

INTERFACE KIT

**IF-10A**

**IF-10B**

**IF-10C**

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# INSTRUCTION MANUAL

KENWOOD CORPORATION

# KENWOOD

© PRINTED IN JAPAN B50-8209-10(K,M)(MC)  
93/12 11 10 9 8 7 6 5 4 3 2 1 92/12 11 10 9 8 7 6

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

**Reorient the receiving antenna**

Relocate the computer with respect to the receiver. Plug the computer into a different outlet so that computer and receiver are on different branch circuit.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

"How to Identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington DC 20402, Stock No. 004-000-00345-4.

**WARNING**

This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

This equipment requires a shielded cable for interconnection to the RS-232C interface unit model IF-232C. Please use a cable supplied with IF-232C for interconnect to this unit. For the interface to a computer, please consult with the IF-232C instruction manual.

Thank you for purchasing this new interface kit.

**IMPORTANT:**

Please read this Instruction Manual carefully before placing the unit in service.

**SAVE THIS INSTRUCTION MANUAL.**

This instruction manual describes both the IF-10A, the IF-10B, and the IF-10C. When appropriate, separate descriptions are given for these three items.

IF-10A: INTERFACE KIT FOR THE TS-711A/711E/811A/  
811B/811E

IF-10B: INTERFACE KIT FOR THE TS-940S

IF-10C: INTERFACE KIT FOR THE TS-140S/680S

The IF-10A/10B/10C interface kit is designed to be installed internally in transceivers such as the TS-140S/680S/711A/711E/811A/811B/811E/940S to allow computer assisted control of various transceiver operating parameters. Control is performed via the computers RS-232C terminal via the IF-232C interface (level translator).

The following explicit definitions apply in this manual:

**Note** : If disregarded, inconvenience only, no risk of equipment damage or personal injury.

**Caution:** Equipment damage may occur, but not personal injury.

**1. BEFORE**

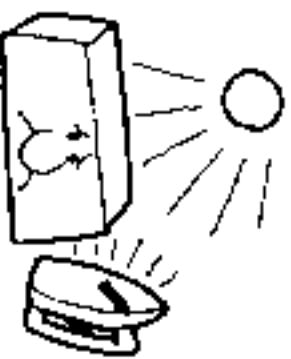
**Notes on installation:**  
Do not place which is exposed to light, near a heat source, etc.

- 1. BEFORE
- 2. SPECIFICATIONS
  - 2-1. SPE
  - 2-2. ACC
- 3. INSTALLATION
  - 3-1. IF-1
  - 3-2. IF-1
  - 3-3. IF-1
- 4. OPERATION
  - 4-1. PRE
  - 4-2. CON
  - 4-3. CON
- 5. SCHEM

# 1. BEFORE OPERATION

## Notes on installation

Do not place the unit in a place which is exposed to direct sunlight, near a heating appliance, etc.



## CONTENTS

1. BEFORE OPERATION .....	3
2. SPECIFICATIONS AND ACCESSORIES .....	3
2-1. SPECIFICATIONS .....	3
2-2. ACCESSORIES .....	4
3. INSTALLATION .....	5
3-1. IF-10A .....	5
3-2. IF-10B .....	6
3-3. IF-10C .....	7
4. OPERATION .....	8
4-1. PRECAUTIONS FOR COMPUTER-CONNECTED OPERATION .....	8
4-2. CONTROL OPERATION .....	8
4-3. COMMANDS .....	9
5. SCHEMATIC DIAGRAM .....	47

# 2. SPECIFICATIONS AND ACCESSORIES

## 2-1. SPECIFICATIONS

### 2-1-1. Interface

Communication method ..... Serial interface, full-duplex

Transfer rate ..... 4800 BPS

(bits per second)

Synchronization ..... Start-stop

(Asynchronous)

Bit construction ..... 1 start bit, 8 character bits, 2 stop bits

Parity ..... None

Signal format ..... TTL level

### 2-1-2. Terminal Connections

Pin No.	Signal Name		I/O
1	GND	Signal ground	
2	$\overline{\text{TXD}}$	Transmit data	Output
3	$\overline{\text{RXD}}$	Receive data	Input
4 (Note)	CTS	Transmit enable	Input
5	RTS	Receive enable	Output
6	NC	No connection	

Note: \_\_\_\_\_

For the TS-940S pin 4 is +5V.

**GND:** This is the signal ground terminal.

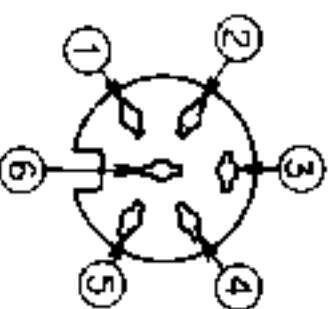
**TXD:** The transmit data is the serial data from the transceiver to the computer. The output utilizes negative logic.

**RXD:** The receive data is the serial data from the computer to the transceiver. The input utilizes negative logic.

**CTS:** This signal is supplied from the computer, and is used to inhibit transmit data from the transceiver when the computer is not ready to receive. The input utilizes positive logic. [Transmit data is stopped by a logic low.] [Except TS-940S]

**RTS:** This signal is applied to the computer, and is used to inhibit transmit data from the computer when the transceiver is not ready to receive it. The output utilizes positive logic. (Inhibit is requested when the level is low.)

Connector pin configuration



(Viewed from the rear)

## 2-2. ACCESSORIES

The following accessories are supplied with the unit. Confirm that all are present.

1. EPROM (IF-10A/10B only) .. (MBM2732A-30) . 1 ea.
2. Boss (IF-10A only) ..... (J32-0795-04) ..... 2 ea.
3. Pan head screw  
(IF-10A/10C only) ..... (N30-2605-41) ..... 2 ea.
4. Self tapping screw  
(IF-10B only) ..... (N35-2605-41) ..... 2 ea.
5. Brazier head tapping screw  
(IF-10C only) ..... (N87-2606-46) ..... 4 ea.
6. DIN connector bracket  
(IF-10A/10C only) ..... (E06-0655-05) ..... 1 ea.
7. Instruction manual ..... (B50-8209-xx) ..... 1 ea.

**Note:** \_\_\_\_\_


The IF-10A/10B/10C does not include computer software, guidelines are provided but due to the wide variety of computers available, all of which have their own languages it is left up to the owner to design his or her own software package. \_\_\_\_\_

# 3. INSTALLATION

## 3-1. IF-10A

Caution: \_\_\_\_\_

Before removing the cover be sure to disconnect the power cable, or damage may result to the radio or interface kit.

1. Remove the eight screws securing the upper cover using a #2 Phillips screwdriver.
  2. Remove the two screws marked  from the control unit, and install the supplied bosses.
  3. Plug the interface board onto the 7 pin connector (J15) and 9 pin connector (J16) as shown in the illustration.
  4. Secure the circuit board using the two screws removed in step number 2.
  5. Remove the plastic plug that is currently installed in the ACC1 jack area, at the upper rear corner of the radio.
  6. Install the DIN connector using the bracket supplied, as shown in the illustration.
  7. Install the EPROM (Erasable and Programmable Read Only Memory) into the vacant socket on the circuit board.
- Caution: \_\_\_\_\_
- Align the notch on the EPROM with the notch in the socket, or damage to the EPROM and or circuit board may result!
8. Replace the top cover.

