

KENWOOD

TS-990S

PC CONTROL COMMAND
Reference Guide

JVCKENWOOD Corporation

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PC CONTROL COMMAND REFERENCE GUIDE

ABOUT THIS REFERENCE GUIDE

All descriptions in this reference guide are for the user's convenience. **JVC KENWOOD Corporation** does not support nor warrant the applicability of this documentation in any way.

CONNECTING TO A PC

You can connect the TS-990S transceiver to a PC COM port using a RS-232C connector, to a USB port using a USB 2.0 (AB type) cable, or to a LAN port.

If using the COM port or USB, through the transceiver menu, select a baud rate for communications between the PC and the transceiver.

■ Using a RS-232C Straight Cable

Directly connect the RS-232C straight cable between the COM port of the PC and the COM terminal of the transceiver.

■ Using a USB Cable

When using a USB cable, you must first pre-install a virtual COM port driver on the PC. Then, connect the USB cable A connector to the USB port of the PC and the B connector the USB terminal of the transceiver.

Download the driver from the following URL.

https://www.kenwood.com/i/products/info/amateur/software_download.html

Note: No warranty for the operation is granted when connecting through a USB hub.

■ Using a LAN Cable

When connecting the TS-990S and a PC using a hub, connect them with a straight cable. When connecting the TS-990S directly to a PC, connect them with a cross cable.

LAN COMMUNICATION PROCEDURES

- 1 Through the LAN menu of the transceiver, set the various IP addresses and your user ID and password.
- 2 Set the TCP/IP using the PC.
- 3 Send the ##CN command from the PC to connect with the transceiver.
- 4 When a connection response comes from the transceiver, send the ##ID command to transmit your user ID and password.
- 5 If the transmitted ID and password are authenticated with those set up in the transceiver, the connection is completed.

Note: If there are no communications for 10 seconds, the TCP/IP connection with the transceiver is terminated.

COM/ USB-B (VIRTUAL COM) CONNECTOR

Entry	Specifications
Protocol	UART (RS-232C)
Baud Rate	Selectable from 4800*/ 9600/ 19200/ 38400/ 57600/ 115200 bps
Start Bit	1
Data Bit	8
Stop Bit	1 (2 is available only when using 4800 bps)
Parity Bit	None
Flow Control	Hardware flow control is possible

*: 4800 bps cannot be used with the USB-B connector.

LAN CONNECTOR

Entry	Specifications
Protocol	TCP/IP
Character Encoding Mode	UTF-16

CHARACTER CODING

Character coding is based on the ASCII code. However, the letters assigned to 80h ~ FFh are replaced as follows by Menu 9-01 (Keyboard Language):

Menu 9-01 Setting	Character Coding
Japanese	ISO-2022-JP
Other than Japanese	ISO-8859-1

AI (AUTO INFORMATION) FUNCTION

The AI (Auto Information) function automatically outputs contents of commands whenever various states of the transceiver changes.

For example, the frequency information of the main band is automatically output to the PC with the FA command when you change the operating frequency of the main band. It is not necessary to first send a read command from the PC. Besides the frequency of the main band, almost all changes of state of the transceiver are automatically output with each command.

Using this function, you can see the state of the transceiver on a PC in real time. This is useful when making an application using log management software.

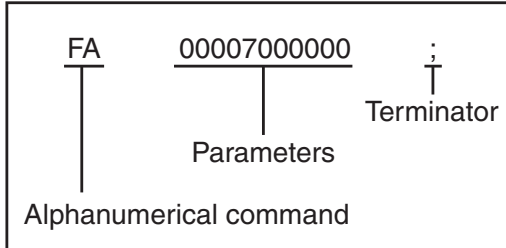
Turn this function on using the AI command (the initial state is OFF).

PC CONTROL COMMANDS

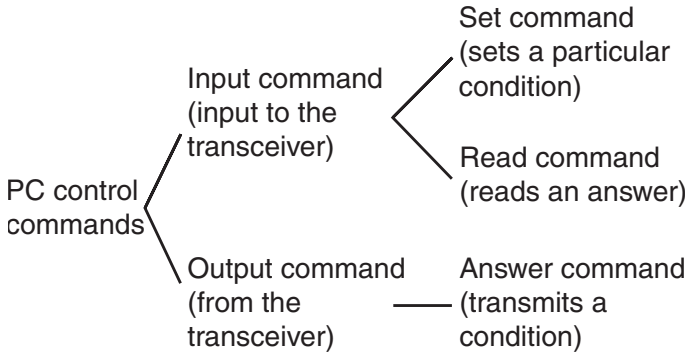
Note: PC control commands will not be available when “MSQ/ PKS Pin Assignment (COM Connector)” from the Advanced Menu is set to “On”.

A computer control command is composed of a 2 to 5-letter alphabetical command-name, a set of parameters, and the terminator that signals the end of the command.

Example: Command to set the Main Band VFO to 7 MHz



Commands can be classified as shown below:



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

- To set the frequency to 7 MHz, the following command is sent from the computer to the transceiver:
“FA00007000000;” **(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:
“FA00007000000;” **(Answer command)**

■ **Command**

A command consists of 2 to 5 alphanumeric characters. You may use either lower or upper case characters. The commands available for this transceiver are listed in the PC Control Command Tables, beginning on page 3.

■ **Parameters**

Parameters are used to specify information necessary to implement the desired command. The parameters to be used for each command are predetermined. The number of digits assigned to each parameter is also predetermined. Refer to the PC Control Command Tables {page 3} to configure the appropriate parameters.

■ **Terminator**

To signal the end of a command, it is necessary to use a semicolon (;). The digit where this special character must appear differs depending on the command used.

■ **Error Messages**

In addition to the Answer command, the transceiver can send the error messages listed below.

Error Message	Reason for Error
?;	<ul style="list-style-type: none"> Command syntax was incorrect. Command was not executed due to the current status of the transceiver (even though the command syntax was correct). <p>Note: Occasionally, this message may not appear due to microprocessor transients in the transceiver.</p>
E;	A communication error occurred, such as an overrun or framing error during a serial data transmission.
O;	A receive buffer overrun error occurred.

PC CONTROL COMMAND REFERENCE GUIDE

PC CONTROL COMMAND TABLES

AC		Antenna Tuner										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: RX-AT THRU 1: RX-AT IN ◆ This parameter is invalid during the Setting command. Always enter 1.) P2 0: TX-AT THRU 1: TX-AT IN P3 0: Stop Tuning/ Tuning is inactive 1: Start Tuning/ Tuning is active • The RX AT circuit sets, use the EX command. • To begin tuning, use command "AC111;".
		A	C	P1	P2	P3	;					
Read		1	2	3	4	5	6	7	8	9	10	
		A	C	;								
Answer		1	2	3	4	5	6	7	8	9	10	
		A	C	P1	P2	P3	;					

AG		AF Control										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 000 ~ 255
		A	G	P1	P2	P2	P2	;				
Read		1	2	3	4	5	6	7	8	9	10	
		A	G	P1	;							
Answer		1	2	3	4	5	6	7	8	9	10	
		A	G	P1	P2	P2	P2	;				

AI		Auto Information										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: AI OFF 1: Not used 2: AI ON (Not back up the ON state) 3: Not used 4: AI ON (Back up the ON state) • When AI is ON, the respective response command is sent when the parameter is changed by the command with the response command. • When AI function is ON by setting P1 parameter to 2 and the transceiver is turned to OFF, AI function is also turned to OFF. • The backup state is initialized (AI OFF) by full reset, standard reset, or VFO reset. • The AI function can be set separately for USB connector, COM connector, or LAN connector. • Parameter 4 is supported from firmware version 1.20.
		A	I	P1	;							
Read		1	2	3	4	5	6	7	8	9	10	
		A	I	;								
Answer		1	2	3	4	5	6	7	8	9	10	
		A	I	P1	;							

AM		Auto Mode										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: AM OFF 1: AM ON
		A	M	P1	;							
Read		1	2	3	4	5	6	7	8	9	10	
		A	M	;								
Answer		1	2	3	4	5	6	7	8	9	10	
		A	M	P1	;							

PC CONTROL COMMAND REFERENCE GUIDE

ANO	Antenna Selection										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 1: ANT1 2: ANT2 3: ANT3 4: ANT4 9: No change (setting command only) P3 0: RX ANT is not used 1: RX ANT is used 9: No change (setting command only) P4 0: Drive Out OFF 1: Drive Out ON 9: No change (setting command only)
	A	N	0	P1	P2	P3	P4	;			
Read	1	2	3	4	5	6	7	8	9	10	• When setting the command, enter only the parameters you are changing. For parameters you are not changing, enter "9". • For a response command, parameter P2, P3, and P4 cannot be "g".
	A	N	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	A	N	0	P1	P2	P3	P4	;			

AN1	Antenna Name										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 4: Antenna Number P2 Always a space P3 String of alphanumeric characters for the Antenna Name (up to 5 characters)
	A	N	1	P1	P2	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20	
Read	1	2	3	4	5	6	7	8	9	10	
	A	N	1	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	A	N	1	P1	P2	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20	
	;										

APO	Audio Peak Filter										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 1: APF OFF 2: APF ON
	A	P	0	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10	
	A	P	0	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	A	P	0	P1	P2	;					

AP1	Audio Peak Filter Shift										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 00 ~ 80 99: Initial value setting (center) (setting command only) ◆ 40 is the center (CW pitch frequency). ◆ 00 represents a -200 Hz shift from center. ◆ 80 represents a +200 Hz shift from center. ◆ Each step represents a 5 Hz shift.
	A	P	1	P1	P2	P2	;				
Read	1	2	3	4	5	6	7	8	9	10	
	A	P	1	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	A	P	1	P1	P2	P2	;				

PC CONTROL COMMAND REFERENCE GUIDE

AP2		Audio Peak Filter Pass Bandwidth										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	A	P	2	P1	P2	;						
Read		1	2	3	4	5	6	7	8	9	10	P2 0: NAR 1: MID 2: WIDE 9: Initial value setting (setting command only)
	A	P	2	P1	;							
Answer		1	2	3	4	5	6	7	8	9	10	
	A	P	2	P1	P2	;						

AS0		Auto Mode Frequency Division Registration										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 11-digit Frequency in Hz (unused digits must be 0) P2 (Mode (refer to the P2 parameter of the OM command)) • You can set a maximum of 32 divisions.
	A	S	0	P1	P1	P1	P1	P1	P1	P1	P1	
		11	12	13	14	15	16	17	18	19	20	
	P1	P1	P1	P1	P2	;						

AS1		Number of Auto Mode Frequency Divisions										Parameters:
Read		1	2	3	4	5	6	7	8	9	10	P1 00 ~ 32
	A	S	1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	A	S	1	P1	P1	;						

AS2		Auto Mode Frequency Division Readout										Parameters:
Read		1	2	3	4	5	6	7	8	9	10	P1 00 ~ 31: Frequency division number P2 11 digit displayed frequency (for example, 14.175 MHz is displayed as 00014175000) P3 (Mode (refer to the P2 parameter of the OM command))
	A	S	2	P1	P1	;						
Answer		1	2	3	4	5	6	7	8	9	10	• If the selected frequency division has no information, P2 and P3 are all set to "0". • While the Auto Information (AI) function is ON, this command will not automatically respond.
	A	S	2	P1	P1	P2	P2	P2	P2	P2	P2	
		11	12	13	14	15	16	17	18	19	20	
	P2	P2	P1	P2	P2	P2	P3	;				

AS3		Deleting an Auto Mode Frequency Division										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 00 ~ 31: Frequency division number to be deleted
	A	S	3	P1	P1	;						
• If there is only 1 frequency division available, it cannot be deleted.												

