

# TS-950series

## EXTERNAL CONTROL INSTRUCTION MANUAL

KENWOOD CORPORATION

## CONTENTS

1. SPECIFICATIONS .....	3
2. OPERATION .....	3
2-1. PRECAUTIONS FOR COMPUTER-CONNECTED OPERATION .....	3
2-2. CONTROL OPERATION .....	3
2-3. COMMANDS .....	4

# 1. SPECIFICATIONS

## ■ Interface

Communication method ... Serial interface, fullduplex  
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

## ■ Terminal Connections

Pin No.	Signal Name		I/O
1	GND	Signal ground	
2	TXD	Transmit data	Output
3	RXD	Receive data	Input
4	CTS	Transmit enable	Input
5	RTS	Receive enable	Output
6	NC	No connection	

GND: This is the signal ground terminal.

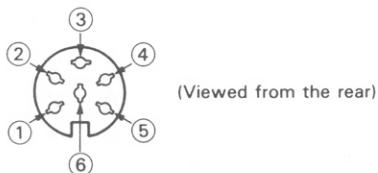
TXD: The transmit data is the serial data from the transceiver to the computer. The output utilizes negative logic.

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.)

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



# 2. OPERATION

## Caution:

Turn the POWER switch OFF before making connections.

## 2-1. 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.

## 2-2. 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 is 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 37 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.

## 2-3. 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 VFO A to  
↑ ↑ ↑ 7 MHz.  
Command Parameters Terminator

### 2-3-1. Command Description

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

### 2-3-2. 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-950 so the command could be as given above "MC109" or as:  
"MC\_09;" ..... In this case a blank has been used to fill the parameter block for the memory bank number.

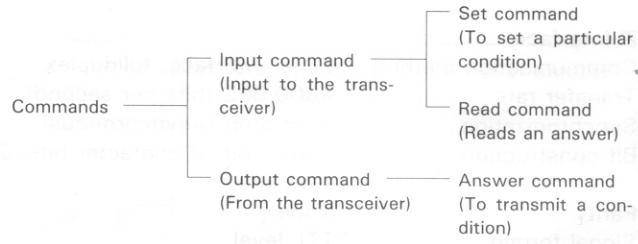
The following are examples of bad commands:

"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.  
"MC1009" ..... No terminator

### 2-3-3. 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 ";".

## 2-3-4. 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:  
"FA0000700000;" .....(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:  
"FA0000700000;" .....(Answer command)

### 2-3-5. Error Messages

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

?	<ul style="list-style-type: none"><li><input type="radio"/> When the command syntax is incorrect.</li><li><input type="radio"/> When the command was not executed due to the current status of the transceiver, even though the command syntax was correct.</li></ul> <p><b>Note:</b> Occasionally this message may not appear due to microprocessor transients in the transceiver.</p>
E;	When a communication error occurs, such as an overrun error or framing error occurs during serial data transmissions.
O;	When the receive data is sent but processing cannot be completed.

### 2-3-6. How to read the command tables

Command	<b>AI</b>	AUTO INFORMATION	
Applicable models for the command		Applicable models	ALL
Function of the command		Function	AUTO INFORMATION ON/OFF setting
The number of the command columns is shown.			
Corresponds to the parameter of the command format.		P1	Parameter
Corresponds to the format No. in the parameter list. For the parameter formats, refer to the parameter list.		1	Format
Indicates the parameters function.			Parameter function
The format of the command is shown. When oblique lines are drawn in the 1st and 2nd columns there is no set command.	1 14	1 15 16 17 18 19 20 21 22 23 24 25 26	Set command
The format of the command for reading the sets condition is shown. When oblique lines are drawn in the 1st and 2nd columns, there is no read command.	1 14 15 16 17 18 19 20 21 22 23 24 25 26	1 2 3 4 5 6 7 8 9 10 11 12 13	Read command
The format of the command output from the transceiver is shown. When oblique lines are drawn in the 1st and 2nd columns, there is no answer command.	1 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	1 2 3 4 5 6 7 8 9 10 11 12 13	Output commands
Description	(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. (2) The check time is longer than 1.5 seconds during scanning or TUNING dial rotation.		For parameters, refer to "IF" command
	Usage of command, details of functions, and cautions are described.		

