

KENWOOD

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**INTERFACE SPECIFICATIONS**

Communication method	Serial interface, full duplex
Transfer rate	4800 bps (bits/second)
Synchronization	Start-stop (Asynchronous)
Bit configuration	1 start bit, 8 character bits, 2 stop bits
Parity	None
Signal format	TTL level

**UNPACKING**

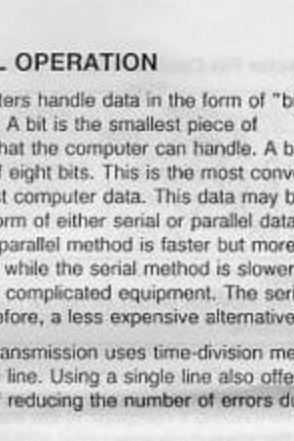
The IF-10D package includes the following items:  
 IF-10D interface unit ..... 1  
 Instruction manual .. (B62-0360-00) ... 1 copy

**INSTALLATION**

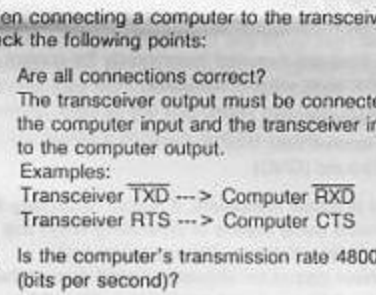
This manual explains how to operate the TS-50S transceiver equipped with an IF-10D personal computer interface.

First, install the interface using the following instructions:

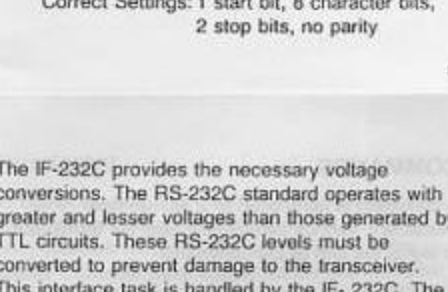
- Turn the power off and remove the power connector from the TS-50S.
- Attach the interface to the right side of the TS-50S (front view) using the screws supplied with the mounting bracket.



- Remove the protective patch from the bottom cover of the TS-50S. Plug the 6-pin interface connector into the exposed connector (CN6). Note that the interface connector only fits correctly one way.



**Interconnection Diagram**



**Connector Pinout**

Pin No.	Signal	Name	I/O
1	GND	Signal ground	Output
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: Signal ground terminal

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

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

CTS: This signal is supplied from the computer. It is used to inhibit transmit data from the transceiver when the computer is not ready to receive. The input uses positive logic. (Transmit data is stopped when the level is 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 uses positive logic. (Inhibit is requested when the level is low.)

**BEFORE USING IF-10D**

When connecting a computer to the transceiver, check the following points:

- Are all connections correct?  
 The transceiver output must be connected to the computer input and the transceiver input to the computer output.  
 Examples:  
 Transceiver TXD ---> Computer RXD  
 Transceiver RTS ---> Computer CTS

- Is the computer's transmission rate 4800 bps (bits per second)?

- Is the computer's bit configuration correct?  
 Correct Settings: 1 start bit, 8 character bits, 2 stop bits, no parity

**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 eight 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 streams. The parallel method is faster but more complicated, while the serial method is slower and requires less complicated equipment. The serial form is, therefore, a less expensive alternative.

Serial data transmission uses time-division methods over a single line. Using a single line also offers the advantage of reducing the number of errors due to line noise.

Only 3 lines are required theoretically for control of the transceiver via the computer:

- Transmit data (TXD)
- Receive data (RXD)
- Ground (GND)

From a practical standpoint, it is also necessary to incorporate some means of controlling when this data transfer will occur. The computer and transceiver cannot be allowed to send data at the same time! The required control is achieved by using the RTS and CTS lines.

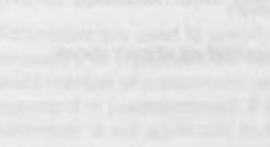
The IF-232C provides the necessary voltage conversions. The RS-232C standard operates with greater and lesser voltages than those generated by TTL circuits. These RS-232C levels must be converted to prevent damage to the transceiver. This interface task is handled by the IF-232C. The actual command sequence would be similar to those described below.

For example, the transceiver is set to 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 9 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; therefore, refer to the instruction manuals provided with the terminal program and computer.