BC		Beat Cancel										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	B	C	P1	P2	;							
Read		1	2	3	4	5	6	7	8	9	10	P2 0: Beat Cancel OFF 1: Beat Cancel 1 ON 2: Beat Cancel 2 ON
	B	C	P1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	B	C	P1	P2	;							

PC CONTROL COMMAND REFERENCE GUIDE

BD / BU	Frequency Band Selection (Setting 1) / [UP]/[DOWN] Operating (Setting 2)										Parameters:
Set 1	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band ◆ This parameter is invalid during the Setting command; the operating band is always selected. Enter any value. P2 (Band Number) 00: 1.8 MHz band 01: 3.5 MHz band 02: 7 MHz band 03: 10 MHz band 04: 14 MHz band 05: 18 MHz band 06: 21 MHz band 07: 24 MHz band 08: 28 MHz band 09: 50 MHz band 10: GEN1 11: GEN2 P3 1 ~ 5: Band memory number ◆ 0 is returned when the frequency range does not support the band memory.) • When changing the band memory of the same frequency band, appoint the same band direct number for the setting 1 command. • Using BU; as the setting 2 command performs the same operation as pressing [UP], and using BD; as the setting 2 command performs the same operation as pressing [DOWN]. • When the AI function automatically responds, the BU; command responds.
	B	D/U	P1	P2	P2	;					
Set 2	1	2	3	4	5	6	7	8	9	10	
	B	D/U	;								
Read	1	2	3	4	5	6	7	8	9	10	
	B	D/U	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	D/U	P1	P3	;						

BI	Break-in										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Break-in Off 1: Semi Break-in 2: Full Break-in • Settings can only be performed in CW mode. • "0" is returned when reading in any mode other than CW mode.
	B	I	P1	;							
Read	1	2	3	4	5	6	7	8	9	10	
	B	I	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	B	I	P1	;							

BP	Notch Control										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 000 (minimum) ~ 127 (maximum) ◆ Turning the NOTCH control fully to the left selects 000 and turning it fully to the right selects 127. • When manual notch function is ON, the NOTCH control reflects the notch frequency. When the band eliminator function is ON, the NOTCH control reflects the center frequency of the eliminated band.
	B	P	P1	P2	P2	P2	;				
Read	1	2	3	4	5	6	7	8	9	10	
	B	P	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	B	P	P1	P2	P2	P2	;				

BSO	Scope Image ON/OFF										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Scope Display OFF 1: Scope Display ON • In some cases, the scope display may be temporarily displaying a different screen. However, the response does not change, even in that case.
	B	S	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	0	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

BS1	Scope Image Type										Parameters: P1
	Set	1	2	3	4	5	6	7	8	9	
	B	S	1	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	1	P1	;						

BS2	Bandscope Object										Parameters: P1
	Set	1	2	3	4	5	6	7	8	9	
	B	S	2	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	2	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	2	P1	;						

BS3	Bandscope Operation Mode										Parameters: P1
	Set	1	2	3	4	5	6	7	8	9	
	B	S	3	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	3	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	3	P1	;						

BS4	Bandscope Span (Center Mode)										Parameters: P1 <Firmware version 1.20 or later> P1 <Firmware version 1.13 or lower>
	Set	1	2	3	4	5	6	7	8	9	
	B	S	4	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	4	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	4	P1	;						

BS5	Bandscope Lower/Upper Frequency Limit (Fixed Mode)										Parameters: P1 (Lower Limit Frequency) P2 (Upper Limit Frequency)
	Read	1	2	3	4	5	6	7	8	9	
	B	S	5	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	5	P1	P1	P1	P1	P1	P1	P1	
	11	12	13	14	15	16	17	18	19	20	
	P1	P2	P2	P2	P2	P2	P2	P2	P2	;	

PC CONTROL COMMAND REFERENCE GUIDE

BS6		Bandscope Display Pause									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Pause OFF 1: Pause ON
	B	S	6	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	6	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	6	P1	;						

BS7		Bandscope Marker									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Scope object receive frequency only 1: Scope object receive frequency and non-scope object receive frequency 2: Scope object receive and transmit frequency 3: Scope object receive frequency and non-scope object receive and transmit frequency
	B	S	7	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	7	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	7	P1	;						

BS8		Bandscope Attenuator									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: 10 dB 2: 20 dB 3: 30 dB
	B	S	8	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	8	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	8	P1	;						

BS9		Bandscope Max Hold									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: ON
	B	S	9	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	9	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	9	P1	;						

BSA		Bandscope Display Averaging									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: Level 1 2: Level 2 3: Level 3
	B	S	A	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	A	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	A	P1	;						

BSB		Bandscope With Waterfall Display Speed									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 3
	B	S	B	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	B	S	B	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	B	S	B	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

BSC	Bandscope Reference Display Level										Parameters: P1 <Firmware version 1.20 or later> 000 ~ 060 ◆000 represents -20 dB, 040 represents 0 dB, and 060 represents +10 dB. Each step represents 0.5 dB.) P1 <Firmware version 1.13 or lower> 000 ~ 080 ◆ 000 represents -20 dB, 040 represents 0 dB, and 080 represents +20 dB. Each step represents 0.5 dB.)	
	Set	1	2	3	4	5	6	7	8	9		10
		B	S	C	P1	P1	P1	;				
	Read	1	2	3	4	5	6	7	8	9		10
B		S	C	;								
Answer	1	2	3	4	5	6	7	8	9	10		
	B	S	C	P1	P1	P1	;					

BSD	Bandscope Waterfall Display Clear										Parameters: No parameters are used with this command. • When the AI function is ON, the waterfall display clear timing is returned as a response.	
	Set	1	2	3	4	5	6	7	8	9		10
		B	S	D	;							
Answer	1	2	3	4	5	6	7	8	9	10		
	B	S	D	;								

BSE	Bandscope Range Shift (Marker is moved to the center zone with Fixed mode)										Parameters: No parameters are used with this command. • Only valid during FIX mode.
	Set	1	2	3	4	5	6	7	8	9	
	B	S	E	;							

BSF	Audio Scope Sound Generator Selection										Parameters: P1 0: Main Band Reception Sound 1: Sub Band Reception Sound	
	Set	1	2	3	4	5	6	7	8	9		10
		B	S	F	P1	;						
	Read	1	2	3	4	5	6	7	8	9		10
B		S	F	;								
Answer	1	2	3	4	5	6	7	8	9	10		
	B	S	F	P1	;							

BSG	Audio Scope Attenuator										Parameters: P1 0: 0 dB 1: 10 dB 2: 20 dB 3: 30 dB	
	Set	1	2	3	4	5	6	7	8	9		10
		B	S	G	P1	;						
	Read	1	2	3	4	5	6	7	8	9		10
B		S	G	;								
Answer	1	2	3	4	5	6	7	8	9	10		
	B	S	G	P1	;							

BSH	Audio Scope Span (Audio Scope)										Parameters: P1 0: 3 kHz 1: 8 kHz	
	Set	1	2	3	4	5	6	7	8	9		10
		B	S	H	P1	;						
	Read	1	2	3	4	5	6	7	8	9		10
B		S	H	;								
Answer	1	2	3	4	5	6	7	8	9	10		
	B	S	H	P1	;							

PC CONTROL COMMAND REFERENCE GUIDE

BSI	Oscilloscope Level										Parameters: P1 0: 0 dB 1: -10 dB 2: -20 dB 3: -30 dB
	1	2	3	4	5	6	7	8	9	10	
Set	B	S	I	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
Answer	B	S	I	P1	;						

BSJ	Oscilloscope Sweep Time										Parameters: P1 0: 1 ms 1: 3 ms 2: 10 ms 3: 30 ms 4: 100 ms 5: 300 ms
	1	2	3	4	5	6	7	8	9	10	
Set	B	S	J	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
Answer	B	S	J	P1	;						

BY	BUSY LED Status										Parameters: P1 (Main Band) 0: BUSY LED Off 1: BUSY LED lit P2 (Sub Band) 0: BUSY LED Off 1: BUSY LED lit
	1	2	3	4	5	6	7	8	9	10	
Read	B	Y	;								
Answer	B	Y	P1	P2	;						

CA	CW Auto Tune										Parameters: P1 0: Main Band 1: Sub Band P2 0: Pauses CW Auto Tune/ Inactive 1: Starts CW Auto Tune/ Active
	1	2	3	4	5	6	7	8	9	10	
Set	C	A	P1	P2	;						
Read	1	2	3	4	5	6	7	8	9	10	
Answer	C	A	P1	P2	;						

CB	Operating Band										Parameters: P1 0: Main Band 1: Sub Band
	1	2	3	4	5	6	7	8	9	10	
Set	C	B	P1	;							
Read	1	2	3	4	5	6	7	8	9	10	
Answer	C	B	P1	;							

CDO	CW Communication Screen Display										Parameters: P1 0: CW Communication screen display OFF 1: CW Communication screen display ON • Supported from the firmware version 1.20.
	1	2	3	4	5	6	7	8	9	10	
Set	C	D	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
Answer	C	D	0	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

CD1	CW Morse Decoding Threshold Level										<u>Parameters:</u> P1 001 ~ 030 ◆ 001 or less value of P1 parameter is rectified by 001, and 030 or more value is rectified by 030. • Supported from the firmware version 1.20.
	Set	1	2	3	4	5	6	7	8	9	
	C	D	1	P1	P1	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	
	C	D	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	D	1	P1	P1	P1	;				

CD2	Decoded CW Morse Character Output										<u>Parameters:</u> P1 Decoded character (usually 1 character, abbreviation is 2 characters) • When AI is ON, the character decoded by the Morse code decoder is output. • Supported from the firmware version 1.20.
	Answer	1	2	3	4	5	6	7	8	9	
	C	D	2	P1	P1	;					

CD3	CW Communication Screen (Decode Filter)										<u>Parameters:</u> P1 0: OFF 1: Normal 2: Narrow • Supported from the firmware version 1.20.
	Set	1	2	3	4	5	6	7	8	9	
	C	D	3	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	D	3	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	D	3	P1	;						

CD4	CW Communication Screen (Quick Mode)										<u>Parameters:</u> P1 0: Quick Mode OFF 1: Quick Mode ON • Supported from the firmware version 1.20.
	Set	1	2	3	4	5	6	7	8	9	
	C	D	4	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	D	4	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	D	4	P1	;						

CD5	CW Decode										<u>Parameters:</u> P1 0: CW Decode OFF 1: CW Decode ON • The CD5 command is same as the operation of F5 [DEC OFF] or F5 [DEC ON] on the CW communication screen. • Supported from the firmware version 1.20.
	Set	1	2	3	4	5	6	7	8	9	
	C	D	5	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	D	5	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	D	5	P1	;						

CG	CAR Control										<u>Parameters:</u> P1 000 (minimum) ~ 255 (maximum)
	Set	1	2	3	4	5	6	7	8	9	
	C	G	P1	P1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	
	C	G	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	C	G	P1	P1	P1	;					

PC CONTROL COMMAND REFERENCE GUIDE

CH	MULTI/CH Control										Parameters: P1 0: Move the MULTI/CH control up for 1 step 1: Move the MULTI/CH control down for 1 step
	Set	1	2	3	4	5	6	7	8	9	
	C	H	P1	;							

CK0	Clock (Local Clock Date and Time)										Parameters: P1 12 ~ 99: Year P2 01 ~ 12: Month P3 01 ~ 31: Day P4 00 ~ 23: Hour P5 00 ~ 59: Minute ◆ You cannot use this command to perform the setting while the automatic retrieval setting by the NTP is ON.
	Set	1	2	3	4	5	6	7	8	9	
	C	K	0	P1	P1	P2	P2	P3	P3	P4	
	11	12	13	14	15	16	17	18	19	20	
	P4	P5	P5	;							
Read	1	2	3	4	5	6	7	8	9	10	
	C	K	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	0	P1	P1	P2	P2	P3	P3	P4	
	11	12	13	14	15	16	17	18	19	20	
	P4	P5	P5	;							

CK1	Clock (Setting Situation of the Local Clock Date and Time)										Parameters: P1 0: Not set 1: Set
	Read	1	2	3	4	5	6	7	8	9	
	C	K	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	1	P1	;						

CK2	Clock (Local Clock Time Zone)										Parameters: P1 000 ~ 112 ◆ Each step represents 15 minutes, where 000 is -14:00, 056 is +00:00 and 112 is +14:00
	Set	1	2	3	4	5	6	7	8	9	
	C	K	2	P1	P1	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	
	C	K	2	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	2	P1	P1	P1	;				

CK3	Clock (Time Zone of 2nd Clock)										Parameters: P1 000 ~ 112 ◆ Each step represents 15 minutes, where 000 is -14:00, 056 is +00:00 and 112 is +14:00
	Set	1	2	3	4	5	6	7	8	9	
	C	K	3	P1	P1	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	
	C	K	3	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	3	P1	P1	P1	;				

CK4	Clock (Identification Character of 2nd Clock)										Parameters: P1 1 character
	Set	1	2	3	4	5	6	7	8	9	
	C	K	4	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	K	4	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	4	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

CK5		Clock (Date Format)									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: MM/DD/YY 1: DD/MM/YY 2: YY/MM/DD
	C	K	5	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	K	5	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	5	P1	;						

CK6		Clock (Automatic Date/Time Retrieval)									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: ON ◆ You must first set up an NTP server address in order to turn this function ON.)
	C	K	6	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	K	6	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	C	K	6	P1	;						

CK7		Clock (NTP Server Address)									Parameters:
Set	1	2	3	4	5 - 55	56	57	58	59	P1 Always a space P2 NTP Server Address (up to 50 characters) ◆ When the configuration command is sent with P2 being blank, the configuration contents of the NTP server address are deleted and the automatic date/time retrieval is automatically turned OFF.)	
	C	K	7	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9		10
	C	K	7	;							
Answer	1	2	3	4	5 - 55	56	57	58	59		
	C	K	7	P1	P2	;					

CK8		Clock									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	No parameters are used with this command. • The clock is acquisitioned from the NTP server.
	C	K	8	;							

CM0		Registration of CW Message (Paddle Input)									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Non-operational/ Operation ended • End of standby 1: Storing CH1/ Standby 2: Storing CH2/ Standby 3: Storing CH3/ Standby 4: Storing CH4/ Standby 5: Storing CH5/ Standby 6: Storing CH6/ Standby 7: Storing CH7/ Standby 8: Storing CH8/ Standby P2 000 ~ 100: Progress (%) ◆ While waiting for registration, P2 is 000. • During not operation, the first response is output. While registering or during standby, the second response is output. • When the "CW Message Entry" menu is set to "Text String", you cannot use this command.
	C	M	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	M	0	;							
Answer 1	1	2	3	4	5	6	7	8	9	10	
	C	M	0	0	;						
Answer 2	1	2	3	4	5	6	7	8	9	10	
	C	M	0	P1	P2	P2	P2	;			

PC CONTROL COMMAND REFERENCE GUIDE

CM1		Play/Stop the CW Message										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Non-operational/ Stop Playback 1: Playing/Start CH1 2: Playing/Start CH2 3: Playing/Start CH3 4: Playing/Start CH4 5: Playing/Start CH5 6: Playing/Start CH6 7: Playing/Start CH7 8: Playing/Start CH8 P2 (Repeat Playback) 0: Non-operational/ During Playback 1: Awaiting Repeat Playback (Repeat interval count)
	C	M	1	P1	;							
Read		1	2	3	4	5	6	7	8	9	10	P1 0: Non-operational/ Stop Playback 1: Playing/Start CH1 2: Playing/Start CH2 3: Playing/Start CH3 4: Playing/Start CH4 5: Playing/Start CH5 6: Playing/Start CH6 7: Playing/Start CH7 8: Playing/Start CH8 P2 (Repeat Playback) 0: Non-operational/ During Playback 1: Awaiting Repeat Playback (Repeat interval count)
	C	M	1	;								
Answer		1	2	3	4	5	6	7	8	9	10	P1 0: Non-operational/ Stop Playback 1: Playing/Start CH1 2: Playing/Start CH2 3: Playing/Start CH3 4: Playing/Start CH4 5: Playing/Start CH5 6: Playing/Start CH6 7: Playing/Start CH7 8: Playing/Start CH8 P2 (Repeat Playback) 0: Non-operational/ During Playback 1: Awaiting Repeat Playback (Repeat interval count)
	C	M	1	P1	P2	;						

CM2		Register Status of CW Message (Paddle Input)										Parameters:
Read		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 0: Not Stored 1: Stored
	C	M	2	P1	;							
Answer		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 0: Not Stored 1: Stored
	C	M	2	P1	P2	;						

- When the "CW Message Entry" menu is set to "Text String", you cannot use this command.