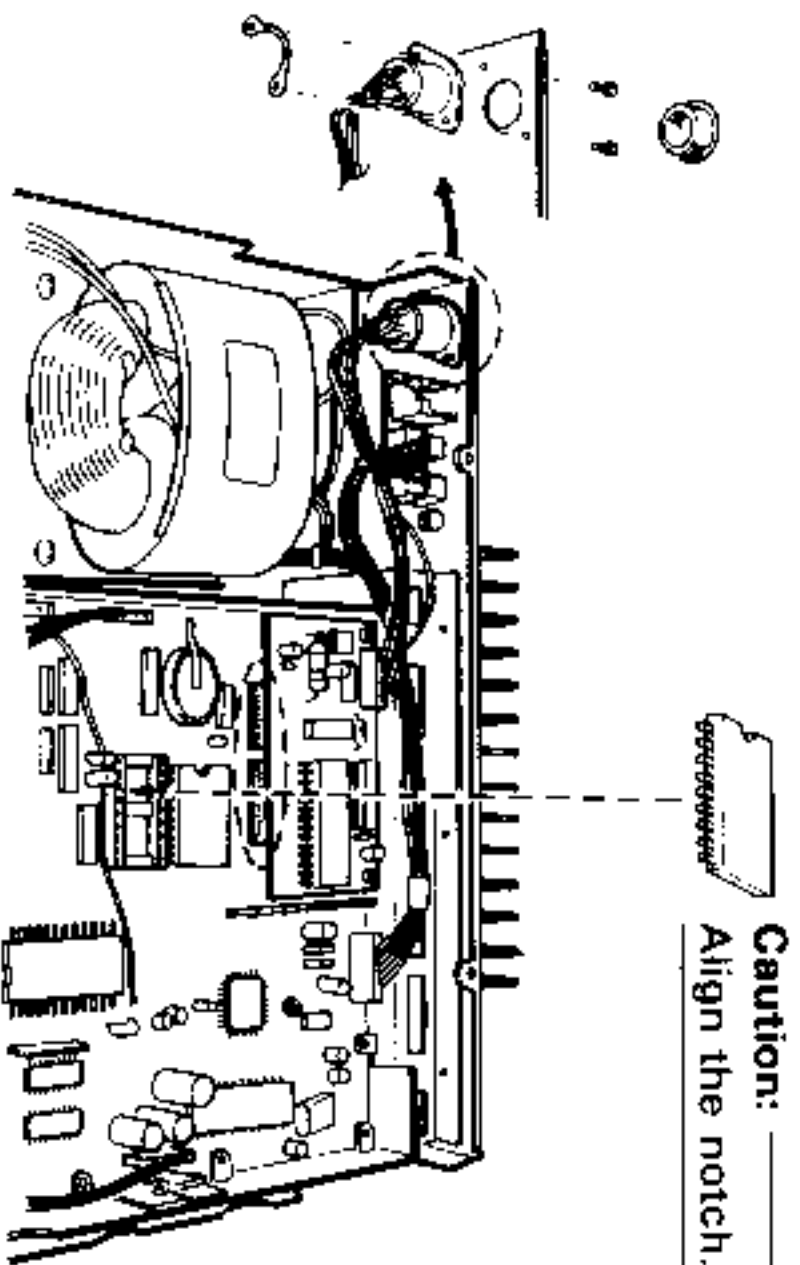


Fig. 3-1

## 3-2. IF-10B

**Caution:** \_\_\_\_\_

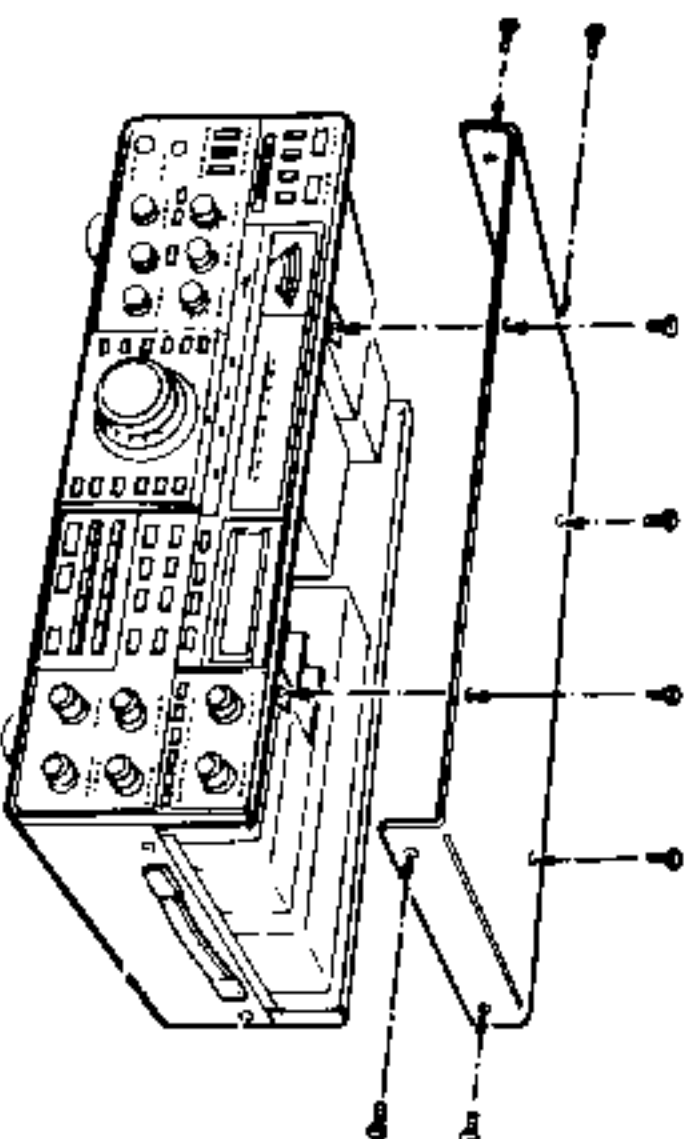
Before removing the cover be sure to disconnect the power cable, or damage may result to the radio or interface kit.

1. Remove the eight screws securing the transceiver's upper cover, using a #2 Phillips head screwdriver, and remove the top cover. (Fig. 3-2)
2. Remove the four screws that secure the speaker mounting bracket to the chassis and swing the bracket up towards the AT (antenna tuner) unit. Be especially careful of the wiring harness. Don't stretch the cable harness. (Fig. 3-3, Fig. 3-4)
3. Next remove the eight screws that secure the shield covering Digital A unit. Swing the cover to the side. Again be careful of the wiring harness. (Fig. 3-5)
4. Place the interface unit on the hexagonal boss on the Digital A unit, and secure it with the screws provided with the interface kit.
5. Connect the connector on Digital A unit to the interface unit as shown in Fig. 3-6.
6. Install the expansion EPROM (Erasable and Programmable Read Only Memory) into the vacant socket on the digital unit. Orientation of this component is critical for proper operation of the radio, and interface.

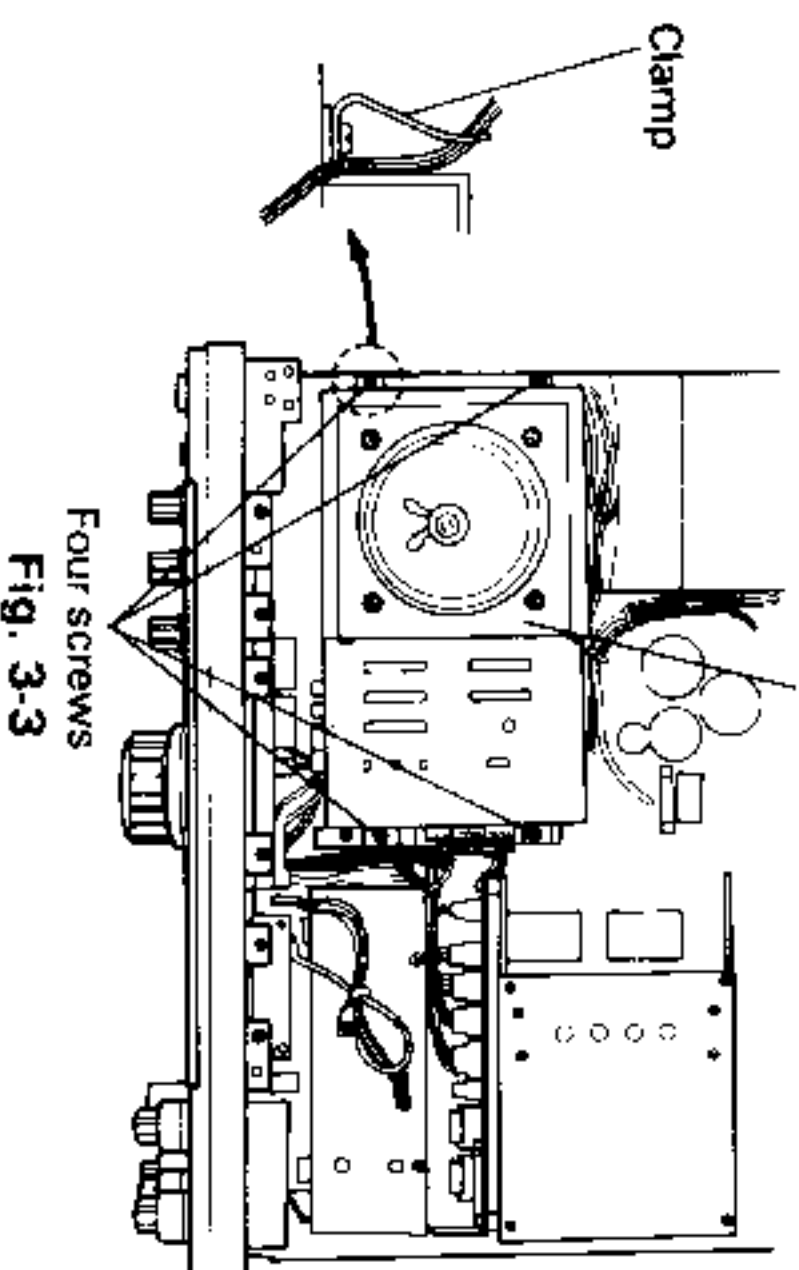
**Caution:** \_\_\_\_\_

Install the EPROM so that the notch in the end is on the same end as the notch in the IC socket.

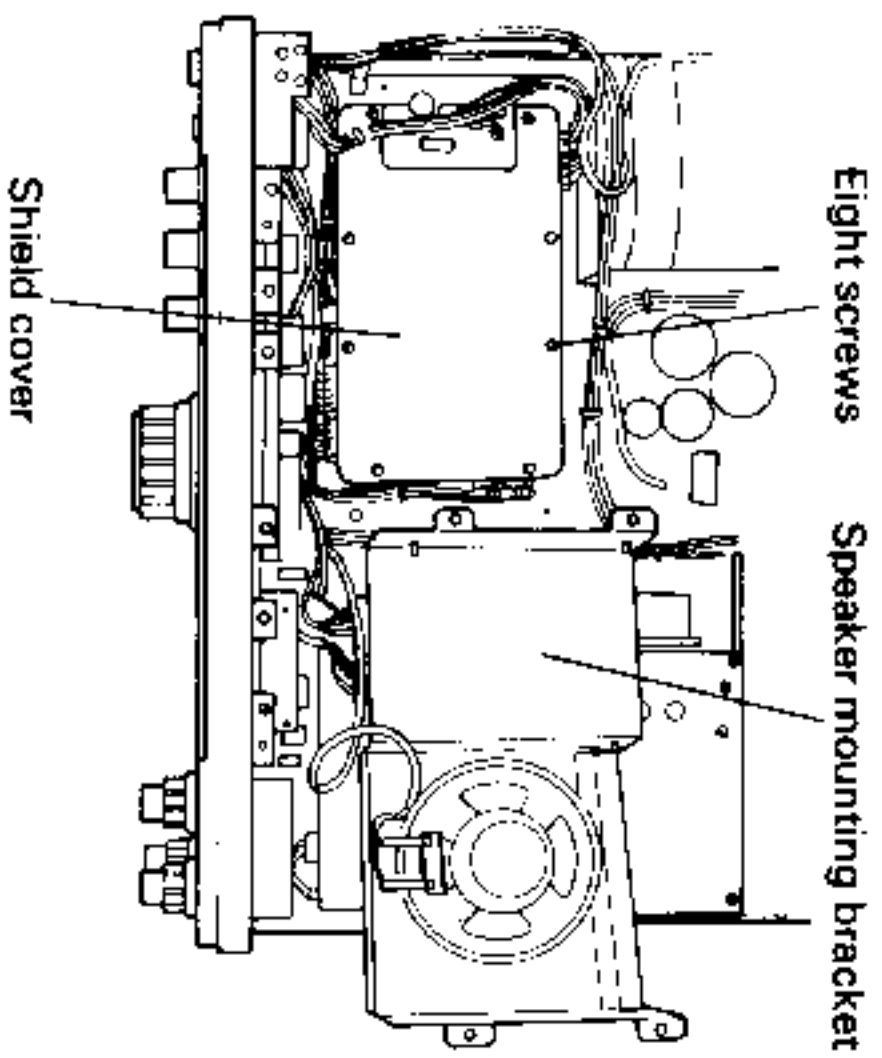
7. Replace the shield cover. Do not pinch any wires under the cover when you tighten it down.
8. Reinstall the speaker mounting bracket, confirming that the connector located on the left side of the digital A unit is secure, and not pinched under the bracket.
9. Replace the top cover.