**COMMANDS**

A command is composed of 2 alphabetical characters, various parameters, and the terminator to signal the end of the command.

Example:  
 FA 0007000000 ; Command to set VFO A to 7 MHz



**Command Description**

A command must consist of upper case alphabetical characters.

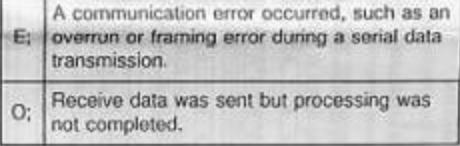
**Parameter Description (Refer to Parameter List)**

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 ";".

**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.

**Types of Commands**



Commands can be classified as shown above.

**Error Messages**

In addition to the Answer Command, the transceiver can send the following error messages:

?	Command syntax was incorrect.
E;	Command was not executed due to the current status of the transceiver, even though the command syntax was correct.
O;	A communication error occurred, such as an overrun or framing error during a serial data transmission.
	Receive data was sent but processing was not completed.

**Reading Command Tables**

For example, note the following in the case of the FA command (Frequency VFO A):

- To set the frequency to 7 MHz, the following command is sent from the computer to the transceiver:  
 "FA0007000000;" (Set Command)
- To read the frequency of VFO A, the following command is sent from the computer to the transceiver:  
 "FA;" (Read Command)
- When the Read Command, above, has been sent, the following command is returned to the computer:  
 "FA0007000000;" (Answer Command)

**Parameter List**

In addition to the Answer Command, the transceiver can send the following error messages:

Command	Name	Number of Digits	Format
1	SW	1	0=OFF, 1=ON
2	MODE	1	1=LSB, 2=USB, 3=CW, 4=FM, 5=AM
3	FUNCTION	1	0=VFO A, 1=VFO B, 2=MR
4	FREQUENCY	11	Represented in Hz, using 11 digits. Example: 0007000000 is 7 MHz ↑ ↑ ↑ ↑ ↑ 1 Hz 1 kHz 10 GHz
5	RIT FREQUENCY	5	The first digit is "+" or "-", and the remaining four digits indicate the frequency in Hz. Example: +0830 is +0.83 kHz

Parameter	Format	Parameter function
6	-	-
7	MEMORY	2
8	-	-
9	-	-
10	-	-
11	TX/RX	1
12	-	-
13	-	-
14	STONE FREQUENCY	2
15	-	-
16	MODEL NO.	3

**Command Use Precautions**

- The included characters (00 to 1FH) when control in receive data are ignored.
- Program execution may be delayed during rapid encoder rotation.
- Receive data is not processed when directly entering the frequency from the keyboard.

**Command List**

Command	Function	Page
FA/FB	FREQUENCY VFO A / FREQUENCY VFO B	18
FN	FUNCTION	19
ID	ID	20
IF	INFORMATION	21
MD	MODE	22
RX/TX	RX/TX	23
SP	SPLIT	24

**Parameter List**

Parameter No.	Name	Number of Digits	Format
6	-	-	-
7	MEMORY	2	Represented using two digits. Example: 02 is CH2
8	-	-	-
9	-	-	-
10	-	-	-
11	TX/RX	1	0 = Receive, 1 = Transmit
12	-	-	-
13	-	-	-
14	STONE FREQUENCY	2	Represented using two digits, from 01 to 39. See the cross-reference chart.
15	-	-	-
16	MODEL NO.	3	Three digit number identifying each transceiver.

**Cross-Reference between Tone Numbers and Tone Frequencies**

No.	Freq (Hz)	No.	Freq (Hz)	No.	Freq (Hz)	No.	Freq (Hz)
01	67.0	11	97.4	21	136.5	31	192.8
02	71.9	12	100.0	22	141.3	32	203.7
03	74.4	13	103.5	23	146.2	33	210.7
04	77.0	14	107.2	24	151.4	34	218.1
05	79.5	15	110.9	25	156.7	35	225.7
06	82.5	16	114.8	26	162.2	36	233.6
07	85.4	17	118.8	27	167.9	37	241.8
08	88.5	18	123.0	28	173.8	38	250.3
09	91.5	19	127.0	29	179.9	39	259.0
10	94.6	20	131.8	30	186.2		

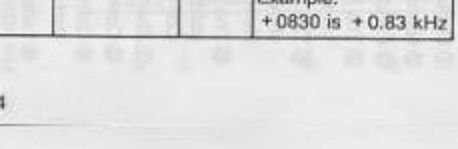
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