CM3		Clear the CW Message (Paddle Input)										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel
	C	M	3	P1	;							

- When the AI function is ON, the CM2 command will notify you when an entry is deleted.
- When the "CW Message Entry" menu is set to "Text String", you cannot use this command.

CM4		CW Message Memory Name (Paddle Input)										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 Always a space P3 Name (up to 20 characters)
	C	M	4	P1	P2	P3	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20		
	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	
	21	22	23	24	25	26	27	28	29	30		
	P3	P3	P3	P3	P3	;						
Read		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 Always a space P3 Name (up to 20 characters)
	C	M	4	P1	;							
Answer		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 Always a space P3 Name (up to 20 characters)
	C	M	4	P1	P2	P3	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20		
	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	P3	
	21	22	23	24	25	26	27	28	29	30		
	P3	P3	P3	P3	P3	;						

- When the "CW Message Entry" menu is set to "Text String", you cannot use this command.

CM5		Registering the CW Message Memory (Text Input)										Parameters:
Set		1	2	3	4	5	6 ~ 55	56	57	58	P1 1 ~ 8: CW Message Channel P2 Always a space P3 Message (up to 50 characters)	
	C	M	5	P1	P2	P3	;					
Read		1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 Always a space P3 Message (up to 50 characters)
	C	M	5	P1	;							
Answer		1	2	3	4	5	6 ~ 55	56	57	58	P1 1 ~ 8: CW Message Channel P2 Always a space P3 Message (up to 50 characters)	
	C	M	5	P1	P2	P3	;					

- When the "CW Message Entry" menu is set to "Paddle", you cannot use this command.

PC CONTROL COMMAND REFERENCE GUIDE

CM6		CW Message Channel Repeat									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: CW Message Channel P2 0: Repeat OFF 1: Repeat ON • This setting cannot be configured for channels that have not been registered.
	C	M	6	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10	
	C	M	6	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	C	M	6	P1	P2	;					

CM7		Contest Number									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Decrementing Numbers P2 0000 ~ 9999: Contest Number
	C	M	7	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	C	M	7	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	C	M	7	P2	P2	P2	P2	;			

CN		CTCSS frequency									Parameters:																																																																																																															
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 (CTCSS frequency)																																																																																																															
	C	N	P1	P2	P2	;																																																																																																																				
Read	1	2	3	4	5	6	7	8	9	10																																																																																																																
	C	N	;																																																																																																																							
Answer	1	2	3	4	5	6	7	8	9	10																																																																																																																
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<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>P2</th><th>Freq. (Hz)</th><th>P2</th><th>Freq. (Hz)</th><th>P2</th><th>Freq. (Hz)</th><th>P2</th><th>Freq. (Hz)</th></tr> </thead> <tbody> <tr><td>00</td><td>67.0</td><td>13</td><td>103.5</td><td>26</td><td>159.8</td><td>39</td><td>199.5</td></tr> <tr><td>01</td><td>69.3</td><td>14</td><td>107.2</td><td>27</td><td>162.2</td><td>40</td><td>203.5</td></tr> <tr><td>02</td><td>71.9</td><td>15</td><td>110.9</td><td>28</td><td>165.5</td><td>41</td><td>206.5</td></tr> <tr><td>03</td><td>74.4</td><td>16</td><td>114.8</td><td>29</td><td>167.9</td><td>42</td><td>210.7</td></tr> <tr><td>04</td><td>77.0</td><td>17</td><td>118.8</td><td>30</td><td>171.3</td><td>43</td><td>218.1</td></tr> <tr><td>05</td><td>79.7</td><td>18</td><td>123.0</td><td>31</td><td>173.8</td><td>44</td><td>225.7</td></tr> <tr><td>06</td><td>82.5</td><td>19</td><td>127.3</td><td>32</td><td>177.3</td><td>45</td><td>229.1</td></tr> <tr><td>07</td><td>85.4</td><td>20</td><td>131.8</td><td>33</td><td>179.9</td><td>46</td><td>233.6</td></tr> <tr><td>08</td><td>88.5</td><td>21</td><td>136.5</td><td>34</td><td>183.5</td><td>47</td><td>241.8</td></tr> <tr><td>09</td><td>91.5</td><td>22</td><td>141.3</td><td>35</td><td>186.2</td><td>48</td><td>250.3</td></tr> <tr><td>10</td><td>94.8</td><td>23</td><td>146.2</td><td>36</td><td>189.9</td><td>49</td><td>254.1</td></tr> <tr><td>11</td><td>97.4</td><td>24</td><td>151.4</td><td>37</td><td>192.8</td><td></td><td></td></tr> <tr><td>12</td><td>100.0</td><td>25</td><td>156.7</td><td>38</td><td>196.6</td><td>99</td><td>to default</td></tr> </tbody> </table>											P2	Freq. (Hz)	P2	Freq. (Hz)	P2	Freq. (Hz)	P2	Freq. (Hz)	00	67.0	13	103.5	26	159.8	39	199.5	01	69.3	14	107.2	27	162.2	40	203.5	02	71.9	15	110.9	28	165.5	41	206.5	03	74.4	16	114.8	29	167.9	42	210.7	04	77.0	17	118.8	30	171.3	43	218.1	05	79.7	18	123.0	31	173.8	44	225.7	06	82.5	19	127.3	32	177.3	45	229.1	07	85.4	20	131.8	33	179.9	46	233.6	08	88.5	21	136.5	34	183.5	47	241.8	09	91.5	22	141.3	35	186.2	48	250.3	10	94.8	23	146.2	36	189.9	49	254.1	11	97.4	24	151.4	37	192.8			12	100.0	25	156.7	38	196.6	99	to default
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◆ Entering a value that does not exist is invalid. 99 is a setting command only.																																																																																																																										

DD0		Scope Display Data Output Control (Bandscope Display Information Setting)									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: No Output 1: High-Speed Output (for LAN connection) 2: Low-Speed Output (for COM connection) ◆ High-speed output and low-speed output cannot be used simultaneously.
	D	D	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	D	D	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	D	D	0	P1	;						

DD1		Scope Display Data Output Control (Sub-Scope Display Information Setting)									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: No Output 1: High-Speed Output (for LAN connection) 2: Low-Speed Output (for COM connection) ◆ High-speed output and low-speed output cannot be used simultaneously.
	D	D	1	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	D	D	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	D	D	1	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

DD2	Display Data Output Control (Bandscope Display Information)									Parameters:
Answer	1	2	3	4	5	6 ~ 45	46	47	48	P1 00 ~ 31: Split Number P2 Bandscope Spectrum Display Information (40 digits) 20 spectrum information are each expressed as 2 ASCII digits. Two digits of the beginning of division No. 00 are spectrum information of the left side, and two digits of the end of division No. 31 become the spectrum information of the right side. The range of value for each spectrum information is from 00h ~ 8Ch (hexadecimal numbering). 00h shows the state where the spectrum is extended to the top (signal strength = 0 dB) and 8Ch shows a state where the spectrum is not displayed (signal strength = -100 dB). The respective spectrum information is converted to ASCII code of the hexadecimal number of from the upper byte digits. For 8Ch, the order becomes "8", "C".
	D	D	2	P1	P1	P2	;			
										<ul style="list-style-type: none"> • When the AI functions sets the speed as low when using the DD0 command, it is output from division No. 00 to 31, sequentially. • When the transceiver is not displaying the bandscope, it is not output. • This command operates only at a baud rate of 115200 bps. • It is possible to perform high-speed control using the ##DD2 command exclusively for a LAN.

DD3	Display Data Output Control (Subscope Display Information)									Parameters:
Answer	1	2	3	4	5	6 ~ 44	45	46	47	P1 00 ~ 14: Split Number P2 Subscope Spectrum Display Information (38 digits) 19 spectrum information are each expressed as 2 ASCII digits. Two digits of the beginning of division No. 00 are spectrum information of the left side, and two digits of the end of division No. 14 become the spectrum information of the right side. The range of value for each spectrum information is from 00h ~ 32h (hexadecimal numbering). 00h shows the state where the spectrum is extended to the top (signal strength = 0 dB) and 32h shows a state where the spectrum is not displayed (signal strength = -50 dB). The respective spectrum information is converted to ASCII code of the hexadecimal number of from the upper byte digits. For 32h, the order becomes "3", "2".
	D	D	3	P1	P1	P2	;			
										<ul style="list-style-type: none"> • When the AI functions sets the speed as low when using the DD1 command, it is output from division No. 00 to 14, sequentially. • When the transceiver is not displaying the subscope, it is not output. • This command operates only at a baud rate of 115200 bps. • It is possible to perform high-speed control using the ##DD3 command exclusively for a LAN.

DF	Δ F Display										Parameters:
Read	1	2	3	4	5	6	7	8	9	10	P1 0: No Δ F Display Information 1: Δ F Display Information (during split mode or split frequency operation)
	D	F	;								
Answer	1	2	3	4	5	6	7	8	9	10	P2 0: Plus 1: Minus ◆ When P1 is 0, P2 also becomes 0. P3 11 digit frequency in Hz (enter unused digits as 0) ◆ When P1 is set to 0, all digits are returned as 0.
	D	F	P1	P2	P3	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20	
	P3	P3	P3	P3	P3	P3	P3	;			

DMO	Dimmer										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 4: Dimmer Preset Number
	D	M	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	D	M	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	D	M	0	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

DM1		Dimmer Adjustment									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 4: Dimmer Preset Number
	D	M	1	P1	P2	P3	P3	P3	;		
Read	1	2	3	4	5	6	7	8	9	10	P2 0: Main Display 1: Sub Display 2: LED
	D	M	1	P1	P2	;					
Answer	1	2	3	4	5	6	7	8	9	10	P3 005 ~ 100: Dimmer Adjustment Value (In steps of 5. Values that are not in steps of 5 are rounded down.) ◆ Entering a value of 999 results in the initial value being entered.
	D	M	1	P1	P2	P3	P3	P3	;		
<ul style="list-style-type: none"> • Dimmer adjusted value 000 (back light off) for the Main and Sub screen is supported by dimmer preset number 4 only. (The value 000 is supported from the firmware version 1.08.) 											

DN / UP		Microphone DWN/UP Switch Operation									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 00 ~ 99: Step Count
	D/U	N/P	P1	P1	;						
<ul style="list-style-type: none"> • If the parameter is skipped, the “DN;” and “UP;” commands will adjust by 1 step. • When setting the parameter from 00 to 99, the frequency is adjusted by the specified step size. • In Memory mode and Quick Memory mode, the command with no P1 parameter specified is treated as a Memory channel down (DN;) or up (UP;) command. With parameters, it is treated as the frequency down or up command. • When setting the parameter to 00, the command is accepted, but no changes occur. 											