### 2-3-7. Parameter list

Format No.	Name	Number of columns	Format
1	SW	1	0=OFF 1=ON
2	MODE	1	1=LSB 4=FM 2=USB 5=AM 3=CW 6=FSK
3	FUNCTION	1	0=VFO A 2=MEMORY 1=VFO B
4	FREQUENCY	11	Represented in Hz, using 11 columns. <b>Example:</b> 00007000000 is 7 MHz  10 GHz 1 MHz 1 kHz 1 Hz
5	RIT/XIT FREQUENCY	5	The first digit is "+" or "-", and the remaining four digits indicate the frequency in Hz. <b>Example:</b> +5320 is +5.32 kHz
6	-	-	
7	MEMORY CHANNEL	2	Represented by two digits. <b>Example:</b> 02 is CH2
8	-	-	
9	MEMORY CHANNEL SPLIT SPECIFICATION	1	0=Receive 1=Transmit
10	MEMORY LOCKOUT	1	0=Not locked out 1=Locked out
11	TX/RX	1	0=Receive 1=Transmit
12	PASSBAND	2	Represented using two digits, from 00 to 20. "00" is the normal or wide position and "20" is the narrowest bandwidth.
13	-	-	
14	TONE FREQUENCY	2	Represented using two digits, from 01 to 39.
15	-	-	
16	MODEL NO.	3	Three digits number specifying each set.
17	-	-	
18	-	-	
19	-	-	
20	-	-	
21	-	-	
22	METER	4	0000 (MIN) ↔ 0030 (MAX)
23	SUB SW	1	0=SUB: OFF, TF-W: OFF 1=SUB: ON, TF-W: OFF 2=SUB: ON, TF-W: ON
24	METER SW	1	0=NO SELECT 3=ALC 1=SWR 4=IC 2=COMP
25	PITCH	2	Represented by two digit numbers in the range 00-55 (00-30 for model TS-950SDX). "00" is the bass and the pitch increases as the numbers increase.
26	FILTER	3	000=NO SELECT (READ ONLY) 002=FM WIDE 003=FM NARROW 005=AM 007=SSB 008=SSB NARROW 009=CW 010=CW NARROW
27	Playback channel	1	0=No playback (when playback has been stopped with the setting command) 1=Channel 1 2=Channel 2 3=Channel 3

### 2-3-8. Command Use Precautions

1. The control characters (00 to 1FH) when included in receive data are ignored.
2. Program execution may be delayed during rapid encoder rotation.
3. Receive data is not processed when directly entering the frequency from the keyboard.
4. To enter the transmitter frequency for split frequency operations using the MW command, enter any number from 1 thru 6 as the mode and either a "0" or a "1" to indicate the memory channel lockout statue.

### 2-3-9. Command List

Command	Function	Page	Models
AI	AUTO INFORMATION	7	ALL
DN/UP	DOWN/UP	7	ALL
DT	DATA	8	ALL
FA/FB/	FREQUENCY VFO A/FREQUENCY	8	ALL
FC	VFO B/FREQUENCY SUB		ALL
FL	FILTER	9	ALL
FR/FT	FUNCTION RX/TX	9	ALL
ID	ID	10	ALL
IF	INFORMATION	10	ALL
LK	LOCK	11	ALL
MC	MEMORY CHANNEL	11	ALL
MD	MODE	12	ALL
MR	MEMORY READ	12	ALL
MW	MEMORY WRITE	13	ALL
MX	AIP	13	ALL
PB	PLAYBACK	14	SDX
PT	PITCH	14	ALL
RC	RIT CLEAR	15	ALL
RD/RU	RIT DOWN/RIT UP	15	ALL
RM	READ METER	16	ALL
RT	RIT	16	ALL
RX/TX	RX/TX	17	ALL
SB	SUB	17	ALL
SC	SCAN	18	ALL
SH/SL	SLOPE TUNE HIGH/LOW	18	ALL
SM	S METER	19	ALL
ST	STEP	19	Excl. SDX
TN	TONE NUMBER	20	ALL
TO	TONE	20	Excl. SDX
VB	VBT	21	ALL
VR	VOICE RECALL	21	ALL
XT	XIT	22	ALL

#### Note:

The model codes have the following meaning:

ALL: All models in the TS-950 series

Excl. SDX: All models in the TS-950 series excluding the TS-950SDX models

SDX: TS-950SDX model only

AI AUTO INFORMATION

DN UP DOWN/UP

Applicable models	ALL	Parameter	Format	Parameter function																																																																													
Function	Same function as microphone UP/DOWN switch																																																																																
Input commands	<table border="1"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td> </tr> <tr> <td>DN</td><td>UP</td><td>:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	DN	UP	:											14	15	16	17	18	19	20	21	22	23	24	25	26														Set command																											
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**DT** DATA