**Fig. 3-2**  
Speaker mounting bracket

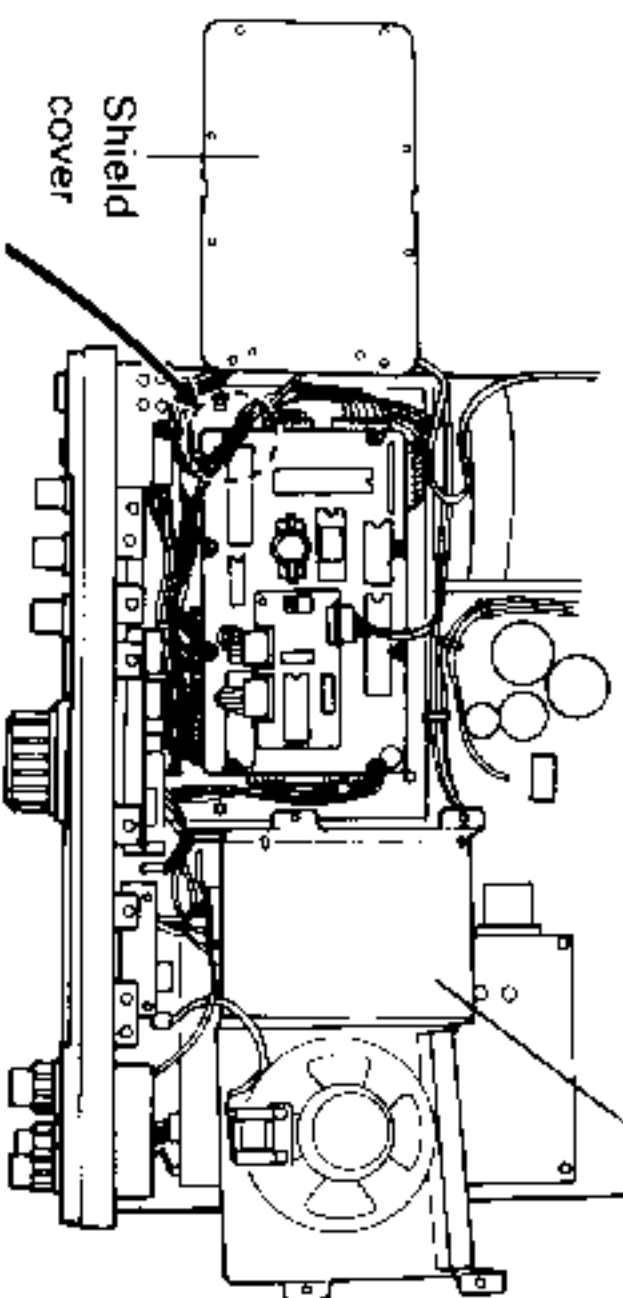


**Fig. 3-3**  
Four screws

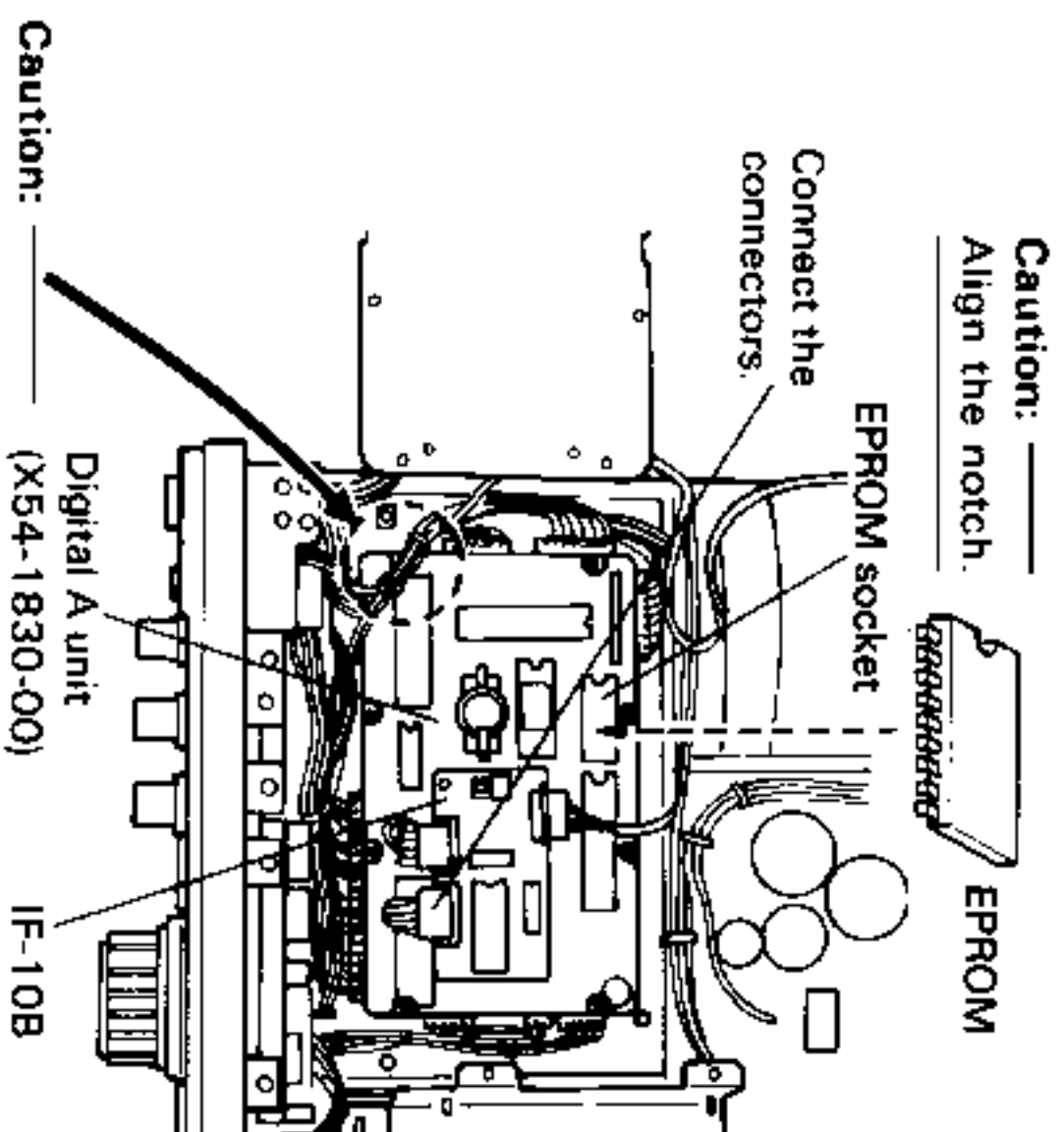


**Fig. 3-4**

Speaker mounting bracket



**Fig. 3-5**



**Fig. 3-6**

**3-3. IF-10C**

Refer to the TS-140S/680S manual for installation instructions.

## 4. OPERATION

**Caution:** \_\_\_\_\_

Turn the POWER switch OFF before making connections.

### 4-1. PRECAUTIONS FOR COMPUTER-CONNECTED OPERATION

When connecting the transceiver with a computer, check the following points.

1. Are the connections correct?  
The transceiver output should be connected to the computer input and the transceiver input to the computer output.

**Example:**

Transceiver's transmission data — Computer's  
receive data

- Transceiver's RTS — Computer's CTS
2. Is the computer's transmission rate 4800 BPS (bits per second)?
3. Is the computer's bit configuration correct?  
1 start bit, 8 character bits, 2 stop bits, no parity.

### 4-2. CONTROL OPERATION

Most computers handle data in the form of "bits", and "bytes". A bit is the smallest piece of information that the computer can handle. A byte is composed of 8 bits. This is the most convenient form for most computer data. This data may be sent in the form of either serial

or parallel data strings. The parallel mode is faster, but more complicated, while the serial form is slower it requires less complicated equipment, and therefore is less expensive.

Serial transmission of data occurs over a single line using time-division methods. This use of a single line also offers the advantage of reducing the number of errors due to line noise.

For control of the transceiver via the computer only three lines are theoretically required: transmit data (TXD), receive data (RXD), and ground (GND). From a practical standpoint it is also necessary to incorporate some means of controlling when this data transfer will occur. We don't want the computer and transceiver sending information at the same time! This is controlled by the RTS and the CTS lines.

The IF-232C and the IF-10A/10B/10C are used in conjunction to provide voltage conversion. RS-232C deals in voltages above and below TTL levels, and must be converted to prevent damage to the transceiver. This interface/conversion is handled by the IF-232C.

The actual command sequence would be similar to those described below:

For example, the radio is placed into the transmit mode whenever the character string "TX" is sent from the computer. The character string "TX" is called a command. It tells the transceiver to do something. There are approximately 21 to 30 different commands available for control of the transceiver.



These commands may be incorporated into a computer program written in BASIC or any other high level language such as PASCAL, etc. Programming methods vary from computer to computer so please refer to the instruction manuals included with your terminal program, and computer.

## 4-3. COMMANDS

The illustration below demonstrates that a command is composed of two alphabetical characters, various parameters, and the terminator to signal the end of the command.

**Example:**

FA 00007000000 ; ..... Command to set  
↑           ↑           ↑           ↑           ↑  
Command Parameters Terminator           VFO A to 7 MHz.

### 4-3-1. Command Description

A command may consist of either lower or upper case alphabetical characters.

### 4-3-2. Parameter Description

(Refer to the parameter list.)

Parameters are used to specify specific information necessary to implement the desired command. The exact number of parameters necessary for each command is predetermined. If a particular parameter is not applicable to the transceiver you are controlling the

parameter digits should be filled using any character except the terminator ";".

For example the MC (Memory channel selector) command uses two parameters, 1 column to specify the memory bank number, and 2 columns to specify the memory channel number. To specify CH9 of memory bank number 1, the command would be:

"MC109;" ..... The memory bank number is not

necessary when programming the  
TS-140S/680S/711A/711E/811A/  
811B/811E so the command could  
be as given above "MC 109" or as:

"MC \_09;" ..... In this case a blank has been used  
to fill the parameter block for the  
memory bank number.