DP		Sub-Display									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Single Frequency Display (enlargement OFF, dial display) 1: Single Frequency Display (enlargement ON, no dial display) 2: Dual Frequency Display (enlargement OFF, sub-scope) 3: Dual Frequency Display (enlargement OFF, no sub-scope) 4: X-Y Scope (only during RTTY communication screen display) 5: Vector scope (only during PSK communication screen display)
	D	P	P1	;							
Read	1	2	3	4	5	6	7	8	9	10	
	D	P	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	D	P	P1	;							

DS0		Screen Display State (Basic Screen)									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Standard 1: SWL Display Mode
	D	S	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	D	S	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	D	S	0	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

DS1	Screen Display State (Function Configuration Screen)										Parameters:
Read	1	2	3	4	5	6	7	8	9	10	P1 000: No Setting Screen 001 ~ 002: Unused 003: Antenna Name Setting Screen 004: Preselector Setting Screen 005: AGC Setting Screen 006: Transmission Voice Input Sound Source Setting Screen 007: Transmission Output Limit Setting Screen 008: VOX Level Setting Screen 009: Speech Processor Effect Type Setting Screen 010: Transmission Filter Setting Screen 011 ~ 014: CW Message Screen 015: RTTY Communication Screen (Normal) 016 ~ 017: RTTY Message Screen 018: PSK Communication Screen (Normal) 019 ~ 020: PSK Message Screen 021: FM Tone Setting Screen 022: Reception Filter Setting Screen 023: Audio System Peak Filter Setting Screen 024: NB1 Level (Sub) Setting Screen 025: NB2 Level (Sub) Setting Screen 026: Auto Notch Tracking Speed Setting Screen 027: Band Eliminator Filter Setting Screen 028: NR1 Level (Sub) Setting Screen 029: NR2 Level (Sub) Setting Screen 030: Memory Channel Screen (Normal) 031: Program Scan Section Setting Screen 032: Program Slow Scan Point Setting Screen 033: Memory Scan Group Setting Screen 034: Voice Message Screen 035 ~ 037: Recording File Screen 038: Timer Setting Screen 039: Program Timer Setting Screen 040: Dimmer Setting Screen 041: NB2 (Main) Setting Screen 042 ~ 043: CW Communication Screen (Normal) 044 ~ 127: Unused 128: Reception Equalizer Screen 129: Reception Equalizer Adjustment Screen 130: Transmission Equalizer Screen 131: Transmission Equalizer Adjustment Screen 132: RTTY Communication Screen (Enlarged) 133: PSK Communication Screen (Enlarged) 134: Memory Channel List Screen (Enlarged) 135 ~ 159: Menu-Related Screen 160 ~ 163: File Selection Screen 164: CW Communication Screen(Enlarged)
	D	S	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	• Various operations via commands may be limited, such as the panel operation of the main body, due to the state of the function setting screen. • "041" is supported from the firmware version 1.10. • "042 ~ 043" and "164" are supported from the firmware version 1.20.
	D	S	1	P1	P1	P1	;				

DS2	Screen Display State (Other)										Parameters:
Read	1	2	3	4	5	6	7	8	9	10	P1 0: Various edit screen display OFF 1: Frequency is being entered 2: Frequency entry log is being displayed 3: Channel number is being entered 4: Character string is being edited 5: Memory Channel is being registered
	D	S	2	;							
Answer	1	2	3	4	5	6	7	8	9	10	• During various character string editing, various operations by the command may be limited, such as panel operation of the transceiver during frequency entry, channel number entry, and memory channel registration.
	D	S	2	P1	;						

DS3	End the Function Setting Screen										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	No parameters are used with this command. • The same transceiver behavior as when transceiver [ESC] is pressed.
	D	S	3	;							

PC CONTROL COMMAND REFERENCE GUIDE

DV	DATA VOX										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: ACC2 2: USB Audio 3: Optical
	D	V	P1	;							
Read	1	2	3	4	5	6	7	8	9	10	
	D	V	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	D	V	P1	;							

EC	Main Band and Sub Band Frequency Information Exchange										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	No parameters are used with this command.
	E	C	;								

EM	Emergency Communication Frequency Mode										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	No parameters are used with this command.
	E	M	;								
<ul style="list-style-type: none"> The transceiver switches to the Emergency frequency after sending this command. When using split operation, switching to Emergency also switches to simplex operation. This command is not available for E market versions (an error occurs). 											

EQRO	Reception Equalizer										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: Reception Equalizer OFF 1: Reception Equalizer ON
	E	Q	R	0	P1	P2	;				
Read	1	2	3	4	5	6	7	8	9	10	
	E	Q	R	0	P1	;					
Answer	1	2	3	4	5	6	7	8	9	10	
	E	Q	R	0	P1	P2	;				
<ul style="list-style-type: none"> The setting command is effective for the selected receive mode in the target band. 											

EQR1	Reception Equalizer Effect										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: High Boost 1 1: High Boost 2 2: Formant Pass 3: Bass Boost 1 4: Bass Boost 2 5: Flat 6: User 1 7: User 2 8: User 3
	E	Q	R	1	P1	P2	;				
Read	1	2	3	4	5	6	7	8	9	10	
	E	Q	R	1	P1	;					
Answer	1	2	3	4	5	6	7	8	9	10	
	E	Q	R	1	P1	P2	;				
<ul style="list-style-type: none"> The setting command is effective for the selected receive mode in the target band. Use the UR command for equalizing of the chosen effect. 											

EQR2	Reception Equalizer Copy										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: User 1 1: User 2 2: User 3
	E	Q	R	2	P1	P2	;				
<ul style="list-style-type: none"> The adjustment contents in the effect which are currently being selected are copied first. 											

PC CONTROL COMMAND REFERENCE GUIDE

EQT0 Transmission Equalizer											Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: ON • When transmission mode is CW, FSK, PSK, the EQT0 command cannot be set or read. • The setting command is effective for the selected transmit mode.
	E	Q	T	0	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	
	E	Q	T	0	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	E	Q	T	0	P1	;					

EQT1 Transmission Equalizer Effect											Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: High Boost 1 1: High Boost 2 2: Formant Pass 3: Bass Boost 1 4: Bass Boost 2 5: Conventional 6: User 1 7: User 2 8: User 3 • When transmission mode is CW, FSK, PSK, the EQT1 command cannot be set or read. • The setting command is effective for the selected transmit mode. • Use the UT command for equalizing of the chosen effect.
	E	Q	T	1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	
	E	Q	T	1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	E	Q	T	1	P1	;					

EQT2 Transmission Equalizer Copy											Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: User 1 1: User 2 2: User 3 • The adjustment contents in the effect which are currently being selected are copied first.
	E	Q	T	2	P1	;					

PC CONTROL COMMAND REFERENCE GUIDE

EX	Set or Read the Menu										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Menu 1: Advanced Menu P2 00 ~ 99: Category Number ◆ Entering a non-existing number causes an error to occur. ◆ Enter any value when using the Advanced Menu. P3 00 ~ 99: Entry Number ◆ Entering a non-existing number causes an error to occur. ◆ Entering a number that cannot be set also causes an error to occur. P4 (Configuration Classification) Space: Normal Configuration. 9: Initializing ◆ Response is always a space. P5 String of alphanumeric characters for the Menu setting Entering a value larger than the size limit causes an error to occur. Normally a 3-digit number (blank digits must be entered as 0). PF key settings use 4 digits (refer to the PF Key assignment ID lists). Frequency settings use 8 digits (blank digits must be entered as 0). A power-on message can vary in length from 0 to 15 characters. Screen saver text can vary in length from 0 to 10 characters. ◆ Refer to the Menu tables below for the EX Command Parameter lists. ◆ Entering a value other than the listed values causes an error to occur.)
	E	X	P1	P2	P2	P3	P3	P4	P5	P5	
	11	12	13	14	15	16	17	18	19	20	
	P5	P5	P5	P5	P5	P5	P5	P5	P5	P5	
	21	22	23	24	25	26	27	28	29	30	
P5	P5	P5	;								
Read	1	2	3	4	5	6	7	8	9	10	
	E	X	P1	P2	P2	P3	P3	;			
Answer	1	2	3	4	5	6	7	8	9	10	
	E	X	P1	P2	P2	P3	P3	P4	P5	P5	
	11	12	13	14	15	16	17	18	19	20	
	P5	P5	P5	P5	P5	P5	P5	P5	P5	P5	
	21	22	23	24	25	26	27	28	29	30	
P5	P5	P5	;								

PC CONTROL COMMAND REFERENCE GUIDE

EX Command Parameter Lists

P1	P2	P3	Function	Menu						
				P5						006 ~
				000	001	002	003	004	005	
0	00	00	Color Display Pattern (Main screen)	Type 1	Type 2	Type 3				
0	00	01	Color Display Pattern (Sub screen)	Type 1	Type 2	Type 3	Same as Main			
0	00	02	Font Style (Frequency display)	Font 1	Font 2	Font 3				
0	00	03	Dial Color Pattern	Type 1	Type 2					
0	00	04	Screen Saver	Off	Type 1	Type 2				
0	00	05	Screen Saver Wait Time	Preview (5 [sec])	5 [min]	15 [min]	30 [min]	60 [min]		
0	00	06	Screen Saver Message	Up to 10 alphanumeric characters						
0	00	07	Power-on Message	Up to 15 alphanumeric characters						
0	00	08	FM Mode S-meter Sensitivity	Low	High					
0	00	09	Meter Response Speed		1	2	3	4		
0	00	10	Meter Display Pattern	Type 1	Type 2	Type 3				
0	00	11	Meter Display Peak Hold	Off	On					
0	00	12	Long Press Duration of Panel Keys	200 [ms]	300 [ms]	400 [ms]	500 [ms]	600 [ms]	700 [ms]	Up to 2000 [ms] (in steps of 100)
0	00	13	Touchscreen Tuning	Off	On					
0	00	14	Operating Band (High/Low & Shift/Width Controls)	Main and Sub Bands	Main Band Only					
0	00	15	PF A: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	16	PF B: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	17	Voice (Main Band): Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	18	Voice (Sub Band): Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	19	External PF 1: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	20	External PF 2: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	21	External PF 3: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	22	External PF 4: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	23	External PF 5: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	24	External PF 6: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	25	External PF 7: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	26	External PF 8: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	27	Microphone PF 1: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	28	Microphone PF 2: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	29	Microphone PF 3: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	30	Microphone PF 4: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	31	Microphone Down: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	32	Microphone Up: Key Assignment	Refer to the list of function allotment numbers for the PF key						
0	00	33	Automatic Power Off	Off	60 [min]	120 [min]	180 [min]			
0	00	34	Data Mode Numbers <Firmware version 1.20 or later>		1	2	3			
0	01	00	Beep Volume	Off	1	2	3	4	5	Up to 20 (in steps of 1)
0	01	01	Voice Message Volume (Play)	Off	1	2	3	4	5	Up to 20 (in steps of 1)
0	01	02	Sidetone Volume	Linked with monitor control	Off	1	2	3	4	Up to 20 (in steps of 1)
0	01	03	Voice Guidance Volume	Off	1	2	3	4	5	Up to 20 (in steps of 1)

PC CONTROL COMMAND REFERENCE GUIDE

P1	P2	P3	Function	Menu						
				P5						
				000	001	002	003	004	005	006 ~
0	01	04	Voice Guidance Speed		1	2	3	4		
0	01	05	User Interface Language (Voice Guidance & Messages)	English	Japanese					
0	01	06	Automatic Voice Guidance	Off	On					
0	01	07	Headphones Mixing Balance	0	1	2	3	4	5	Up to 10 (in steps of 1)
0	01	08	Headphones Left/Right Reverse	Off	On					
0	02	00	FFT Scope Averaging (RTTY Decode)	0	1	2	3	4	5	Up to 9 (in steps of 1)
0	02	01	RX UOS	Off	On					
0	02	02	Newline Code	CR+LF	All					
0	02	03	Diddle	Off	Blank Code	Letters Code				
0	02	04	TX UOS	Off	On					
0	02	05	Automatic Newline Insertion	Off	On					
0	02	06	FSK Spacing	170 [Hz]	200 [Hz]	425 [Hz]	850 [Hz]			
0	02	07	FSK Keying Polarity	Off	On					
0	02	08	FSK Tone Frequency	1275 [Hz]	2125 [Hz]					
0	02	09	FFT Scope Averaging (PSK Decode)	0	1	2	3	4	5	Up to 9 (in steps of 1)
0	02	10	PSK AFC Tuning Range	±8 [Hz]	±15 [Hz]					
0	02	11	PSK Tone Frequency	1.0 [kHz]	1.5 [kHz]	2.0 [kHz]				
0	02	12	CW/RTTY/PSK Log File Format <Rename with firmware version 1.20 or later>	html	txt					
0	02	13	CW/RTTY/PSK Time Stamp <Rename with firmware version 1.20 or later>	Off	Time Stamp	Time Stamp + Frequency				
0	02	14	Clock (CW/RTTY/PSK Time Stamp) <Rename with firmware version 1.20 or later>	Local Clock	Secondary Clock					
0	03	00	Frequency Rounding Off (Multi/Channel Control)	Off	On					
0	03	01	SSB Mode Frequency Step Size (Multi/Channel Control) <Firmware version 1.20 or later>	0.5 [kHz]	1 [kHz]	2.5 [kHz]	5 [kHz]	10 [kHz]		
			SSB/CW/FSK/PSK Mode Frequency Step Size (Multi/Channel Control) <Firmware version 1.13 or lower>	0.5 [kHz]	1 [kHz]	2.5 [kHz]	5 [kHz]	10 [kHz]		
0	03	02	AM Mode Frequency Step Size (Multi/Channel Control)	5 [kHz]	6.25 [kHz]	10 [kHz]	12.5 [kHz]	15 [kHz]	20 [kHz]	006: 25 007: 30 008: 50 009: 100
0	03	03	FM Mode Frequency Step Size (Multi/Channel Control)	5 [kHz]	6.25 [kHz]	10 [kHz]	12.5 [kHz]	15 [kHz]	20 [kHz]	006: 25 007: 30 008: 50 009: 100
0	03	04	Frequency Step Size (Up/Down Keys)	100 [kHz]	500 [kHz]	1000 [kHz]				
0	03	05	9 kHz Step in AM Broadcast Band (Multi/Channel Control)	Off	On					
0	03	06	Tuning Control (Main): Number of Steps per Revolution	250 [Step]	500 [Step]	1000 [Step]				
0	03	07	Tuning Control (Sub): Number of Steps per Revolution	250 [Step]	500 [Step]	1000 [Step]				
0	03	08	Number of Band Memories	1	3	5				
0	03	09	CW/FSK/PSK Mode Frequency Step Size (Multi/Channel Control) <Firmware version 1.20 or later>	0.5 [kHz]	1 [kHz]	2.5 [kHz]	5 [kHz]	10 [kHz]		