Applicable models		ALL	Parameter	Format	Parameter function																																																																													
Function	DATA mode ON/OFF setting		P1	1	DATA ON/OFF																																																																													
Input commands	Set command	<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>D</td><td>T</td><td>P1</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	D	T	P1	;										14	15	16	17	18	19	20	21	22	23	24	25	26	;																																								
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Description	<p>DATA mode ON/OFF setting</p> <p>This command is used to set the DATA mode ON or OFF. The parameter P1 specifies the state: 1 for ON and 0 for OFF.</p>																																																																																	

**FA** **FB** **FC** FREQUENCY VFO A/FREQUENCY VFO B/FREQUENCY SUB

Applicable models		ALL	Parameter	Format	Parameter function																																																																													
Function	VFO A, VFO B and SUB frequency selection and readout		P1	4	FREQUENCY																																																																													
Input commands	Set command	<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>FA/FB/FC</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	FA/FB/FC													14	15	16	17	18	19	20	21	22	23	24	25	26	;																																								
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Output commands	Answer command	<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>FA/FB/FC</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td><td>32</td><td>33</td><td>34</td><td>35</td><td>36</td><td>37</td><td>38</td><td>39</td></tr> <tr><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>	1	2	3	4	5	6	7	8	9	10	11	12	13	FA/FB/FC													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	;														
1	2	3	4	5	6	7	8	9	10	11	12	13																																																																						
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27	28	29	30	31	32	33	34	35	36	37	38	39																																																																						
;																																																																																		
Description	<p>VFO A, VFO B and SUB frequency selection and readout</p> <p>This command is used to select the frequency for VFO A, VFO B or SUB. The parameter P1 specifies the frequency: 1 for VFO A, 2 for VFO B and 4 for SUB.</p>																																																																																	

**FL FILTER**

Applicable models		ALL		Parameter	Format	Parameter function								
Function	FILTER selection						P1, P2	26	FILTER					
	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13
		F	L		P1		P2		;					
		14	15	16	17	18	19	20	21	22	23	24	25	26
	Input commands													
	Read command	1	2	3	4	5	6	7	8	9	10	11	12	13
		F	L	;										
		14	15	16	17	18	19	20	21	22	23	24	25	26
	Output commands													
	Answer command	1	2	3	4	5	6	7	8	9	10	11	12	13
		F	L		P1		P2		;					
		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
Description														

**FR FT FUNCTION RX, FUNCTION TX**

Applicable models		ALL		Parameter	Format	Parameter function								
Function	VFO A, VFO B and MEMORY CHANNEL setting						P1	3	FUNCTION					
	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13
		FR		P1	;									
		14	15	16	17	18	19	20	21	22	23	24	25	26
	Input commands													
	Read command	1	2	3	4	5	6	7	8	9	10	11	12	13
	Output commands													
	Answer command	1	2	3	4	5	6	7	8	9	10	11	12	13
Description														

**ID**

ID

83739-19

Applicable models		ALL		Parameter	Format	Parameter function		
Function	Model No. readout transceiver recognition.		P1	16	Model Number TS-950 series...008 (Excl. TS-950 SDX) TS-950 SDX ...012			
Description	Input commands	Set command						
Input commands	Read command	Answer command						

**IF** INFORMATION

Applicable models		ALL		Parameter	Format	Parameter function		
Function	Display of transceivers current condition		P1	4	DISPLAY FREQUENCY			
Description	Input commands	Set command						
Input commands	Read command	Answer command						
Output commands	Answer command		P2	—	RIT FREQUENCY			
			P3	5	RIT ON/OFF			
Output commands	Answer command		P4	1	XIT ON/OFF			
			P5	1	MEMORY CHANNEL			
Output commands	Answer command		P6	—	TX/RX			
			P7	7	MODE			
Output commands	Answer command		P8	11	FUNCTION			
			P9	2	SCAN ON/OFF			
Output commands	Answer command		P10	3	SPLIT ON/OFF			
			P11	1	TONE ON/OFF			
Output commands	Answer command		P12	1	TONE FREQUENCY			
			P13	1	—			
Output commands	Answer command		P14	14	—			
			P15	—	;			

**LK** LOCK

Applicable models		ALL		Parameter	Format	Parameter function							
Function	LOCK ON/OFF setting and display												
Description	Input commands		Set command										
	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
	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
	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

**MC** MEMORY CHANNEL

Applicable models		ALL		Parameter	Format	Parameter function							
Function	Memory channel setting												
Description	Input commands		Set command										
	1	2	3	4	5	6	7	8	9	10	11	12	13
	M	C	—	P2	;								
	14	15	16	17	18	19	20	21	22	23	24	25	26
	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
	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
	27	28	29	30	31	32	33	34	35	36	37	38	39