The following are examples of bad commands:

"MC09;" ..... No memory bank specification (not  
enough parameters)

"MC19;" ..... Not enough digits in the memory  
channel parameter, i.e. CH9 should  
be given as "09".

"MC \_1 \_09 \_;" ..... Unnecessary characters between  
parameters.

"MC 1009" ..... No terminator

Parameter list

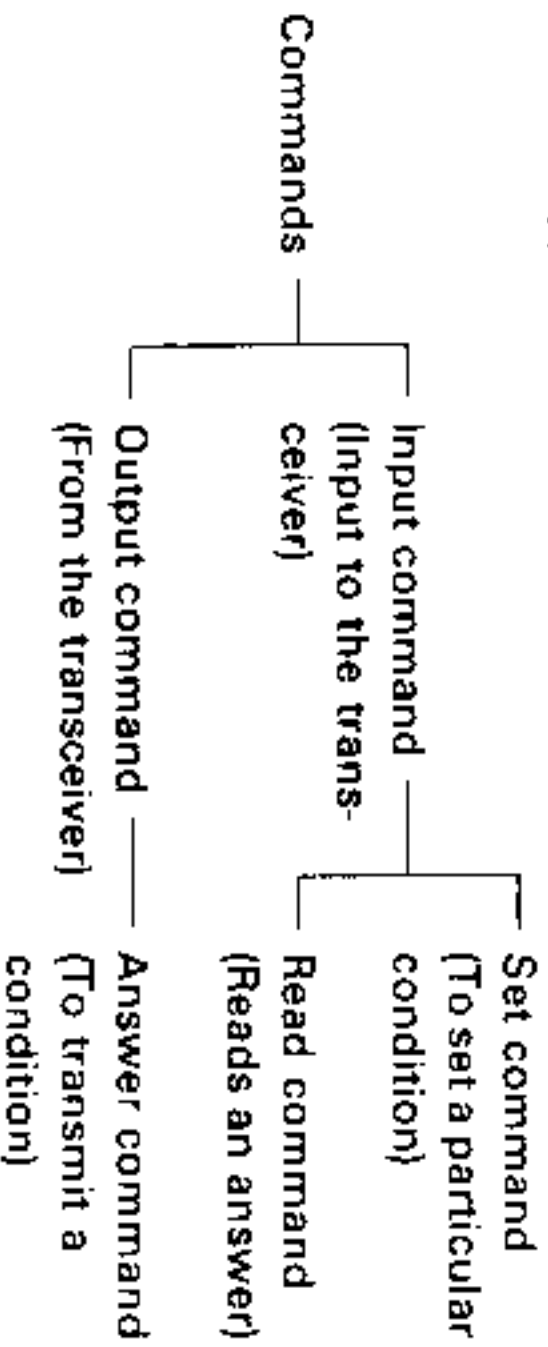
Format No.	Name	Number of columns	Format
1	SW	1	0 = OFF 1 = ON
2	MODE	1	1 = LSB 4 = FM 7 = CWN 2 = USB 5 = AM 3 = CW 6 = FSK (FSK: TS-940S only) (AM: TS-140S/680S/940S only) (CWN: TS-140S/680S only)
3	FUNCTION	1	0 = VFO A 2 = MEMORY 1 = VFO B 3 = COM (COM: TS-711A/711E/811A/ 811B/811E only)
4	FREQUENCY	11	Represented in Hz, using 11 columns. <b>Example:</b> 00007200000 is 7.2 MHz 10 GHz 1 MHz 1 kHz 1 Hz
5	RIT FREQUENCY	5	The first column is "-" or "+", and the remaining four columns indicate the frequency in Hz. <b>Example:</b> +5320 is +5.32 kHz
6	STEP FREQUENCY	5	Represented in Hz, using 5 columns. (TS-711A/711E/811A/811B/811E/940S only)
7	MEMORY CHANNEL	2	Represented in two columns. <b>Example:</b> 02 is CH2
8	MEMORY BANK	1	Represented using one column. (TS-940S only)

Format No.	Name	Number of columns	Format
9	MEMORY CHANNEL SPLIT SPECIFICATION	1	0 = Receive 1 = Transmit (TS-140S/680S/711A/711E/ 811A/811B/811E only)
10	MEMORY LOCKOUT	1	0 = Not locked out 1 = Locked out (TS-140S/680S/711A/711E/ 811A/811B/811E only)
11	TX/RX	1	0 = Receive 1 = Transmit
12	PASSBAND	2	Represented using two columns, from 00 to 31. "00" is the normal or wide position and "31" is the narrowest bandwidth (TS-940S only)
13	OFFSET	1	0 = SIMPLEX 2 = -- 1 = + (TS-711A/711E/811A/ 811B/811E only)
14	STONE FREQUENCY	2	Represented using two columns, from 01 to 37. This corresponds to the number displayed on the M.CH display during tone select operation. (TS-711A/811A/811B only)
15	CALL SIGN	6	Represented using 6 columns. <b>Example:</b> W6DJY (TS-711A/711E/811A/ 811B/811E/940S only)
16	MODEL NO.	3	Three column number specifying each set.

### 4-3-3. Terminator

To signal the end of a command it is necessary to use a special character. The character that has been selected for use is the semicolon ";". This special character must appear as the last character in a particular command string.

### 4-3-4. Types of Commands



Commands can be classified as shown in the chart above. For example, with the FA (Frequency of VFO A) command.

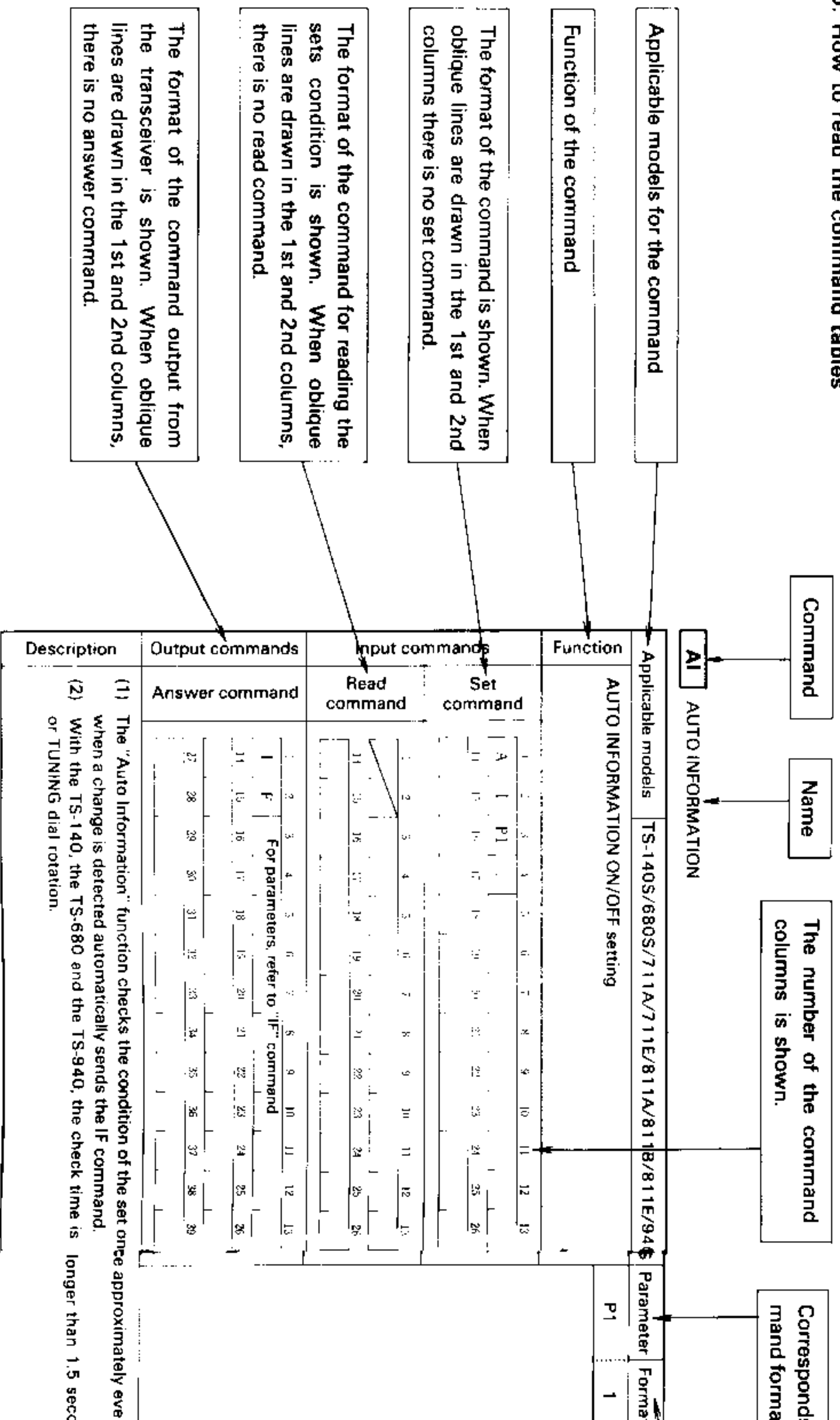
- To set the frequency at 7 MHz, the command sent from the computer to the transceiver is:  
"FA00007000000;" ..... (Set command)
- To read the frequency of VFO A, the command sent from the computer to the transceiver is:  
"FA;" ..... (Read command)
- When the read command, above, has been sent, the command returned to the computer is:  
"FA00007000000;" ..... (Answer command)

### 4-3-5. Error Messages

In addition to the answer command, the transceiver will send one of the following error messages:

	<p><input type="radio"/> When the command syntax is incorrect.</p> <p><input type="radio"/> When the command was not executed due to the current status of the transceiver, even though the command syntax was correct.</p> <p><b>Note:</b> _____</p> <p>Occasionally this message may not appear due to microprocessor transients in the transceiver.</p>
?;	
E;	<p>When a communication error occurs, such as an overrun error or framing error occurs during serial data transmissions.</p>
O;	<p>When the receive data is sent but processing cannot be completed.</p>

#### 4-3-6. How to read the command tables



Corresponds to the parameter of the command format.

Corresponds to the format No. in the parameter list. For the parameter formats, refer to the parameter list.

Indicates the parameters function.

Parameter	Format	Parameter function
P1	1	AI ON/OFF

Time approximately every 1.5 seconds and longer than 1.5 seconds during scanning

Usage of command, details of functions, and cautions are described.