PC CONTROL COMMAND REFERENCE GUIDE

P1	P2	P3	Function	Menu							
				P5						006 ~	
				000	001	002	003	004	005		
0	03	10	Lock Function <Firmware version 1.20 or later>	Frequency Lock	Tuning Control Lock						
0	03	11	Tuning Speed Control (Main) <Firmware version 1.20 or later>		Off	2	3	4	5	Up to 10 (in steps of 1)	
0	03	12	Sensitivity (Main) <Firmware version 1.20 or later>		1	2	3	4	5	Up to 10 (in steps of 1)	
0	03	13	Tuning Speed Control (Sub) <Firmware version 1.20 or later>		Off	2	3	4	5	Up to 10 (in steps of 1)	
0	03	14	Tuning Speed Control Sensitivity (Sub) <Firmware version 1.20 or later>		1	2	3	4	5	Up to 10 (in steps of 1)	
0	04	00	Number of Quick Memory Channels	3 [ch]	5 [ch]	10 [ch]					
0	04	01	Temporary Change (Memory Channel Configurations)	Off	On						
0	04	02	Program Slow Scan	Off	On						
0	04	03	Program Slow Scan Range	100 [Hz]	200 [Hz]	300 [Hz]	400 [Hz]	500 [Hz]			
0	04	04	Scan Hold	Off	On						
0	04	05	Scan Resume	Time-operated	Carrier-operated						
0	05	00	Paddle Jack Configuration (Front)	Key	Paddle	Paddle (Bug key mode)					
0	05	01	Key Jack Configuration (Rear)	Key	Paddle	Paddle (Bug key mode)					
0	05	02	Electronic Keyer Squeeze Mode	Mode A	Mode B						
0	05	03	Dot and Dash Reversed Keying	Off	On						
0	05	04	Paddle (Microphone Up/Down Keys)	Off	On						
0	05	05	Automatic CW TX with Keying in SSB Mode	Off	On						
0	05	06	Carrier Frequency Offset (SSB Mode to CW Mode)	Off	On						
0	05	07	CW Keying Weight Ratio	Automatic	2.5	2.6	2.7	2.8	2.9	Up to 4.0 (in steps of 0.1)	
0	05	08	CW Keying Reversed Weight Ratio	Off	On						
0	05	09	Interrupt Keying	Off	On						
0	05	10	CW Message Entry	Text string	Paddle						
0	05	11	Contest Number	0001 ~ 9999 (Must be a 4-digit number)							
0	05	12	Contest Number Format	Off	190 to ANO	190 to ANT	90 to NO	90 to NT			
0	05	13	Channel Number (Count-up Message)	Off	Channel 1	Channel 2	Channel 3	Channel 4	Channel 5	006: Ch 6 007: Ch 7 008: Ch 8	
0	05	14	CW Rise Time	1 [ms]	2 [ms]	4 [ms]	6 [ms]				
0	05	15	CW/ Voice Message Retransmit Interval Time	0 [s]	1 [s]	2 [s]	3 [s]	4 [s]	5 [s]	Up to 60 [s] (in steps of 1)	
0	06	00	Playback Time (Full-time Recording)	Last 10 [s]	Last 20 [s]	Last 30 [s]					
0	06	01	Recorded Audio File Storage Location	Internal	USB						
0	06	02	Time-out Timer	Off	3 [min]	5 [min]	10 [min]	20 [min]	30 [min]		
0	06	03	TX Inhibit	Off	On						
0	06	04	Transmit Power Step Size	1 [W]	5 [W]						
0	06	05	TX Filter Numbers	2	3						
0	06	06	RX Filter Numbers	2	3						
0	06	07	Filter Control in SSB Mode (High/Low and Shift/Width)	High & Low Cuts	Shift & Width						

PC CONTROL COMMAND REFERENCE GUIDE

P1	P2	P3	Function	Menu						
				P5						
				000	001	002	003	004	005	006 ~
0	06	08	Filter Control in SSB-Data Mode (High/Low and Shift/Width)	High & Low Cuts	Shift & Width					
0	06	09	VOX Voice Delay (Microphone)	Off	Short	Medium	Long			
0	06	10	VOX Voice Delay (except Microphone)	Off	Short	Medium	Long			
0	07	00	Baud Rate (COM Port)	4800 [bps]	9600 [bps]	19200 [bps]	38400 [bps]	57600 [bps]	115200 [bps]	
0	07	01	Baud Rate (USB Port)	4800 [bps]	9600 [bps]	19200 [bps]	38400 [bps]	57600 [bps]	115200 [bps]	
0	07	02	Quick Data Transfer	Off	On					
0	07	03	Overwrite Location (Quick Data Transfer)	VFO	Quick Memory					
0	07	04	Overwrite Location (DX Packet Cluster Tuned Data)	Operating Band	Sub Band					
0	07	05	USB: Audio Input Level	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	06	ACC 2: Audio Input Level	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	07	Optical: Audio Input Level	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	08	USB: Audio Output Level (Main Band)	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	09	USB: Audio Output Level (Sub Band)	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	10	ACC 2: Audio Output Level (Main Band)	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	11	ACC 2: Audio Output Level (Sub Band)	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	12	Optical: Audio Output Level (Main Band)	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	13	Optical: Audio Output Level (Sub Band)	0	1	2	3	4	5	Up to 100 (in steps of 1)
0	07	14	Audio Output Type (Rear Connectors)	All	Received Audio Only					
0	07	15	Speaker Output Configuration	Normal	Reversed	Mixed				
0	07	16	USB: Audio Output Configuration	Normal	Reversed	Mixed				
0	07	17	ACC2: Audio Output Configuration	Normal	Reversed	Mixed				
0	07	18	Optical: Audio Output Configuration	Normal	Reversed	Mixed				
0	07	19	Antenna Numbers <Firmware version 1.20 or later>		1	2	3	4		
0	08	00	Bandscope Display During TX	Off	On					
0	08	01	TX Audio Signal Waveform Display	Off	On					
0	08	02	Bandscope Maximum Hold	10 [s]	Continuous					
0	08	03	Marker Offset Frequency (SSB Mode)	Off (Carrier Point)	300 [Hz]	400 [Hz]	500 [Hz]	600 [Hz]	700 [Hz]	006: 800 [Hz] 007: 1000 [Hz] 008: 1500 [Hz] 009: 2200 [Hz]
0	08	04	Frequency Scale (Center Mode)	Relative Frequency	Absolute Frequency					
0	08	05	Fixed Mode LF Band Lower Limit (min. 0.03 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	06	Fixed Mode LF Band Upper Limit (max. 0.300 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	07	Fixed Mode MF Band 1 Lower Limit (min. 0.300 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	08	Fixed Mode MF Band 1 Upper Limit (max. 0.522 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	09	Fixed Mode MF Band 2 Lower Limit (min. 0.522 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	10	Fixed Mode MF Band 2 Upper Limit (max. 1.705 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	11	Fixed Mode 1.8 MHz Band Lower Limit (min. 1.705 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						

PC CONTROL COMMAND REFERENCE GUIDE

P1	P2	P3	Function	Menu						
				P5						
				000	001	002	003	004	005	006 ~
0	08	12	Fixed Mode 1.8 MHz Band Upper Limit (max. 2.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	13	Fixed Mode 3.5 MHz Band Lower Limit (min. 2.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	14	Fixed Mode 3.5 MHz Band Upper Limit (max. 4.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	15	Fixed Mode 5 MHz Band Lower Limit (min. 4.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	16	Fixed Mode 5 MHz Band Upper Limit (max. 6.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	17	Fixed Mode 7 MHz Band Lower Limit (min. 6.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	18	Fixed Mode 7 MHz Band Upper Limit (max. 8.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	19	Fixed Mode 10 MHz Band Lower Limit (min. 8.0 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	20	Fixed Mode 10 MHz Band Upper Limit (max. 11 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	21	Fixed Mode 14 MHz Band Lower Limit (min. 11 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	22	Fixed Mode 14 MHz Band Upper Limit (max. 15 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	23	Fixed Mode 18 MHz Band Lower Limit (min. 15 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	24	Fixed Mode 18 MHz Band Upper Limit (max. 20 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	25	Fixed Mode 21 MHz Band Lower Limit (min. 20 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	26	Fixed Mode 21 MHz Band Upper Limit (max. 22 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	27	Fixed Mode 24 MHz Band Lower Limit (min. 22 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	28	Fixed Mode 24 MHz Band Upper Limit (max. 26 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	29	Fixed Mode 28 MHz Band Lower Limit (min. 26 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	30	Fixed Mode 28 MHz Band Upper Limit (max. 30 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	31	Fixed Mode 50 MHz Band Lower Limit (min. 30 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	32	Fixed Mode 50 MHz Band Upper Limit (max. 60 MHz)	8-digit frequency (in Hz) with unused digits entered as 0 (in steps of 1 kHz)						
0	08	33	Waterfall Pause when Tuning (Center Mode) <Firmware version 1.20 or later>	Off	On					
0	08	34	Touchscreen Tuning Step Correction (SSB/ CW/ FSK/ PSK) <Firmware version 1.20 or later>	Off	On					
0	08	35	Waterfall Color Type <Firmware version 1.20 or later>	Type1	Type2					
0	09	00	Send Message by Function Keys (USB Keyboard)	Off	On					
0	09	01	Keyboard Language (USB Keyboard)	Japanese	English (US)	English (UK)	French	French (Canadian)	German	006: Portuguese 007: Portuguese (Brazilian) 008: Spanish 009: Spanish (Latin American) 010: Italian
0	09	02	Repeat Delay Time (USB Keyboard)		1	2	3	4		
0	09	03	Repeat Speed (USB Keyboard)		1	2	3	4	5	Up to 32 (in steps of 1)

PC CONTROL COMMAND REFERENCE GUIDE

Advanced Menu										
P1	P2	P3	Function	P5						
				000	001	002	003	004	005	006 ~
1	00	00	Indication Signal Type (Main Band)	Automatic	TX Power	ALC	Drain Voltage (Vd)	Compression Level (COMP)	Current (Id)	006: SWR
1	00	01	Indication Signal Type (Sub Band)	TX Power	ALC	Drain Voltage (Vd)	Compression Level (COMP)	Current (Id)	SWR	
1	00	02	Output Level (Main Band)	0 [%]	1 [%]	2 [%]	3 [%]	4 [%]	5 [%]	Up to 100 [%] (in steps of 1)
1	00	03	Output Level (Sub Band)	0 [%]	1 [%]	2 [%]	3 [%]	4 [%]	5 [%]	Up to 100 [%] (in steps of 1)
1	00	04	REF I/O Connector Configuration	Off	Output	Input				
1	00	05	Reference Oscillator Calibration	Parameter value of 000 ~ 510, corresponding to setting values of -255 ~ +255 (in steps of 1)						
1	00	06	Bandwidth (Additional Roofing Filter)	Off	300 [Hz]	400 [Hz]	500 [Hz]	600 [Hz]	700 [Hz]	Up to 3500 [Hz] (in steps of 100)
1	00	07	Attenuation (Additional Roofing Filter)	Parameter value of 000 ~ 040, corresponding to setting values of -20 ~ +20 (in steps of 1)						
1	00	08	TX Power Down with Transverter Enabled	Off	On					
1	00	09	TX Hold After Antenna Tuning	Off	On					
1	00	10	Antenna Tuner During RX	Off	On					
1	00	11	Linear Amplifier Control (HF Band)	Off	Active High	Active High + Relay Control	Active High + Relay & TX Delay Ctrl	Active Low	Active Low + TX Delay Control	
1	00	12	Linear Amplifier Control (50 MHz Band)	Off	Active High	Active High + Relay Control	Active High + Relay & TX Delay Ctrl	Active Low	Active Low + TX Delay Control	
1	00	13	Microphone Gain (FM Mode)		1	2	3	4	5	Up to 100 (in steps of 1)
1	00	14	PKS Polarity Reverse	Off	On					
1	00	15	TX Inhibit While Busy	Off	On					
1	00	16	CTCSS Unmute for Internal Speaker (Main Band)	Mute	Unmute					
1	00	17	CTCSS Unmute for Internal Speaker (Sub Band)	Mute	Unmute					
1	00	18	MSQ Logic State	Low	Open					
1	00	19	SSQ Logic State	Low	Open					
1	00	20	MSQ Reverse Condition	Off	Busy	Sql	Send	Busy-Send	Sql-Send	
1	00	21	SSQ Reverse Condition	Off	Busy	Sql	Send	Busy-Send	Sql-Send	
1	00	22	Standby State Low Power Consumption	Off	On					
1	00	23	Cooling Fan Control After Shutdown	Off	On					
1	00	24	MSQ/PKS Pin Assignment	Off	On					
1	00	25	External Display	Off	On					
1	00	26	Resolution (External Display)	800x600	840x480					
—	—	—	Touchscreen Calibration	Does not correspond to a command						
—	—	—	Software License Agreement	Does not correspond to a command						
—	—	—	Important Notices Concerning Free Open Source	Does not correspond to a command						
—	—	—	About Various Software License Agreements	Does not correspond to a command						