**MD** MODE

**MR** MEMORY READ

**MW** MEMORY WRITE

**MX** AIP (Advanced Intercept Point)

## PB PLAYBACK

Applicable models	SDX	Parameter	Format	Parameter function
Function	DRS, CW PLAYBACK	P1	27	PLAYBACK channel
Input commands	Set command	1 2 3 4 5 6 7 8 9 10 11 12 13 P B P1 ; 14 15 16 17 18 19 20 21 22 23 24 25 26		
Input commands	Read command	1 2 3 4 5 6 7 8 9 10 11 12 13 P B ; 14 15 16 17 18 19 20 21 22 23 24 25 26		
Output commands	Answer command	1 2 3 4 5 6 7 8 9 10 11 12 13 P 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		
Description	(Requires optional DRU-2) (for SSB playback)			

## PT PITCH

Applicable models	ALL	Parameter	Format	Parameter function
Function	PITCH setting	P1	25	PITCH
Input commands	Set command	1 2 3 4 5 6 7 8 9 10 11 12 13 P T P1 ; 14 15 16 17 18 19 20 21 22 23 24 25 26		
Input commands	Read command	1 2 3 4 5 6 7 8 9 10 11 12 13 P T ; 14 15 16 17 18 19 20 21 22 23 24 25 26		
Output commands	Answer command	1 2 3 4 5 6 7 8 9 10 11 12 13 P T 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		
Description	This command changes the pitch frequency irrespective of PITCH knob setting. When the PITCH button is rotated, the pitch changes corresponding to the position of the knob.			

**RC RIT CLEAR**

R3FM QAZB MH

Applicable models		ALL													Parameter	Format	Parameter function															
Function	RIT/XIT frequency clearance																															
Description																																

**RM** READ METER

Applicable models		Parameter														Format	Parameter function		
Function	METER selection and readout														P1	24	METER selection		
															P2	22	METER level		
Description																			
Input commands	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13	R	M	P1	;	
		14	15	16	17	18	19	20	21	22	23	24	25	26					
Input commands	Read command	1	2	3	4	5	6	7	8	9	10	11	12	13	R	M	;		
		14	15	16	17	18	19	20	21	22	23	24	25	26					
Output commands	Answer command	1	2	3	4	5	6	7	8	9	10	11	12	13	R	M	P1		P2
		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					

**RT** RIT

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

**RX** **TX** RX/TX

PAGE 38

Applicable models		Parameter		Format	Parameter function																																																					
Function		RX: For receive operation TX: For transmit operation																																																								
Input commands		<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>RX</td><td>TX</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>					1	2	3	4	5	6	7	8	9	10	11	12	13	RX	TX	;											14	15	16	17	18	19	20	21	22	23	24	25	26													
1	2	3	4	5	6	7	8	9	10	11	12	13																																														
RX	TX	;																																																								
14	15	16	17	18	19	20	21	22	23	24	25	26																																														
Output commands		<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>					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													
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																																														
Description		Place the REC/SEND switch to REC.																																																								

**SB** SUB

Applicable models		Parameter		Format	Parameter function																																																					
Function		SUB ON/OFF setting and TF-W ON/OFF setting																																																								
Input commands		<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>S</td><td>B</td><td>P1</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>					1	2	3	4	5	6	7	8	9	10	11	12	13	S	B	P1	;										14	15	16	17	18	19	20	21	22	23	24	25	26													
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S	B	P1	;																																																							
14	15	16	17	18	19	20	21	22	23	24	25	26																																														
Output commands		<table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td></tr> <tr><td>S</td><td>B</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </table>					1	2	3	4	5	6	7	8	9	10	11	12	13	S	B	;											14	15	16	17	18	19	20	21	22	23	24	25	26													
1	2	3	4	5	6	7	8	9	10	11	12	13																																														
S	B	;																																																								
14	15	16	17	18	19	20	21	22	23	24	25	26																																														
Description		Place the REC/SEND switch to REC.																																																								

**SC** SCAN

Applicable models		ALL													Parameter	Format	Parameter function																																																	
Function	Scan ON/OFF setting															P1	1	SCAN ON/OFF																																																
Input commands		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td></td><td></td><td></td></tr> <tr><td>S</td><td>C</td><td>P1</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td></td><td></td><td></td></tr> </table>		1	2	3	4	5	6	7	8	9	10	11	12	13				S	C	P1	;													14	15	16	17	18	19	20	21	22	23	24	25	26																		
1	2	3	4	5	6	7	8	9	10	11	12	13																																																						
S	C	P1	;																																																															
14	15	16	17	18	19	20	21	22	23	24	25	26																																																						
Output commands		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td></td><td></td><td></td></tr> <tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td></td><td></td><td></td></tr> </table>		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																		
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14	15	16	17	18	19	20	21	22	23	24	25	26																																																						
Description	Answer command																																																																	