#### 4-3-7. Command Use Precautions

Model	Precaution
TS-140S/ 680S/711A/ 711E/811A/ 811B/811E/ 940S	The control characters (OO to IFH) when included in receive data are ignored.
TS-140S/ 680S/940S	Program execution may be delayed during rapid encoder rotation.
TS-940S	The MW (Memory Write) command cannot be executed during memory channel operation.

#### 4-3-8. Command List

Command	Function	Model							Page
		TS-140S TS-680S	TS-711A	TS-711E	TS-811A TS-811B	TS-811E	TS-940S		
AI	AUTO INFORMATION	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	16	
AT	ANTENNA TUNER	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	17	
DI	DCS ID	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	18	
DN/UP	DOWN/UP	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	19	
DS	DCS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	20	

Model	Precaution
TS-940S	Receive data is not processed when directly entering the frequency from the keyboard or while the T-F SET key is depressed.
TS-811A	<p><b>Note:</b> _____</p> <p>When the microprocessor is reset, as when changing the lithium battery, re-enter M.CH1 first by pressing the M.IN switch, or improper operation may result when operating with computer.</p> <p>To enter the transmitter frequency for split frequency operations using the MW command, enter any number from 1 thru 7 as the mode and either a "0" or a "1" to indicate the memory channel lockout statue.</p>
TS-140S/ 680S/711A/ 711E/811A/ 811B/811E	

Command	Function	Model						Page
		TS-140S TS-680S	TS-711A	TS-711E	TS-811A TS-811B	TS-811E	TS-940S	
FA/FB	FREQUENCY VFO A/FREQUEN- CY VFO B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	21
FN	FUNCTION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	22
HD	SCAN HOLD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	23
ID	ID	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24
IF	INFORMATION	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25
LK	LOCK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26
LO	LOCAL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27
MC	MEMORY CHANNEL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28
MD	MODE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29
MR	MEMORY READ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30
MS	MEMORY SCAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31
MW	MEMORY WRITE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	32
OS	OFFSET	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	33
RC	RIT CLEAR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	34
RD/RU	RIT DOWN/RIT UP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35
RT	RIT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	36
RX/TX	RX/TX	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37
SC	SCAN	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	38
SH/SL	SLOPE TUNE HIGH/SLOPE TUNE LOW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	39
SP	SPLIT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40
ST	STEP	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	41
TN	tone NUMBER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	42
TO	tone	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	43
VB	VBT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	44
VR	VOICE RECALL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45
XT	XIT	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	46

\* This command is not applicable to "KENWOOD" versions of the TS-711E/811E.

**AI** AUTO INFORMATION

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S		
Function	Parameter	Format	Parameter function
AUTO INFORMATION ON/OFF setting	P1	1	AI ON/OFF
Input commands			
Set command	<pre> 1  2  3  4  5  6  7  8  9 10 11 12 13 A  I  P1  :    14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>		
Read command	<pre> 1  2  3  4  5  6  7  8  9 10 11 12 13 /  /  /  /  /  /  /  /  /  /  /  /  / 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>		
Output commands			
Answer command	<pre> 1  2  3  4  5  6  7  8  9 10 11 12 13 I  F  For parameters, refer to "IF" command 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 </pre>		
Description	<p>(1) The "Auto Information" function checks the condition of the set once approximately every 1.5 seconds and when a change is detected automatically sends the IF command.</p> <p>(2) With the TS-140, the TS-680 and the TS-940 the check time is longer than 1.5 seconds during scanning or TUNING dial rotation.</p>		



**AT** ANTENNA TUNER

Applicable model	TS-940S	Parameter	Format	Parameter function
Antenna tuner standby operation				
Function				
Description	Output commands			
	Answer command			
	Input commands			
		Read command	Set command	

**D1** DCS ID

Applicable models	TS-711A/711E/811A/811B/811E		
DCS call sign readout	Parameter	Format	Parameter function
	P1	15	Call sign of your station
	P2	15	Call sign of receiving station
Function			
Input commands			
Output commands			
Description	<p>The call sign of the receiving station should read out as soon as a signal is received. The analysis of incoming call signs is continuous. However the call sign may be incorrectly display due to noise.</p>		

**DN****UP****DOWN/UP**

Description	Output commands	Input commands		Function	Applicable models	Parameter	Format	Parameter function
		Read command	Set command					
	<p>Answer command</p>	<p>Read command</p>	<p>Set command</p>	<p>Same function as microphone UP/DOWN switch</p>	<p>TS-140S/680S/711A/711E/811A/811B/811E/940S</p>			

**DS** DCS

Description	Output commands	Input commands		Function	Applicable models		
		Read command	Set command		TS-711A/711E/811A/811B/811E	Parameter	Format
	Answer command			DCS system ON/OFF selection and readout	P1	1	DCS ON/OFF
	<pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 D S P1 : 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>	<pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 D S : 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>	<pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 D S P1 : 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>				

**FA**

**FB**

**FREQUENCY VFO A/FREQUENCY VFO B**

Description	Output commands	Input commands	Function
VFO A and VFO B frequency selection and readout	<p><b>Answer command</b></p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 F A F B 14 15 16 17 18 19 20 21 22 23 24 25 26 : 27 28 29 30 31 32 33 34 35 36 37 38 39 </pre>	<p><b>Read command</b></p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 E A F R 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>	<p><b>Set command</b></p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 V A F B 14 15 16 17 18 19 20 21 22 23 24 25 26 : </pre>

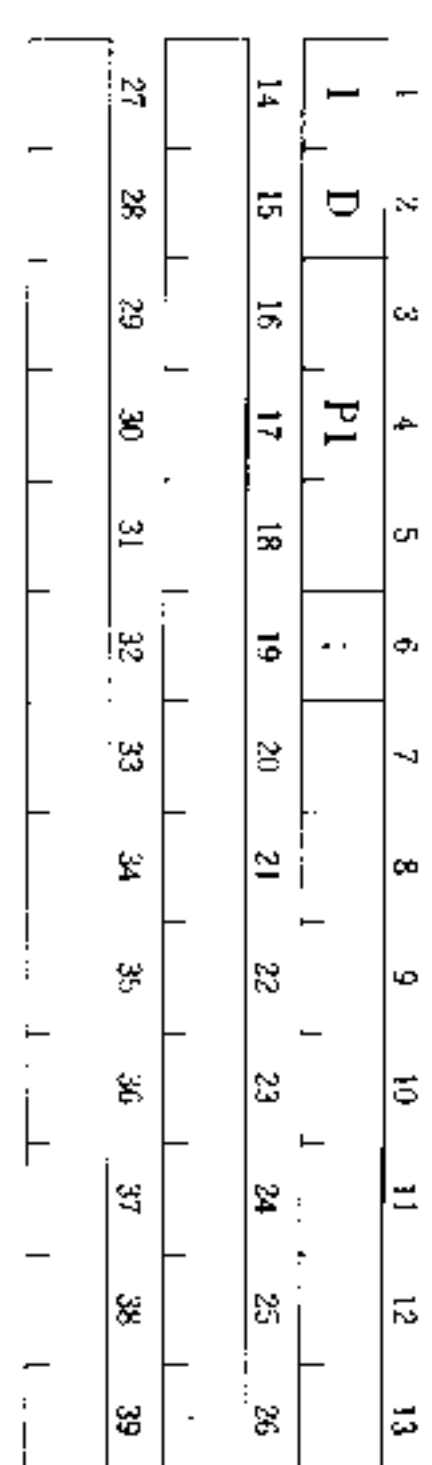
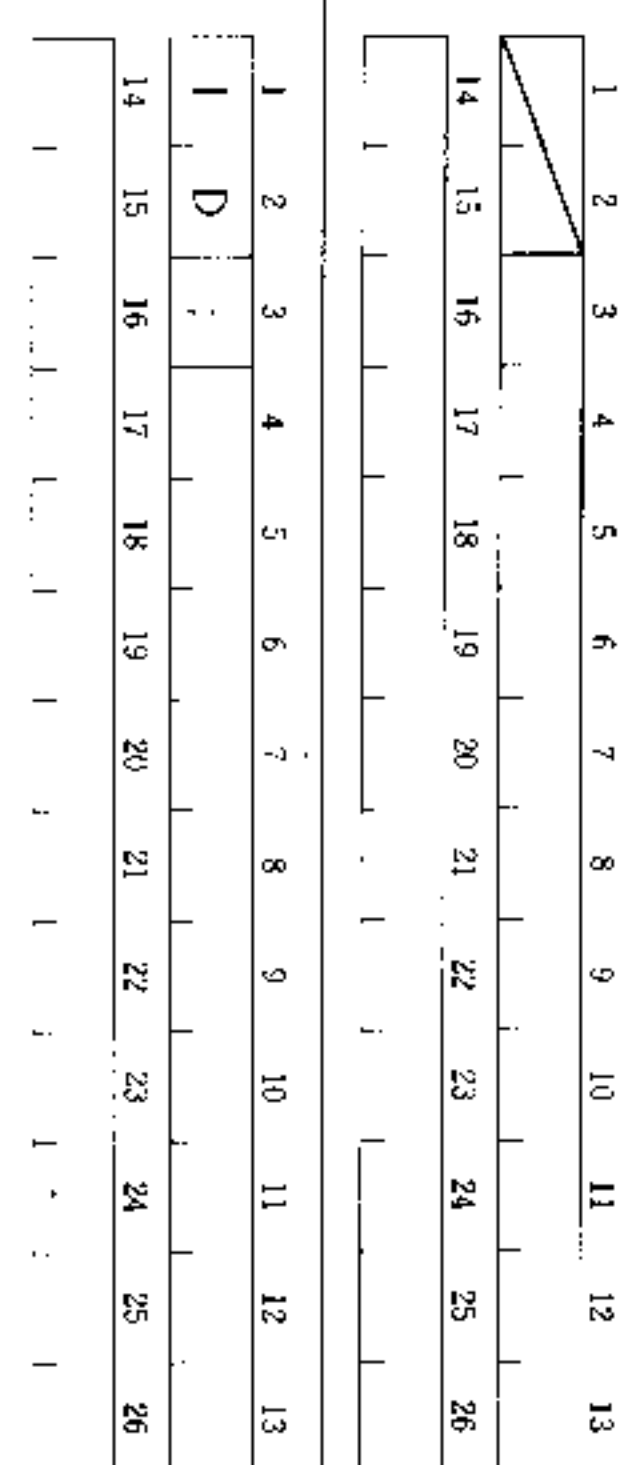
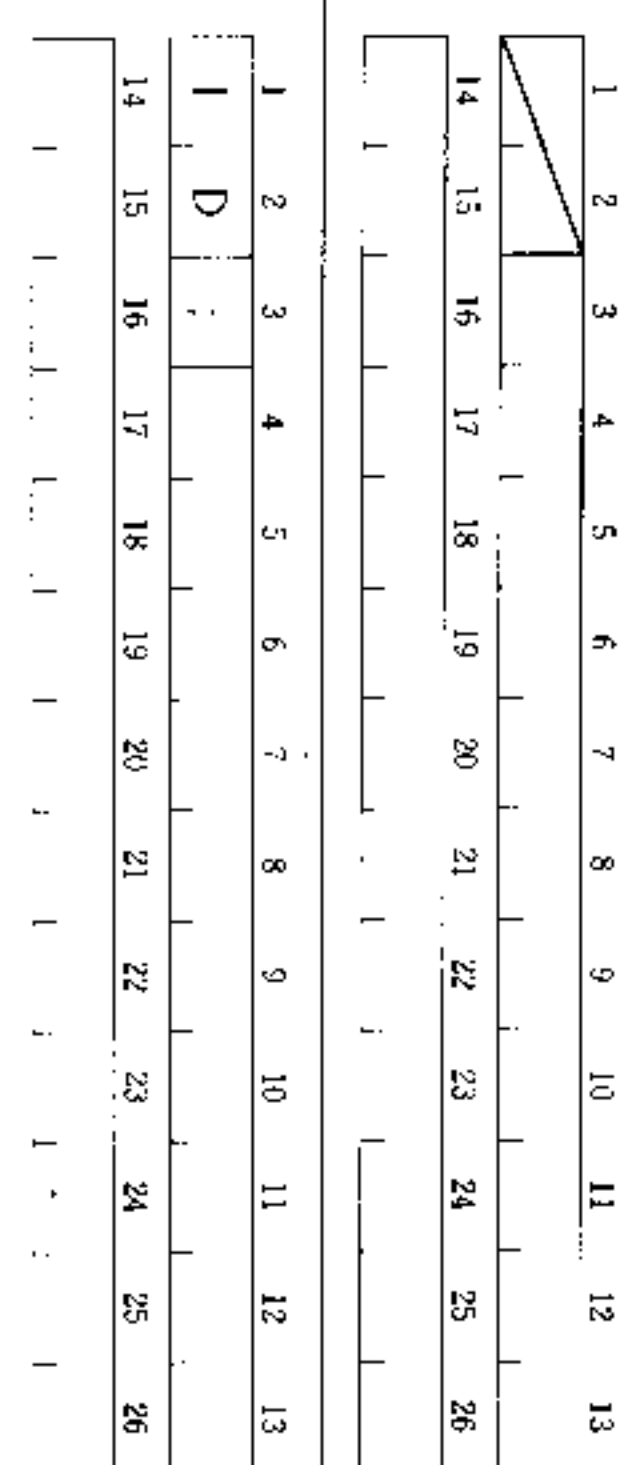
**FN** FUNCTION