PC CONTROL COMMAND REFERENCE GUIDE

PF Key Assignment Lists

Function	PF Key Allotment ID	Function	PF Key Allotment ID
Menus		APF SEL (Main Band)	1040
Menu 00-00	0000	Mute (Main Band)	1041
Menu 00-01	0001	CW T. (Sub Band)	1042
▼	▼	FIL A/ SEL (Sub Band)	1043
Menu 09-03	0903	FIL B/ SEL (Sub Band)	1044
Advanced Menu Direct Call		FIL C/ SEL (Sub Band)	1045
Advanced MENU 0	2000	AGC SEL (Sub Band)	1046
Advanced MENU 1	2001	AGC Slow (Sub Band)	1047
▼	▼	AGC Mid (Sub Band)	1048
Advanced MENU 30	2030	AGC Fast (Sub Band)	1049
Panel Switch		AGC Off (Sub Band)	1050
AT/AT Tune	1000	NCH SEL (Sub Band)	1051
VOX/ SEL	1001	A.NCH SEL (Sub Band)	1052
PROC/ SEL	1002	BEF SEL (Sub Band)	1053
ANT1	1003	NB1 SEL (Sub Band)	1054
ANT2	1004	NB2 SEL (Sub Band)	1055
ANT3	1005	NR1 SEL (Sub Band)	1056
ANT4	1006	NR2 SEL (Sub Band)	1057
Data1/ SEL	1007	APF SEL (Sub Band)	1058
Data2/ SEL	1008	Mute (Sub Band)	1059
Data3/ SEL	1009	Voice1 (Main Band)	1100
RX (Main Band)	1010	Voice2	1101
TX (Main Band)	1011	Voice3	1102
M>S	1012	Voice1 (Sub Band)	1103
M/S	1013	DSP Monitor	1104
RX (Sub Band)	1014	RX Monitor	1105
TX (Sub Band)/ (Split Frequency)	1015	TX Tune <Ver. 1.13 or lower> TX Tune 1 <Ver. 1.20 or later>	1106
TS-SET	1016	Data Send	1107
Main	1017	Send	1108
Sub	1018	Data VOX/ SEL	1109
M/V (Memory)	1019	Message Memory CH1	1110
M.IN (Memory)	1020	Message Memory CH2	1111
M>V (Memory)	1021	Message Memory CH3	1112
REC (Recorder)/ Full-time REC	1022	Message Memory CH4	1113
Stop (Recorder)	1023	Message Memory CH5	1114
Play (Recorder)	1024	Message Memory CH6	1115
S.DISP/ SEL	1025	Message Memory CH7	1116
MR (Quick Memo)/ SEL	1026	Message Memory CH8	1117
MIN (Quick Memo)	1027	Contest Number Decrement	1118
CW T. (Main Band)	1028	SWL	1119
FIL A/ SEL (Main Band)	1029	RF Scope	1120
FIL B/ SEL (Main Band)	1030	AF Scope	1121
FIL C/ SEL (Main Band)	1031	Waterfall	1122
AGC SEL (Main Band)	1032	Extended Memory Channel	1123
AGC Slow (Main Band)	1033	DOWN Key (Microphone)	1124
AGC Mid (Main Band)	1034	UP Key (Microphone)	1125
AGC Fast (Main Band)	1035	Capture	1126
AGC Off (Main Band)	1036	Safe Removal of USB Flash Drive	1127
NCH SEL (Main Band)	1037	Emergency Frequency	1128
A.NCH SEL (Main Band)	1038	TX Tune 2 <Ver. 1.20 or later>	1106
BEF SEL (Main Band)	1039	Off	9999

PC CONTROL COMMAND REFERENCE GUIDE

FA	Main Band Frequency										Parameters: P1 Frequency (11 digits in Hz) ◆ For example, enter 00014195000 for 14.195 MHz. (Blank digits must be entered as 0.) When calling an unregistered Memory Channel, the response is all spaces.
	Set	1	2	3	4	5	6	7	8	9	
F		A	P1	P1	P1	P1	P1	P1	P1	P1	
11		12	13	14	15	16	17	18	19	20	
Read	P1	P1	P1	;							
	1	2	3	4	5	6	7	8	9	10	
	F	A	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	F	A	P1	P1	P1	P1	P1	P1	P1	P1	
	11	12	13	14	15	16	17	18	19	20	
	P1	P1	P1	;							

FB	Sub Band Frequency										Parameters: P1 Frequency (11 digits in Hz) ◆ For example, enter 00014195000 for 14.195 MHz. (Blank digits must be entered as 0.) When calling an unregistered Memory Channel, the response is all spaces.
	Set	1	2	3	4	5	6	7	8	9	
F		B	P1	P1	P1	P1	P1	P1	P1	P1	
11		12	13	14	15	16	17	18	19	20	
Read	P1	P1	P1	;							
	1	2	3	4	5	6	7	8	9	10	
	F	B	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	F	B	P1	P1	P1	P1	P1	P1	P1	P1	
	11	12	13	14	15	16	17	18	19	20	
	P1	P1	P1	;							

FC	Change the Frequency (Tuning Control)										Parameters: P1 0: Main Band 1: Sub Band P2 0: Up 1: Down P3 0: Normal frequency step size 1: Double the frequency step size 2: 5 times the frequency step size 3: 10 times the frequency step size 4: 50 times the frequency step size 5: 100 times the frequency step size
	Set	1	2	3	4	5	6	7	8	9	
F		C	P1	P2	P3	;					

FLO	Select the Receive Filter										Parameters: P1 0: Main Band 1: Sub Band P2 0: A 1: B 2: C
	Set	1	2	3	4	5	6	7	8	9	
F		L	0	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10	
	F	L	0	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	F	L	0	P1	P2	;					

PC CONTROL COMMAND REFERENCE GUIDE

FL1	Roofing Filter										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	F	L	1	P1	P2	P3	;				
Read	1	2	3	4	5	6	7	8	9	10	P3 (Roofing Filter) 0: Auto 1: 270 Hz 2: 500 Hz 3: 2.7 kHz 4: 6 kHz 5: 15 kHz 6: Additional Roofing Filter
	F	L	1	P1	P2	;					
Answer	1	2	3	4	5	6	7	8	9	10	P4 (Roofing Filter Bandwidth) 0027 ~ 1500 (in steps of 10 Hz) ◆ When P3 is set to Auto, this parameter will tell you the bandwidth of the chosen roofing filter by the reception circuit.
	F	L	1	P1	P2	P3	P4	P4	P4	P4	
	;										

FL2	IF Filter Shape										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	F	L	2	P1	P2	P3	;				
Read	1	2	3	4	5	6	7	8	9	10	P3 0: Sharp 1: Medium 2: Soft 3: None (FM mode only) 9: Initial value setting (setting command only) ◆ FM mode can read only.
	F	L	2	P1	P2	;					
Answer	1	2	3	4	5	6	7	8	9	10	
	F	L	2	P1	P2	P3	;				

FL3	AF Filter Type										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	F	L	3	P1	P2	P3	;				
Read	1	2	3	4	5	6	7	8	9	10	P3 0: Narrow 1: Medium 2: Wide 9: Initial value setting (setting command only)
	F	L	3	P1	P2	;					
Answer	1	2	3	4	5	6	7	8	9	10	
	F	L	3	P1	P2	P3	;				

FS	Fine Tuning										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	F	S	P1	P2	;						
Read	1	2	3	4	5	6	7	8	9	10	
	F	S	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	F	S	P1	P2	;						

PC CONTROL COMMAND REFERENCE GUIDE

FV	Firmware Version										Parameters: P1 Reads out the character string of the firmware version. • For example, for firmware version 1.00, it reads "FV1.00;".
	1	2	3	4	5	6	7	8	9	10	
Read	F	V	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	F	V	P1	P1	P1	P1	;				

FW	FM Normal/Narrow										Parameters: P1 0: Main Band 1: Sub Band P2 0: Normal 1: Narrow • This command can be used only in FM mode.
	1	2	3	4	5	6	7	8	9	10	
Set	F	W	P1	P2	;						
Read	F	W	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	F	W	P1	P2	;						

GC	AGC Time Constant										Parameters: P1 0: Main Band 1: Sub Band P2 0: AGC Off 1: AGC Slow 2: AGC Mid 3: AGC Fast 4: AGC Off → On (AGC returns to its Slow/Mid/Fast status before turning Off.) • This command cannot be performed in FM mode (an error sounds). • Setting the AGC to AGC Off → On will turn the AGC On and will set the previous AGC status (Slow/Mid/Fast).
	1	2	3	4	5	6	7	8	9	10	
Set	G	C	P1	P2	;						
Read	G	C	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	G	C	P1	P2	;						

GT	AGC Time Constant Preset										Parameters: P1 0: Main Band 1: Sub Band P2 (Slow Preset Value) 01 ~ 20 (in steps of 1) 99: Initial value setting (setting command only) P3 (Mid Preset Value) 01 ~ 20 (in steps of 1) 99: Initial value setting (setting command only) P4 (Fast Preset Value) 01 ~ 20 (in steps of 1) 99: Initial value setting (setting command only) • While the AGC is OFF, the GT command can still be read. • While in FM mode, the GT command cannot be set or read.
	1	2	3	4	5	6	7	8	9	10	
Set	G	T	P1	P2	P2	P3	P3	P4	P4	;	
Read	G	T	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	G	T	P1	P2	P2	P3	P3	P4	P4	;	

GT2	AGC Time Constant Preset Copy										Parameters: P1 0: Main Band 1: Sub Band
	1	2	3	4	5	6	7	8	9	10	
Set	G	T	2	P1	;						

ID	Transceiver ID Number										Parameters: P1 022
	1	2	3	4	5	6	7	8	9	10	
Read	I	D	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	I	D	P1	P1	P1	;					

PC CONTROL COMMAND REFERENCE GUIDE

IP0		DHCP									Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 0: DHCP OFF 1: DHCP ON P2 ~ P5 001.001.001.001 ~ 223.223.223.223: IP address (If no IP address is acquired when DHCP is turned ON, the IP address is replaced with hyphens: ---,---,---,---) • When DHCP is ON, the IP address acquired automatically is output as a response. When DHCP is OFF, the set fixed IP address is output as a response.
		I	P	0	P1	;						
Read		1	2	3	4	5	6	7	8	9	10	
		I	P	0	;							
Answer		1	2	3	4	5	6	7	8	9	10	
		I	P	0	P1	P2	P2	P2	P3	P3	P3	
		11	12	13	14	15	16	17	18	19	20	
		P4	P4	P4	P5	P5	P5	;				

IP1		IP Address (Manual Configuration)									Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 ~ P4 (IP address) 001.000.000.000 ~ 223.255.255.255 P5 ~ P8 (Subnet Mask address) 000.000.000.000 ~ 255.255.255.255 P9 ~ P12 (Default Gateway address) 001.000.000.000 ~ 223.255.255.255 ◆ If P9 ~ P12 are not set, they will become all blank. P13 ~ P16 (Priority DNS Server address) 001.000.000.000 ~ 223.255.255.255 ◆ If P13 ~ P16 are not set, they will become all blank. P17 ~ P20 (Secondary DNS Server address) 001.000.000.000 ~ 223.255.255.255 ◆ If P17 ~ P20 are not set, they will become all blank.
		I	P	1	P1	P1	P1	P2	P2	P2	P3	
		11	12	13	14	15	16	17	18	19	20	
		P3	P3	P4	P4	P4	P5	P5	P5	P6	P6	
		21	22	23	24	25	26	27	28	29	30	
		P6	P7	P7	P7	P8	P8	P8	P9	P9	P9	
		31	32	33	34	35	36	37	38	39	40	
		P10	P10	P10	P11	P11	P11	P12	P12	P12	P13	
		41	42	43	44	45	46	47	48	49	50	
		P13	P13	P14	P14	P14	P15	P15	P15	P16	P16	
		51	52	53	54	55	56	57	58	59	60	
		P16	P17	P17	P17	P18	P18	P18	P19	P19	P19	
		61	62	63	64	65	66	67	68	69	70	
	P20	P20	P20	;								
Read		1	2	3	4	5	6	7	8	9	10	
		I	P	1	;							
Answer		1	2	3	4	5	6	7	8	9	10	
		I	P	1	P1	P1	P1	P2	P2	P2	P3	
		11	12	13	14	15	16	17	18	19	20	
		P3	P3	P4	P4	P4	P5	P5	P5	P6	P6	
		21	22	23	24	25	26	27	28	29	30	
		P6	P7	P7	P7	P8	P8	P8	P9	P9	P9	
		31	32	33	34	35	36	37	38	39	40	
		P10	P10	P10	P11	P11	P11	P12	P12	P12	P13	
		41	42	43	44	45	46	47	48	49	50	
		P13	P13	P14	P14	P14	P15	P15	P15	P16	P16	
		51	52	53	54	55	56	57	58	59	60	
		P16	P17	P17	P17	P18	P18	P18	P19	P19	P19	
		61	62	63	64	65	66	67	68	69	70	
	P20	P20	P20	;								

IP2		MAC Address									Parameters:	
Read		1	2	3	4	5	6	7	8	9	10	P1 ~ P6 00 ~ FF: MAC address (A ~ F entries must be capitalized)
		I	P	2	;							
Answer		1	2	3	4	5	6	7	8	9	10	
		I	P	2	P1	P1	P2	P2	P3	P3	P4	
		11	12	13	14	15	16	17	18	19	20	
		P4	P5	P5	P6	P6	;					

PC CONTROL COMMAND REFERENCE GUIDE

IP3	ID and Password Management										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: Character string length of current ID
	I	P	3	P1	P2	P3	P4	P5	P5	P5	P2 1 ~ 8: Character string length of current password
	11	12	13	14	15	16	17	18	19	20	P3 1 ~ 8: Character string length of new ID
	P5	P5	P5	P5	P5	P6	P6	P6	P6	P6	P4 1 ~ 8: Character string length of new password
	21	22	23	24	25	26	27	28	29	30	P5 Up to 8 digits: Current ID
	P6	P6	P6	P7	P7	P7	P7	P7	P7	P7	P6 Up to 8 digits: Current password
	31	32	33	34	35	36	37	38	39	40	P7 Up to 8 digits: New ID
Read	P7	P8	P8	P8	P8	P8	P8	P8	P8	;	P8 Up to 8 digits: New password
	1	2	3	4	5	6	7	8	9	10	P9 0: Update failed 1: Update successful ◆ If the current ID and password do not match, the update fails.
	I	P	3	P9	;						

KS	Keying speed										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 004 ~ 060 (in steps of 1)
	K	S	P1	P1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	
	K	S	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	K	S	P1	P1	P1	;					