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

Applicable models		ALL													Parameter	Format	Parameter function																																																	
Function	Slope tune band setting and readout.															P1	12	PASSBAND																																																
Input commands		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td></td><td></td><td></td></tr> <tr><td>SH</td><td>SL</td><td>P1</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td></td><td></td><td></td></tr> </table>		1	2	3	4	5	6	7	8	9	10	11	12	13				SH	SL	P1	;													14	15	16	17	18	19	20	21	22	23	24	25	26																		
1	2	3	4	5	6	7	8	9	10	11	12	13																																																						
SH	SL	P1	;																																																															
14	15	16	17	18	19	20	21	22	23	24	25	26																																																						
Output commands		<table border="1" style="margin-left: auto; margin-right: auto;"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td></td><td></td><td></td></tr> <tr><td>SH</td><td>SL</td><td>;</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td></td><td></td><td></td></tr> </table>		1	2	3	4	5	6	7	8	9	10	11	12	13				SH	SL	;														14	15	16	17	18	19	20	21	22	23	24	25	26																		
1	2	3	4	5	6	7	8	9	10	11	12	13																																																						
SH	SL	;																																																																
14	15	16	17	18	19	20	21	22	23	24	25	26																																																						
Description	Answer command															This command changes the SLOPE TUNE bandwidth irrespective of SLOPE TUNE knob setting on the front panel of the transceiver. When the SLOPE TUNE knob is rotated, the slope tune bandwidth changes corresponding to the position of the knob.																																																		

**SM** S-METER

PREMIUM SHOT 01

Applicable models		Parameter		Format	Parameter function
Function		S-Meter signal output		P1	22 METER level
Input commands	Set command	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			
Input commands	Read command	1 2 3 4 5 6 7 8 9 10 11 12 13 S M ; 14 15 16 17 18 19 20 21 22 23 24 25 26			
Output commands	Answer command	1 2 3 4 5 6 7 8 9 10 11 12 13 S M 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			
Description	During transmit, the meter displays the transmitter power output.				

**ST** STEP

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

**TN** TONE NUMBER

**TO** TONE

**VB** VBT

Applicable models		ALL													Parameter	Format	Parameter function		
Function	VBT passband setting and display																P1	12	PASSBAND
Description	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13					
	Set command	V	B	P1	;														
	Set command	14	15	16	17	18	19	20	21	22	23	24	25	26					
Description	Input commands	1	2	3	4	5	6	7	8	9	10	11	12	13					
	Input commands	V	B	;															
	Input commands	14	15	16	17	18	19	20	21	22	23	24	25	26					
Description	Output commands	1	2	3	4	5	6	7	8	9	10	11	12	13					
	Output commands	V	B	P1	;														
	Output commands	14	15	16	17	18	19	20	21	22	23	24	25	26					
Description	Answer command	27	28	29	30	31	32	33	34	35	36	37	38	39					
	Answer command																		
	Answer command																		
1. This command changes the bandwidth irrespective of the position of the VBT knob. When the VBT knob is rotated, the bandwidth changes corresponding to the position of the knob.																			

**VR** VOICE RECALL

Applicable models		ALL													Parameter	Format	Parameter function		
Function	Generation of synthesized voice.																		
Description	Set command	1	2	3	4	5	6	7	8	9	10	11	12	13					
	Set command	V	R	;															
	Set command	14	15	16	17	18	19	20	21	22	23	24	25	26					
Description	Input commands	1	2	3	4	5	6	7	8	9	10	11	12	13					
	Input commands	V	R	;															
	Input commands	14	15	16	17	18	19	20	21	22	23	24	25	26					
Description	Output commands	1	2	3	4	5	6	7	8	9	10	11	12	13					
	Output commands	V	R	;															
	Output commands	14	15	16	17	18	19	20	21	22	23	24	25	26					
Description	Answer command	27	28	29	30	31	32	33	34	35	36	37	38	39					
	Answer command																		
	Answer command																		
Requires the use of the optional VS-2 Voice Synthesizer.																			

**XT XIT**

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**MEMO:**

TS-950  
EXTERNAL INSTRUMENTS  
INSTRUCTION MANUAL

KENWOOD

## CONTENTS

WOMEN

INTRODUCTION	1
OPERATION	2
DISASSEMBLY AND ASSEMBLY	3
MAINTENANCE	4
STORAGE	5
DISPOSAL	6

KENWOOD