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S		
Function	Parameter	Format	Parameter function
VFO A and VFO B MEMORY COM setting (COM: TS-711/811 Only)	P1	3	FUNCTION
Description	Output commands		
	Answer command		
Input commands	Read command		
Set command			

**HD** SCAN HOLD

Applicable model		TS-940S					
Function	Temporary scan.	Parameter	P1	Format	1	Parameter function	SCAN HOLD ON/OFF
		Description					
Output commands		Input commands					
Answer command		Read command		Set command			
<pre> 1  2  3  4  5  6  7  8  9 10 11 12 13 H  D  P1  ; 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>		<pre> 1  2  3  4  5  6  7  8  9 10 11 12 13 H  D  ; 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>		<pre> 1  2  3  4  5  6  7  8  9 10 11 12 13 H  D  P1  ; 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 </pre>			

**ID** ID

Description	Output commands	Input commands	Function
	<p><b>Answer command</b></p> 	<p><b>Read command</b></p> 	<p><b>Applicable models</b> TS-140S/680S/711A/711E/811A/811B/811E/940S</p> <p><b>Parameter</b> P1      <b>Format</b> 16      <b>Parameter function</b> MODEL No.</p> <p>TS-140/680 : 006            TS-711 : 001            TS-811 : 002            TS-940 : 003</p>
		<p><b>Set command</b></p> 	



**IF** INFORMATION

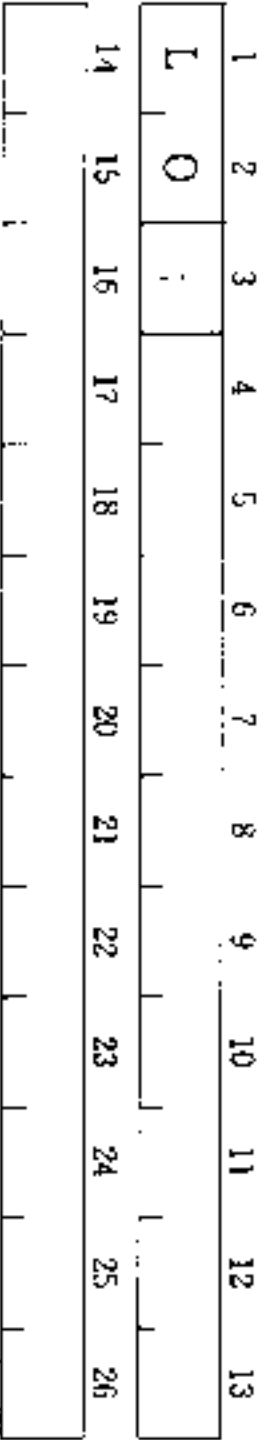
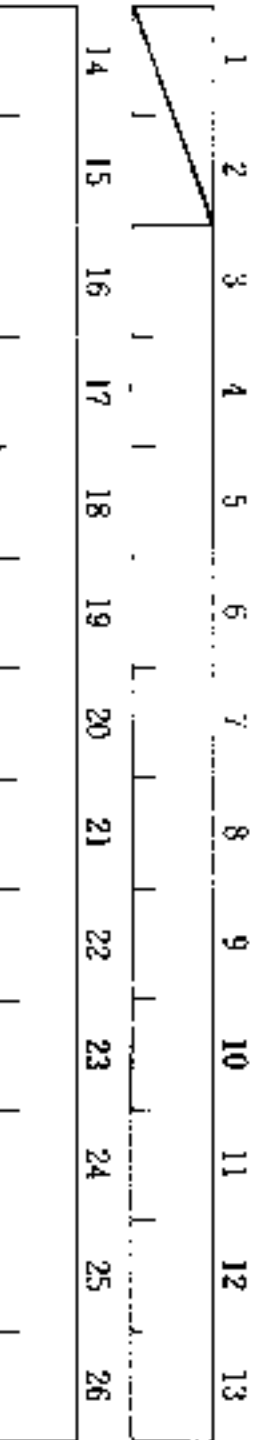
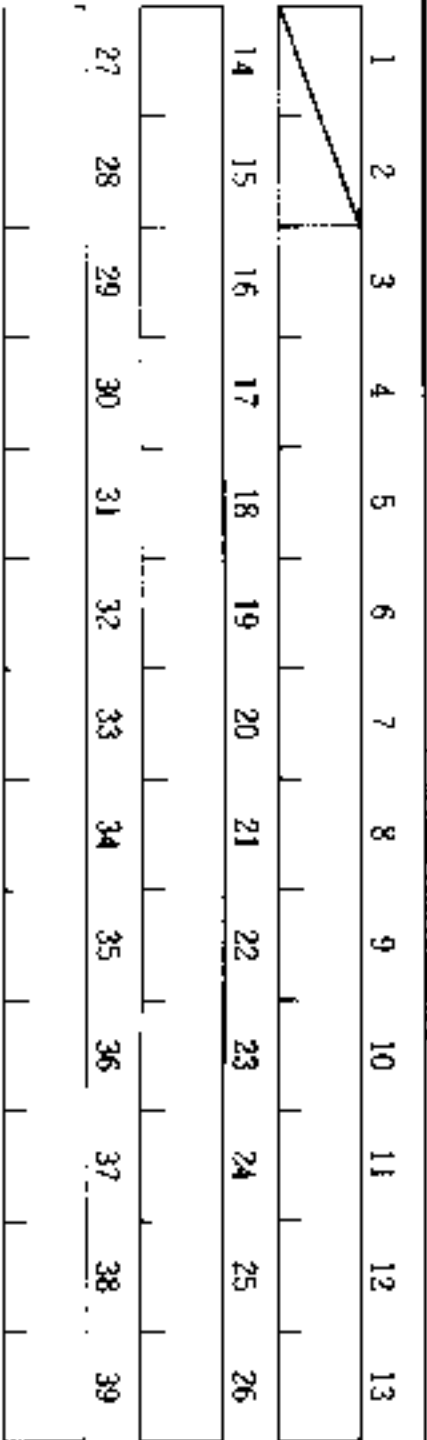
Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function		
Display of transceivers current condition		P1	4	DISPLAY FREQUENCY		
		P2	6	STEP FREQUENCY (TS-711A/711E/811A/811B/811E/940S only)		
		P3	5	RIT FREQUENCY		
		P4	1	RIT ON/OFF		
		P5	1	XIT ON/OFF (TS-711A/711E/811A/811B/811E/940S only)		
		P6	8	MEMORY BANK (TS-940S only)		
		P7	7	MEMORY CHANNEL		
		P8	11	TX/RX		
		P9	2	MODE		
		P10	3	FUNCTION		
Input commands		P11	1	SCAN ON/OFF		
		P12	1	SPLIT ON/OFF		
		P13	1	tone ON/OFF (TS-711A/711E/811A/811B/811E only)*		
		P14	14	tone FREQUENCY (TS-711A/811A/811B only)		
		P15	13	OFFSET (TS-711A/711E/811A/811B/811E only)		
		Output commands		P15	13	OFFSET (TS-711A/711E/811A/811B/811E only)
				P14	14	tone FREQUENCY (TS-711A/811A/811B only)
				P13	1	tone ON/OFF (TS-711A/711E/811A/811B/811E only)*
				P12	1	SPLIT ON/OFF
				P11	1	SCAN ON/OFF
P10	3			FUNCTION		
P9	2			MODE		
P8	11			TX/RX		
P7	7			MEMORY CHANNEL		
P6	8			MEMORY BANK (TS-940S only)		
Function		P3	5	RIT FREQUENCY		
		P4	1	RIT ON/OFF		
		P5	1	XIT ON/OFF (TS-711A/711E/811A/811B/811E/940S only)		
		P6	8	MEMORY BANK (TS-940S only)		
		P7	7	MEMORY CHANNEL		
		P8	11	TX/RX		
		P9	2	MODE		
		P10	3	FUNCTION		
		P11	1	SCAN ON/OFF		
		P12	1	SPLIT ON/OFF		
Description	<p>(1) When the frequency step of the TS-711A/711E/811A/811B/811E is changed, the step frequency of the IF command will hold the previous value until the frequency is changed.</p> <p>(2) * This command is not applicable to "KENWOOD" versions of the TS-711E/811E.</p>	P15	13	OFFSET (TS-711A/711E/811A/811B/811E only)		
		P14	14	tone FREQUENCY (TS-711A/811A/811B only)		
		P13	1	tone ON/OFF (TS-711A/711E/811A/811B/811E only)*		
		P12	1	SPLIT ON/OFF		
		P11	1	SCAN ON/OFF		
		P10	3	FUNCTION		
		P9	2	MODE		
		P8	11	TX/RX		
		P7	7	MEMORY CHANNEL		
		P6	8	MEMORY BANK (TS-940S only)		