KY	CW Keying										Parameters:																																																																																																														
Set 1	1	2	3	4	5	6	7	8	9	10	P1 For Setting 1, always enter a space or "2". For Setting 2, entering 0 will cause Setting 1 to stop. An error will occur if any value other than 0 is entered. 0: Character buffer space 1: No character buffer space																																																																																																														
	K	Y	P1	P2	P2	P2	P2	P2	P2	P2																																																																																																															
	11	12	13	14	15	16	17	18	19	20																																																																																																															
	P2	P2	P2	P2	P2	P2	P2	P2	P2	P2																																																																																																															
	21	22	23	24	25	26	27	28	29	30																																																																																																															
Set 2	P2	P2	P2	P2	P2	P2	P2	;			P2 Enter a character string for keying. The characters listed in the following table can be entered.																																																																																																														
	1	2	3	4	5	6	7	8	9	10																																																																																																															
Read	K	Y	;								<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td>J</td></tr> <tr><td>K</td><td>L</td><td>M</td><td>N</td><td>O</td><td>P</td><td>Q</td><td>R</td><td>S</td><td>T</td></tr> <tr><td>U</td><td>V</td><td>W</td><td>X</td><td>Y</td><td>Z</td><td></td><td></td><td></td><td></td></tr> <tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td><td>i</td><td>j</td></tr> <tr><td>k</td><td>l</td><td>m</td><td>n</td><td>o</td><td>p</td><td>q</td><td>r</td><td>s</td><td>t</td></tr> <tr><td>u</td><td>v</td><td>w</td><td>x</td><td>y</td><td>z</td><td></td><td></td><td></td><td></td></tr> <tr><td>0</td><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></tr> <tr><td>(space)</td><td>'</td><td>"</td><td>(</td><td>)</td><td>*</td><td>+</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></tr> </table> <p>Using abbreviations, you can enter the following symbols:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th>Abbreviation</th><th>Symbol</th><th>Abbreviation</th><th>Symbol</th></tr> <tr><td>BT</td><td>[</td><td>SK</td><td>></td></tr> <tr><td>AR</td><td>_</td><td>KN</td><td>]</td></tr> <tr><td>AS</td><td><</td><td>BK</td><td>\</td></tr> <tr><td>HH</td><td>#</td><td>SN</td><td>%</td></tr> </table> <ul style="list-style-type: none"> • When setting spaces in parameter P1, the parameter P2 has a fixed length of 24 bytes. Characters that are left blank will be filled with spaces, but these spaces will not be converted to morse code. Continuously set spaces are keying as a single space. • When setting "2" in parameter P1, the parameter P2 has a maximum variable length of 24 bytes. Continuously set spaces are keying as continuous spaces. • Although you can use lower-case letters as well as upper-case letters for the P2 parameter, there is no distinction made between them when sending the morse code. • You cannot enter a semicolon (;) for the P2 parameter. • P1: 2 is supported from the firmware version 1.10. 	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z					a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z					0	1	2	3	4	5	6	7	8	9	(space)	'	"	()	*	+	,	-		.	/	:	=	?	@					Abbreviation	Symbol	Abbreviation	Symbol	BT	[SK	>	AR	_	KN]	AS	<	BK	\	HH	#	SN	%
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Answer	1	2	3	4	5	6	7	8	9	10																																																																																																															
	K	Y	P1	;																																																																																																																					

PC CONTROL COMMAND REFERENCE GUIDE

LK	F.Lock										Parameters: P1 0: Main Band F.Lock OFF 1: Main Band F.Lock ON P2 0: Sub Band F.Lock OFF 1: Sub Band F.Lock ON									
	Set	1	2	3	4	5	6	7	8	9		10	L	K	P1	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	L	K	;							
Answer	1	2	3	4	5	6	7	8	9	10	L	K	P1	P2	;					

LM	Voice Message Recording										Parameters: P1 1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 5: Channel 5 6: Channel 6 P2 0: Recording is inactive (recording stops by the setting command) 1: Recording is ready 2: Start recording (displays while recording by the response command) 3: Delete P3 000 ~ 100 (s): Elapsed time of the sound recording • Invalid when the Voice Message List display is OFF. (Use the PBO command to turn the Voice Message List display ON/OFF.) • The start of recording is possible only when recording is ready.									
	Set	1	2	3	4	5	6	7	8	9		10	L	M	P1	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	L	M	;							
Answer	1	2	3	4	5	6	7	8	9	10	L	M	P1	P2	P3	P3	P3	;		

LPO	Transmission Output Limiter										Parameters: P1 005 ~ 200 (W) • The upper power limit level response is given, depending on the current transmission frequency and mode.									
	Read	1	2	3	4	5	6	7	8	9		10	L	P	0	;				
Answer	1	2	3	4	5	6	7	8	9	10	L	P	0	P1	P1	P1	;			

LP1	Transmission Output Limiter										Parameters: P1 0: Transmission power upper limit setting other than while in data mode 1: Transmission power upper limit setting for data mode 2: Transmission power upper limit setting during TX tuning P2 00: 1.8M band 01: 3.5M band 02: 5M band 03: 7M band 04: 10M band 05: 14M band 06: 18M band 07: 21M band 08: 24M band 09: 28M band 10: 50M band P3 005 ~ 200 (W) 999: Initial value setting (setting command only)									
	Set	1	2	3	4	5	6	7	8	9		10	L	P	1	P1	P2	P2	P3	P3
Read	1	2	3	4	5	6	7	8	9	10	L	P	1	P1	P2	P2	;			
Answer	1	2	3	4	5	6	7	8	9	10	L	P	1	P1	P2	P2	P3	P3	P3	;

PC CONTROL COMMAND REFERENCE GUIDE

MAO	Memory Channel Configuration										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 000 ~ 119: Channel Number ◆ Channels P0 ~ P9 are represented as 100 ~ 109 and channels E0 ~ E9 are represented as 110 ~ 119.
	M	A	0	P1	P1	P1	P2	P3	P3	P3	P2 0: Single Memory channel 1: Dual Memory channel 2: Section defined Memory channel ◆ The memory channel type is decided while setting the P9 and P10 values, so this parameter is ignored. Enter a dummy value.
	11	12	13	14	15	16	17	18	19	20	P3 Frequency 1 (11 digits in Hz.)
	P3	P3	P3	P3	P3	P3	P3	P3	P4	P5	P4 Mode information for frequency 1 (refer to the P2 value of the OM command)
	21	22	23	24	25	26	27	28	29	30	P5 0: FM Wide for frequency 1 1: FM Narrow for frequency 1
	P6	P7	P7	P8	P8	P9	P9	P9	P9	P9	P6 0: FM Tone function OFF for frequency 1 1: Tone for frequency 1 2: CTCSS for frequency 1 3: Cross Tone for frequency 1
	31	32	33	34	35	36	37	38	39	40	P7 Tone frequency for frequency 1 (refer to the P2 value of the TN command)
	P9	P9	P9	P9	P9	P9	P10	P11	P12	P13	P8 CTCSS frequency for frequency 1 (refer to the P2 value of the CN command)
	41	42	43	44	45	46	47	48	49	50	P9 Frequency 2 (11 digits in Hz. Blank digits must be entered as 0.)
	P13	P14	P14	P15	P16	P17	P18	P18	P18	P18	P10 Mode information for frequency 2 (refer to the P1 value of the OM command)
51	52	53	54	55	56	57	58	59	60	P11 0: FM Wide for frequency 2 1: FM Narrow for frequency 2	
P18	P18	P18	P18	P18	P18	;				P12 0: FM Tone function OFF for frequency 2 1: Tone for frequency 2 2: CTCSS for frequency 2 3: Cross Tone for frequency 2	
Read	1	2	3	4	5	6	7	8	9	10	P13 Tone frequency for frequency 2 (refer to the P2 value of the TN command)
	M	A	0	P1	P1	P1	;				P14 CTCSS frequency for frequency 2 (refer to the P2 value of the CN command)
Answer	1	2	3	4	5	6	7	8	9	10	P15 0: Simplex 1: Split
	M	A	0	P1	P1	P1	P2	P3	P3	P3	P16 0: Dual reception OFF 1: Dual reception ON
	11	12	13	14	15	16	17	18	19	20	P17 1: Scan Lockout OFF 2: Scan Lockout ON
	P3	P3	P3	P3	P3	P3	P3	P3	P4	P5	P18 Channel Name (Up to 10 digits.)
	21	22	23	24	25	26	27	28	29	30	◆ When setting the channel currently being accessed, the new settings are reflected the next time that channel is accessed.
	P6	P7	P7	P8	P8	P9	P9	P9	P9	P9	◆ When the section defined memory channel is in the process of being read, it cannot be set.
	31	32	33	34	35	36	37	38	39	40	◆ When reading a blank channel, parameters P2 to P18 becomes blank.
	P9	P9	P9	P9	P9	P9	P10	P11	P12	P13	◆ When reading a single memory channel, all parameters for frequency 2 become 0.
	41	42	43	44	45	46	47	48	49	50	
	P13	P14	P14	P15	P16	P17	P18	P18	P18	P18	
51	52	53	54	55	56	57	58	59	60		
P18	P18	P18	P18	P18	P18	;					

PC CONTROL COMMAND REFERENCE GUIDE

MA1		Memory Channel Direct Entry										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10		P1
	M	A	1	P1	P1	P1	P1	P1	P1	P1	P1		11 digit frequency in Hz. (Blank digits must be entered as 0.)
	11	12	13	14	15	16	17	18	19	20	P2		
	P1	P1	P1	P1	P2	P3	;				Mode information (refer to the P2 value of the OM command)		
												P3	
												0: FM Wide	
												1: FM Narrow	
												◆ In modes other than FM, this parameter is ignored.	
												• The frequency1 information of the memory channel which was appointed when using this command is updated	
												• When registering a new dual memory channel, use the MI command.	
												• The start and end frequencies are registered as the same frequency when setting it at a section appointment memory channel.	
												• When the AI function is ON, a response can consist of the MA0 command.	

MA2		Memory Channel Name										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10		P1
	M	A	2	P1	P1	P1	P2	P3	P3	P3	000 ~ 119: Channel number		
	11	12	13	14	15	16	17	18	19	20	◆ Channel numbers P00 ~ P09 are represented by 100 ~ 109.		
	P3	P3	P3	P3	P3	P3	P3	;			P2		
												Space: Always a space	
												P3	
												10 digit channel name	
												• Setting an unassigned channel causes an error.	
												• When the AI function is ON, a response is provided by the MA0 command.	

MA3		Scan Lockout										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10		P1
	M	A	3	P1	P1	P1	P2	;			000 ~ 119: Channel number		
												P2	
												0: Scan Lockout OFF	
												1: Scan Lockout ON	
												• Setting an unassigned channel causes an error.	
												• When the AI function is ON, a response is provided by the MA0 command.	

MA4		Channel Copy										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10		P1
	M	A	4	P1	P1	P1	P2	P2	P2	;	000 ~ 119: Original channel number		
												P2	
												000 ~ 119: Target channel number	
												• If the original channel number is an unassigned channel, it cannot be copied.	

MA5		Channel Deletion										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10		P1
	M	A	5	P1	P1	P1	;				000 ~ 119: Channel number		

MA6		Section Defined Memory Channel End Frequency										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10		P1
	M	A	6	P1	P1	P1	P2	P2	P2	P2	100 ~ 109: Section defined memory channel number		
	11	12	13	14	15	16	17	18	19	20	P2		
	P2	P2	P2	P2	P2	P2	P2	;			11 digit end frequency in Hz. (Blank digits must be entered as 0.)		
												• You cannot set an unassigned channel.	
												• Use the MA1 or MI command to register a new section defined memory channel (the start and end frequency are the same).	
												• When the AI function is ON, a response is provided by the MA0 command.	

PC CONTROL COMMAND REFERENCE GUIDE

MEO	Popup Message 1										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 3-digit message ID (refer to the Message ID table below) P2 0: Functions as the [ESC] key 1: Functions as the [F1] key 2: Functions as the [F2] key 3: Functions as the [F3] key 4: Functions as the [F4] key 5: Functions as the [F5] key 6: Functions as the [F6] key 7: Functions as the [F7] key P3 0: Functions as a key press 1: Functions as a long key press (not used) 2: Functions as a key release (used when releasing [F-REC] during the voice message recording screen)
	M	E	0	P1	P1	P1	P2	P3	;		
Read	1	2	3	4	5	6	7	8	9	10	• Operation of the F key which is specified with the setting command for P2 differs every message. [?;] is not returned even when pressing the F key to which no function is assigned.
	M	E	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	M	E	0	P1	P1	P1	;				

Message ID	Display
0	No message display
1	Unused
2	Extraordinary communication configuration frequency access display
3	AGC copy verification display (M > S)
4	AGC copy verification display (S > M)
5	AGC Off verification display
6	Equalizer copy verification display
7	Quick Memory all delete verification display
8	CW message (paddle) register queue display
9	CW message registering display
10	Voice message sound recording queue display
11	Voice message sound recording display
12	Voice message playback display
13	Voice message playback transmission display
14	Audio file playback display
15	Audio file playback NG display
16	File deletion verification display
17	Unused
18	Internal memory capacity insufficient display
19	COM connector operational modification display (normal mode)
20	COM connector operational modification display (MSQ/PKS mode)
21	Unused
22	Program timer configuration completion display
23	Clock unestablished display
24	Program timer start time approach display
25	Program timer finish time approach display
26	Sleep timer sleep approach display
27	Program timer recording display
28	Timer sound recording failure display
29	Data loading verification display (REC.FILE)
30	NTP day and time acquisition success display
31	NTP day and time acquisition failure display
32	Data loading verification display (RXEQ)
33	Data loading verification display (TXEQ)
34	Data loading verification display (Configuration Data)
35	Data loading completion display

