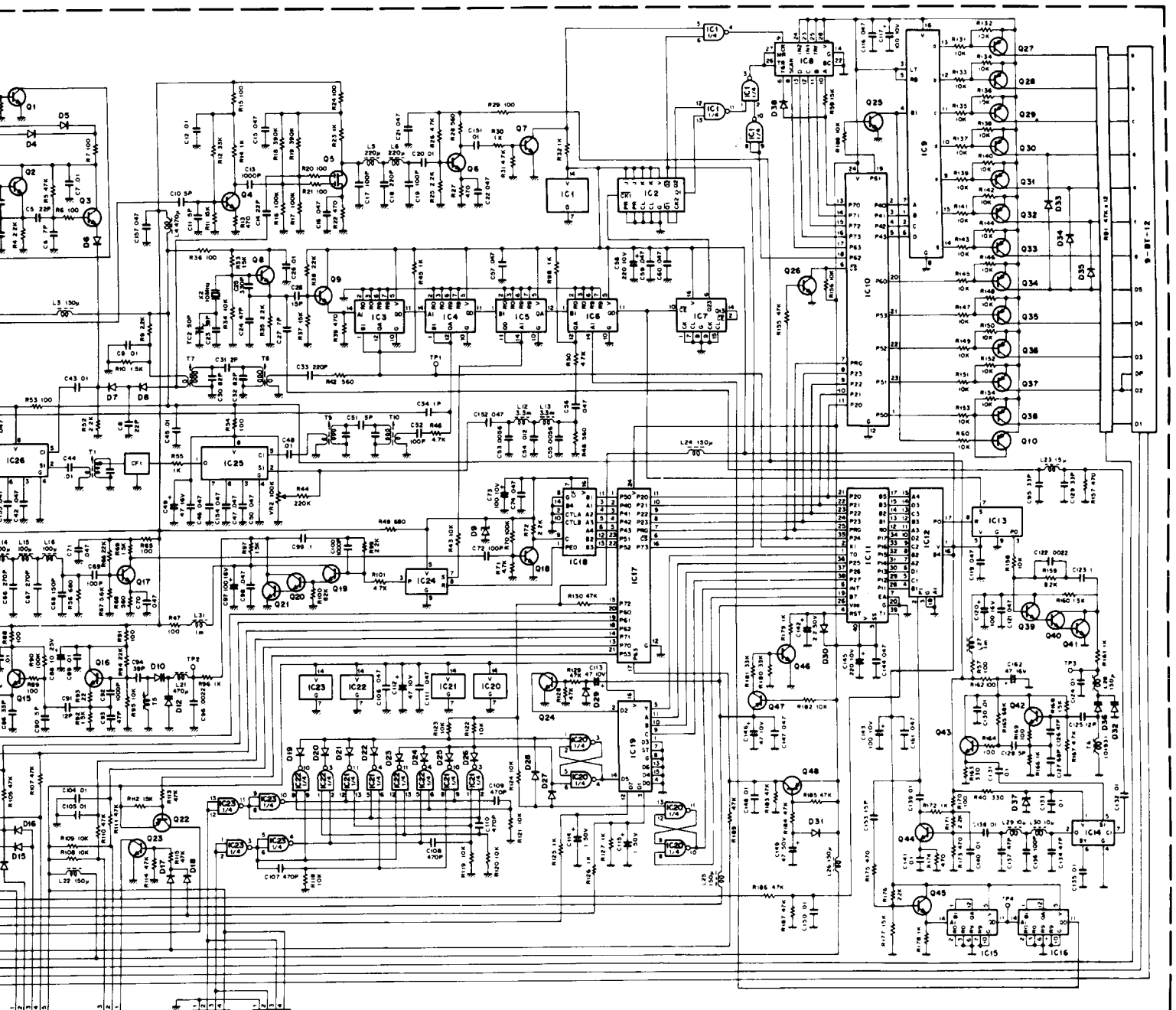
4. Change the AC fuse from 0.5A to 0.3A. Tag power cord at the back of the unit to indicate that the transformer is wired for 240V AC, and the power fuse should be 0.3A and not 0.5A.
5. Replace the top cover and cable up to your work.



# SCHEMATIC DIAGRAM







- |  |            |          |              |                               |
|--|------------|----------|--------------|-------------------------------|
| Q1-4, 6-9, 12, 13, 15-18, 23-26, 42-46 | 25C1815(Y) | IC7      | TC4518BP     | D1, 2, 4, 5, 13-31, 33-35, 38 |
| Q5                                     | 35K73(GR)  | IC8      | TC5032P      | 151555                        |
| Q11, 14                                | 25C1959(Y) | IC9      | SN74LS247N   | D3, 10, 12, 32, 36            |
| Q19-21, 39-41                          | 25C1775(E) | IC10, 17 | μPD6243C     | 15V548C                       |
| Q10, 22, 27-38, 47, 48                 | 25A1015(Y) | IC11     | μPD8048C-155 | D6-8, 11                      |
| IC1, 20-23                             | TC4011BP   | IC12     | TC9122P      | D9                            |
| IC2                                    | TC4027BP   | IC13, 24 | TC5081P      | D37                           |
| IC3-6, 15, 16                          | SN74LS90N  | IC14     | μPC1037H     | W2-081                        |
|  |            | IC18     | MC14569B     |                               |
|  |            | IC19     | HD74LS15P    |                               |
|  |            | IC25-27  | SN16913P     |                               |

VFO-230 (K)(W) ②

**Model VFO-230**

**Serial No.**

\_\_\_\_\_

**Date of Purchase**

\_\_\_\_/\_\_\_\_/\_\_\_\_

**Dealer**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

---

A product of  
**TRIO-KENWOOD CORPORATION**  
17-5, 2-chome, shibuya, shibuya-ku Tokyo 150, Japan

---

**TRIO-KENWOOD COMMUNICATIONS**  
1111 West Walnut Street, Compton, California, 90220, U.S.A.  
**TRIO-KENWOOD COMMUNICATIONS, GmbH**  
D-6374 Steinbach TS, Industriestrasse 8A, West Germany  
**TRIO-KENWOOD ELECTRONICS, N.V.**  
Leuvensesteenweg 504, B-1930 Zaventem, Belgium  
**TRIO-KENWOOD (AUSTRALIA) PTY. LTD.**  
4E Woodcock Place, Lane Cove N.S.W. 2066, Australia

© 15211 PRINTED IN JAPAN B50-2753-00 (G)