**LK** LOCK

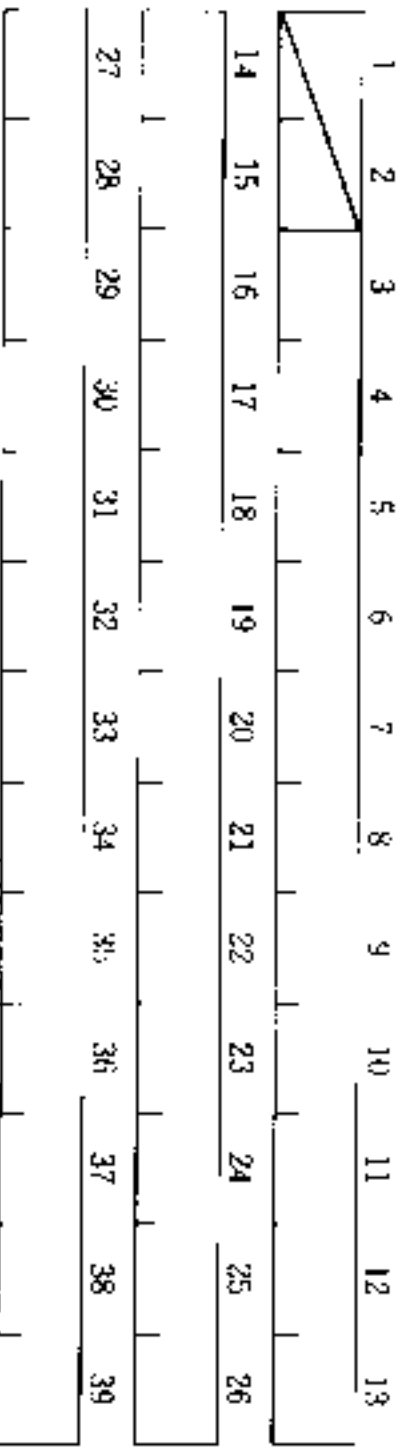
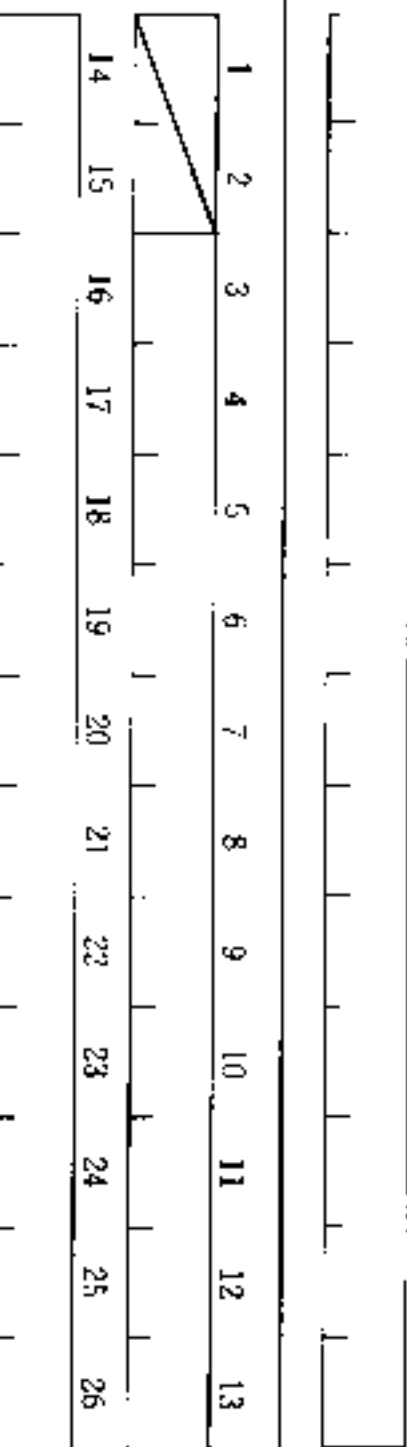
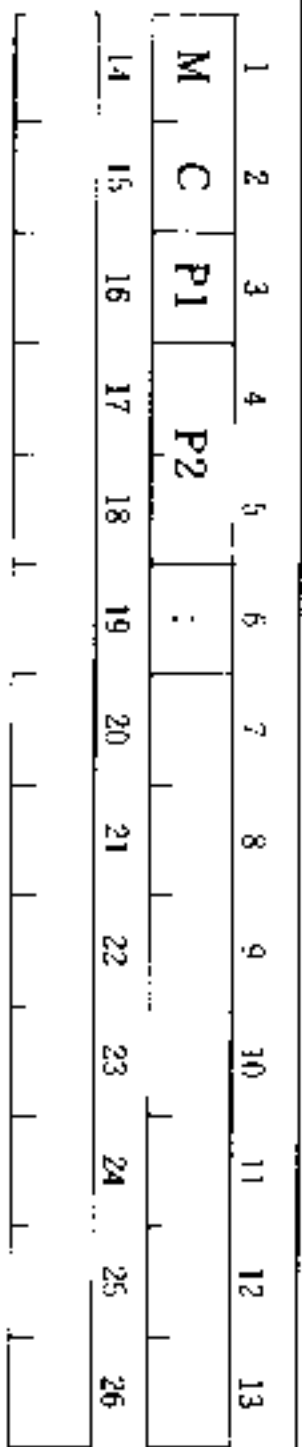
Description	Output commands	Input commands		Function	Parameter	Format	Parameter function
		Read command	Set command				
	<p>Answer command</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 L K P1 ; 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 </pre>	<p>Read command</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 L K ; 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>	<p>Set command</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 L K P1 ; 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>	<p>LOCK ON/OFF setting and display</p>	P1	1	LOCK ON/OFF

Applicable models TS-140S/680S/711A/711E/811A/811B/811E/940S

**LO LOCAL**

Applicable model	TS-940S	Parameter	Format	Parameter function
<p><b>Function</b></p> <p>When a personal computer is used to control VBT etc., the transceivers associated controls are disabled. This command releases control back to the transceivers controls.</p>				
<p><b>Input commands</b></p> <p><b>Set command</b></p> 				
<p><b>Read command</b></p> 				
<p><b>Output commands</b></p> <p><b>Answer command</b></p> 				
<p><b>Description</b></p> <p>When the VB, SL, SH, MC or TX command is executed, the associated switches and controls will not function until the LO command is sent from the computer.</p>				

**MC MEMORY CHANNEL**

Description	Output commands	Input commands	Function									
<p>With the TS-940, this command will disable the MEMORY BANK switch associated top cover switch.</p>	<p><b>Answer command</b></p> 	<p><b>Read command</b></p> 	<p><b>Applicable models</b> TS-140S/680S/711A/711E/811A/811B/811E/940S</p>									
		<p><b>Set command</b></p> 	<p><b>Memory channel setting</b></p> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Format</th> <th>Parameter function</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>8</td> <td>MEMORY BANK (TS-940S only)</td> </tr> <tr> <td>P2</td> <td>7</td> <td>MEMORY CHANNEL</td> </tr> </tbody> </table>	Parameter	Format	Parameter function	P1	8	MEMORY BANK (TS-940S only)	P2	7	MEMORY CHANNEL
	Parameter	Format	Parameter function									
P1	8	MEMORY BANK (TS-940S only)										
P2	7	MEMORY CHANNEL										



**MR MEMORY READ**

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S			
Memory display	Function	Parameter	Format	Parameter function
		P1	9	SPLIT SPECIFICATION
		P2	8	MEMORY BANK (TS-940S only)
		P3	7	MEMORY CHANNEL
		P4	4	FREQUENCY
		P5	2	MODE
		P6	10	MEMORY LOCKOUT (TS-140S/680S/711A/ 711E/811A/811B/ 811E only)
		P7	1	TONE ON/OFF (TS-711A/711E/811A/ 811B/811E only)*
		P8	14	TONE FREQUENCY (TS-711A/811A/811B only)
		P9	13	OFFSET (TS-711A/711E/ 811A/811B/811E only)
Input commands	Output commands	Description		
Set command	Read command	Answer command		
<p>(1) All parameters are set to OFF when the memory channel is vacant.</p> <p>(2) * This command is not applicable to "KENWOOD" versions of the TS-711E/811E.</p> <p>(3) With the TS-140 and the TS-680 to recall the lowest operating frequency of the section use P1 = 1, and to recall the highest operating frequency use P1 = 0.</p>				

**MS** MEMORY SCAN

Applicable model	TS-940S	Parameter	Format	Parameter function
Memory scan ON/OFF and display		P1	1	MEMORY SCAN ON/OFF
		Function		
Input commands		Description		
Set command		Output commands		
<pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 M S P1 ; 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>		Answer command		
<pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 M S ; 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>		<pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 M S P1 ; 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 </pre>		
Read command				

# MW MEMORY WRITE

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S		
Memory entry	Parameter	Format	Parameter function
	P1	9	SPLIT SPECIFICATION
	P2	8	MEMORY BANK (TS-940S only)
	P3	7	MEMORY CHANNEL
	P4	4	FREQUENCY
	P5	2	MODE
	P6	10	MEMORY LOCKOUT (TS-140S/680S/711A/ 711E/811A/811B/ 811E only)
	P7	1	TONE ON/OFF (TS-711A/711E/811A/ 811B/811E only)*
	P8	14	TONE FREQUENCY (TS-711A/811A/811B/ only)
	P9	13	OFF SET (TS-711A/711E/811A/ 811B/811E only)
Function			
Set command			
Read command			
Output commands			
Description	<p>(1) The MW command is valid when all parameters have been correctly entered.</p> <p>(2) When all effective frequency columns are "0", the memory is set to an open channel.</p> <p>(3) When the split channel of the TS-140S/680S/711A/711E/811A/811B/811E is open, the transceiver will be set for the same transmit and receive frequencies, i.e. simplex.</p> <p>(4) * This command is not applicable to "KENWOOD" versions of the TS-711E/811E.</p> <p>(5) With the TS-140 and the TS-680 to recall the lowest operating frequency of the section use P1 = 1, and to recall the highest operating frequency use P1 = 0.</p>		



**OS** OFFSET

Description	Output commands	Input commands		Function	Applicable models	Parameter	Format	Parameter function
		Read command	Set command		TS-711A/711E/811A/811B/811E	P1	13	OFFSET
	<p>Answer command</p>	<p>Read command</p>	<p>Set command</p>	<p>OFFSET setting</p>				

**RC** RIT CLEAR

Function	Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function
RIT frequency clearance					
Input commands	Set command	<p>The diagram shows two signals, R and C, over 26 time slots. R is high from slot 1 to 13, and C is high from slot 1 to 13. Both are low from slot 14 to 26.</p>			
Input commands	Read command	<p>The diagram shows a single signal that is high from slot 1 to 13 and low from slot 14 to 26.</p>			
Output commands	Answer command	<p>The diagram shows two signals over 39 time slots. The first signal is high from slot 1 to 13 and low from slot 14 to 39. The second signal is high from slot 27 to 39 and low from slot 1 to 26.</p>			
Description	<p>When using these commands the center frequency point on the RIT control may not coincide with the center point printed on the front panel. The center point will coincide with the position of the RIT control before these commands were initiated. (TS-140S/680S only)</p>				

**RD**

**RU**

**RIT DOWN/RIT UP**

Function	Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function
Input commands	RIT frequency UP/DOWN				
Description	<p>When using these commands the center frequency point on the RIT control may not coincide with the center point printed on the front panel. The center point will coincide with the position of the RIT control before these commands were initiated. (TS-140S/680S only)</p>				

**RT** RIT

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function
Function	RIT ON/OFF setting			
Input commands	Set command			
	Read command			
	Answer command			
Description				
		P1	1	RIT ON/OFF



**SC** SCAN

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function
Function	Scan ON/OFF setting	P1	1	SCAN ON/OFF
Input commands	<p>Set command</p> <p>Read command</p>			
Output commands	<p>Answer command</p>			
Description				

**SH** **SL** SLOPE TUNE HIGH/SLOPE TUNE LOW

Function	Applicable model	TS-940S	Parameter	Format	Parameter function
Input commands	Slope tune band setting and readout.	Set command		P1	PASSBAND
		Read command			
		Answer command			
Description	The execution of this command will disable the transceivers associated front panel controls.				

**SP SPLIT**

Applicable models	TS-140S/680S/711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function
Function	SPLIT ON/OFF setting			
Input commands	Set command			
Output commands	Read command			
Output commands	Answer command			
Description				



**ST** STEP

Applicable models	TS-711A/711E/811A/811B/811E	Parameter	Format	Parameter function
Function	STEP ON/OFF setting	P1	1	STEP ON/OFF
Input commands	<p>Set command</p> <p>Read command</p>	Output commands	<p>Answer command</p>	Description

**TN** TONE NUMBER

Applicable models	TS-711A/811A/811B	Parameter	Format	Parameter function
Function	Sub-tone frequency setting			
Input commands	<p>Set command</p>	P1	14	TONE FREQUENCY
Input commands	<p>Read command</p>			
Output commands	<p>Answer command</p>			
Description				

**TO TONE**

Applicable models	TS-711A/711E/811A/811B/811E*	Parameter	Format	Parameter function
Function	TONE ON/OFF setting			
Input commands				
Input commands				
Output commands				
Description	* This command is not applicable to "KENWOOD" versions of the TS-711E/811E.			
	P1	1	TONE ON/OFF	

**VB** VBT

Applicable model	TS-940S	Parameter	Format	Parameter function
Function	VBT passband setting and display	P1	12	PASSBAND
Input commands	<p>Set command</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 V B P1 : 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre> <p>Read command</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 V B : 14 15 16 17 18 19 20 21 22 23 24 25 26 </pre>			
Output commands	<p>Answer command</p> <pre> 1 2 3 4 5 6 7 8 9 10 11 12 13 V B P1 : 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 </pre>			
Description	The execution of this command disables the transceivers associated front panel controls.			

**VR** VOICE RECALL

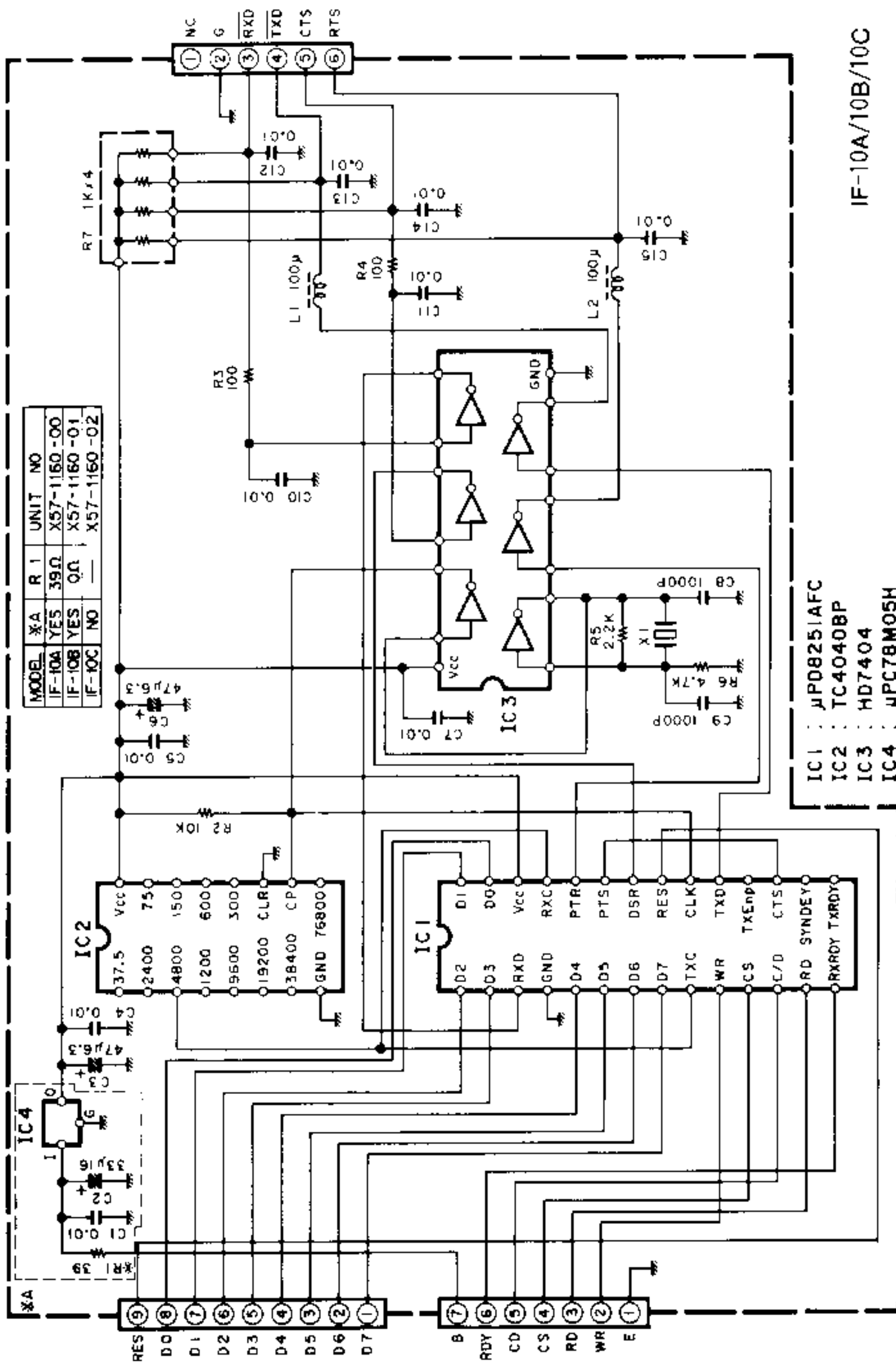
Applicable models	TS-711A/711E/811A/811B/811E/940S	Parameter	Format	Parameter function
Function	Generation of synthesized voice.			
Input commands	Set command			
	Read command			
	Answer command			
Description	Requires the use of the optional VS-1 Voice Synthesizer.			

**XIT** XIT

Applicable model		TS-940S	
Parameter	Format	Parameter function	
P1	1	XIT ON/OFF	
<b>Function</b>			
<b>XIT ON/OFF setting</b>			
<b>Input commands</b>	<b>Set command</b>		
	<b>Read command</b>		
	<b>Answer command</b>		
<b>Output commands</b>			
<b>Description</b>			

# 5. SCHEMATIC DIAGRAM

(X57-1160-00,01,02)



MODEL	XA	R 1	UNIT	NO
IF-10A	YES	39Ω	X57-1160-00	
IF-10B	YES	0Ω	X57-1160-01	
IF-10C	NO	—	X57-1160-02	

- IC1 : μP08251AFC
- IC2 : TC4040BP
- IC3 : HD7404
- IC4 : μPC78M05H

# **K4XL's** **BAMA**

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