PC CONTROL COMMAND REFERENCE GUIDE

Message ID	Display
36	Data loading completion (restart) display
37	Loading file NG display
38	Data loading failure display
39	Data retention verification display (RXEQ)
40	Data retention verification display (TXEQ)
41	Data retention verification display (RTTY)
42 ~ 47	Unused
48	Data retention verification display (PSK)
49	Data retention verification display (REC.FILE)
50	Data retention verification display (Configuration Data)
51	Data retention completion display
52	Format verification display
53	Unmount verification display
54	Unmount completion display
55	Reset run verification display (standard)
56	Reset run verification display (full)
57	Reset run verification display (VFO)
58	Reset run verification display (Memory Channel)
59	Reset run verification display (Menu)
60	Running the reset display (Main LCD)
61	Processing display (whole)
62	Processing display (while NTP acquisition and configuration data writing out)
63 ~ 66	Unused
67	USB memory detection error display
68	USB bus power error display
69	Memory retention failure display
70	USB memory capacity insufficient/writing inhibited display
71	Temperature protection display
72	Frequency unlocking display
73 ~ 74	Unused
75	Program Timer day not yet specified alert warning
76	Unused
77	Program Timer time excess alert warning
78	Program Timer identical time alert warning
79	High temperature transmission protection display
80	Cooling fan malfunction detection display
81	AC/DC power source operational protection display
82	AC/DC power source high temperature detection shutdown posting display
83 ~ 86	Unused
87	Format failure display
88	Operation environmental data change display
89	File deletion failure display
90	Unused
91	USB memory unmount failure display
92	Unused
93	Firmware version mismatch data loading error display
94	Data damage detection error display
95	Unused
96 ~ 107	DSP error detection display

PC CONTROL COMMAND REFERENCE GUIDE

ME1		Popup Message 2									Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 3-digit message ID (refer to the Message ID table above) P2 0: Functions as the [ESC] key 1: Functions as the [F1] key 2: Functions as the [F2] key 3: Functions as the [F3] key 4: Functions as the [F4] key 5: Functions as the [F5] key 6: Functions as the [F6] key 7: Functions as the [F7] key P3 0: Functions as a key press 1: Functions as a long key press <ul style="list-style-type: none"> • Operation of the F key which is specified with the setting command for P2 differs every message. [?:] is not returned even when pressing the F key where allocation of the operation is not done. • In some situations, the message posted using the ME1 command is simultaneously posted with the message from the ME0 command. In such a case, the ME1 message has priority.
	M	E	1	P1	P1	P1	P2	P3	;			
Read		1	2	3	4	5	6	7	8	9	10	
	M	E	1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	M	E	1	P1	P1	P1	;					

MF		Operation Environment Configuration									Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Configuration A 1: Configuration B <ul style="list-style-type: none"> • When changing environments, the transceiver reboots, thus the AI function turns OFF. As such, the MF command does not support automatic response.
	M	F	P1	;								
Read		1	2	3	4	5	6	7	8	9	10	
	M	F	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	M	F	P1	;								

MG		Microphone Gain									Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 000 ~ 255 (in steps of 1) <ul style="list-style-type: none"> • Configure the FM mode microphone gain using the menu. (Refer to the EX command.)
	M	G	P1	P1	P1	;						
Read		1	2	3	4	5	6	7	8	9	10	
	M	G	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	M	G	P1	P1	P1	;						

MI		Memory Channel Registration									Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Single memory channel registration 1: Dual memory channel registration ◆ When registering to a section defined Memory channel, it is registered to the section defined Memory channel regardless of the setting of this parameter. P2 000 ~ 119: Channel number ◆ Channel numbers P00 ~ P09 are represented by 100 ~ 109. Channel numbers E00 ~ E09 are represented by 110 ~ 119. <ul style="list-style-type: none"> • In the case where a blank channel is called, registration of the memory channel is not possible. • When RX and TX of the sub side both turn OFF (in simplex operation and during single reception state), or when accessing a blank channel on the sub side, dual memory channel cannot be registered. • With the section defined memory channel, the start and end frequency are stored as the same frequency. The end frequency is set using the MA7 command.
	M	I	P1	P2	P2	P2	;					

PC CONTROL COMMAND REFERENCE GUIDE

MK	Mode Key Operation										Parameters: P1 0: [LSB/USB] key 1: [CW/CW-R] key 2: [FSK/PSK] key 3: [FM/AM] key 4: [FSK-R] key 5: [PSK-R] key ◆ The [FSK-R] key and [PSK-R] key are virtual keys for PC command control.
	Set	1	2	3	4	5	6	7	8	9	
	M	K	P1	;							

ML	TX Monitor Level										Parameters: P1 000 ~ 255 (in steps of 1)
	Set	1	2	3	4	5	6	7	8	9	
	M	L	P1	P1	P1	;					

MN	Memory Channel Number										Parameters: P1 0: Main Band 1: Sub Band P2 000 ~ 119: ◆ Channel number (Channel numbers P00 ~ P09 are represented by 100 ~ 109. Channel numbers E00 ~ E09 are represented by 110 ~ 119.)
	Set	1	2	3	4	5	6	7	8	9	
	M	N	P1	P2	P2	P2	;				

MO0	TX Monitor										Parameters: P1 0: TX Monitor Off 1: TX Monitor On
	Set	1	2	3	4	5	6	7	8	9	
	M	O	0	P1	;						

MO1	RX Monitor										Parameters: P1 0: RX Monitor Off 1: RX Monitor On • This setting command is for the operating band.
	Set	1	2	3	4	5	6	7	8	9	
	M	O	1	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

M02		DSP Monitor									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: DSP Monitor Off 1: DSP Monitor On • This setting command is for the operating band.
	M	O	2	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	M	O	2	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	M	O	2	P1	;						

MS		Transmission Audio Entry Sound Generator Selection									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: SS signal of SEND/PTT/REMOTE/ACC2 connector 1: PKS signal of DATA SEND/ACC2 connector P2 0: Microphone input transmission OFF 1: Microphone input transmission ON P3 0: ACC2 input transmission OFF 1: ACC2 input transmission ON P4 0: USB-Audio input transmission OFF 1: USB-Audio input transmission ON P5 0: Optical input transmission OFF 1: Optical input transmission ON • ACC2 input (P3) and USB-Audio input (P4) cannot both be ON at the same time. • P2 ~ P5 cannot all be OFF at the same time. • The transmission sound source is appointed by P1 if P2 ~ P5 are all set as "9" and they are returned to their initial settings.
	M	S	P1	P2	P3	P4	P5	;			
Read	1	2	3	4	5	6	7	8	9	10	
	M	S	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	M	S	P1	P2	P3	P4	P5	;			

MT		Meter Selection									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 (Meter Display Item) 0: PO (Meter Display Pattern: Type 2, Type 3 only) 1: ALC (Meter Display Pattern: Type 2, Type 3 only) 2: SWR 3: COMP 4: ID 5: VD 6: TEMP (Meter Display Pattern: Type 1 only) P2 (Meter Display Pattern) 0: Type 1 1: Type 2 2: Type 3 3: Same meter as the Sub band (The pattern which is displayed on the menu screen.) ◆ Even when setting P2 as Type 1 ~ Type 3, the display may display the same meter as the Sub band. In this case, parameter P2 is returned as 3.)
	M	T	P1	;							
Read	1	2	3	4	5	6	7	8	9	10	
	M	T	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	M	T	P1	P2	;						

MU		Mute									Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: Mute OFF 1: Mute ON
	M	U	P1	P2	;						
Read	1	2	3	4	5	6	7	8	9	10	
	M	U	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	M	U	P1	P2	;						

PC CONTROL COMMAND REFERENCE GUIDE

MV	Memory Channel/VFO										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: VFO Mode 1: Single Memory Channel Mode 2: Dual Memory Channel Mode • You cannot directly switch between Single and Dual Memory Channel mode. Switch after returning to VFO mode.
	M	V	P1	P2	;						
Read	1	2	3	4	5	6	7	8	9	10	
	M	V	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	M	V	P1	P2	;						

NB1	Noise Blanker 1										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: NB1 OFF 1: NB1 ON
	N	B	1	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10	
	N	B	1	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	N	B	1	P1	P2	;					

NB2	Noise Blanker 2										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: NB2 OFF 1: NB2 ON
	N	B	2	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10	
	N	B	2	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	N	B	2	P1	P2	;					

NBD	Noise Blanker 2, type B Depth										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1: 0 (Fix) P2 (Depth) 001 ~ 020 999: Initial value setting (setting command only) • This command is supported from the firmware version 1.10.
	N	B	D	P1	P2	P2	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	
	N	B	D	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	N	B	D	P1	P2	P2	P2	;			

NBT	Noise Blanker 2 Type										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1: 0 (Fix) P2 (Type) 0: Type 1 1: Type 2 • This command is supported from the firmware version 1.10.
	N	B	T	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10	
	N	B	T	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	N	B	T	P1	P2	;					

NBW	Noise Blanker 2, type B Width										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1: 0 (Fix) P2 (Width) 001 ~ 020 999: Initial value setting (setting command only) • This command is supported from the firmware version 1.10.
	N	B	W	P1	P2	P2	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	
	N	B	W	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	N	B	W	P1	P2	P2	P2	;			

PC CONTROL COMMAND REFERENCE GUIDE

ND	BEF Attenuation										Parameters: P1 0: Main Band 1: Sub Band P2 00: 20 dB 01: 40 dB 02: 60 dB 03: 80 dB 99: Initial value setting (setting command only)									
	Set	1	2	3	4	5	6	7	8	9		10	N	D	P1	P2	P2	;		
Read	1	2	3	4	5	6	7	8	9	10	N	D	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	N	D	P1	P2	P2	;				

NL1	Noise Blanker 1 Level										Parameters: P1 0: Main Band 1: Sub Band P2 001 ~ 032 (Main Band) 001 ~ 010 (Sub Band) 999: Initial value setting (setting command only) <Sub band only>									
	Set	1	2	3	4	5	6	7	8	9		10	N	L	1	P1	P2	P2	P2	;
Read	1	2	3	4	5	6	7	8	9	10	N	L	1	P1	;					
Answer	1	2	3	4	5	6	7	8	9	10	N	L	1	P1	P2	P2	P2	;		

NL2	Noise Blanker 2 Level										Parameters: P1 0: Main Band 1: Sub Band P2 001 ~ 032 (Main Band) 001 ~ 010 (Sub Band) 999: Initial value setting (setting command only) <Sub band only>									
	Set	1	2	3	4	5	6	7	8	9		10	N	L	2	P1	P2	P2	P2	;
Read	1	2	3	4	5	6	7	8	9	10	N	L	2	P1	;					
Answer	1	2	3	4	5	6	7	8	9	10	N	L	2	P1	P2	P2	P2	;		

NR	Noise Reduction										Parameters: P1 0: Main Band 1: Sub Band P2 0: NR OFF 1: NR1 ON 2: NR2 ON									
	Set	1	2	3	4	5	6	7	8	9		10	N	R	P1	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	N	R	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	N	R	P1	P2	;					

NS	Auto Notch Tracking Speed										Parameters: P1 0: Main Band 1: Sub Band P2 0 (Slow) ~ 4 (Fast) 9: Initial value setting (setting command only)									
	Set	1	2	3	4	5	6	7	8	9		10	N	S	P1	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	N	S	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	N	S	P1	P2	;					

NT	Notch, BEF										Parameters: P1 0: Main Band 1: Sub Band P2 0: Notch OFF 1: Auto Notch 2: Manual Notch 3: BEF									
	Set	1	2	3	4	5	6	7	8	9		10	N	T	P1	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	N	T	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	N	T	P1	P2	;					

PC CONTROL COMMAND REFERENCE GUIDE

NW	Notch Width, BEF Width										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	N	W	P1	P2	P3	P3	;				
Read	1	2	3	4	5	6	7	8	9	10	P2 0: Manual Notch 1: BEF
	N	W	P1	P2	;						
Answer	1	2	3	4	5	6	7	8	9	10	P3 (Manual Notch) 00: Normal 01: Wide P3 (BEF) 00: 300 Hz 01: 400 Hz 02: 500 Hz 03: 600 Hz 04: 700 Hz 05: 800 Hz 06: 900 Hz 07: 1000 Hz 08: 1100 Hz 09: 1200 Hz 99: Initial value setting (setting command only)
	N	W	P1	P2	P3	P3	;				
											<ul style="list-style-type: none"> • When the function being changed is turned OFF, you cannot change the bandwidth of the manual notch.

OM	Operating Mode										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band ◆ This parameter is not used for the setting command. The operating band is always used. Enter any value.
	O	M	P1	P2	;						
Read	1	2	3	4	5	6	7	8	9	10	P2 0: Unused 1: LSB 2: USB 3: CW 4: FM 5: AM 6: FSK 7: CW-R 8: Unused 9: FSK-R A: PSK B: PSK-R C: LSB-D1 D: USB-D1 E: FM-D1 F: AM-D1 G: LSB-D2 H: USB-D2 I: FM-D2 J: AM-D2 K: LSB-D3 L: USB-D3 M: FM-D3 N: AM-D3
	O	M	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	O	M	P1	P2	;						

PA	Pre-amplifier										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band
	P	A	P1	P2	;						
Read	1	2	3	4	5	6	7	8	9	10	P2 0: Pre-amp OFF 1: Pre-amp ON
	P	A	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	P	A	P1	P2	;						

PC CONTROL COMMAND REFERENCE GUIDE

PB0	Voice Message List										Parameters: P1 0: List display OFF 1: List display ON									
	Set	1	2	3	4	5	6	7	8	9		10	P	B	0	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	P	B	0	;						
	Answer	1	2	3	4	5	6	7	8	9	10	P	B	0	P1	;				

PB1	Voice Message Playback, etc.										Parameters: P1 1: Playback Channel 1 2: Playback Channel 2 3: Playback Channel 3 4: Playback Channel 4 5: Playback Channel 5 6: Playback Channel 6 P2 (Operation) 0: Stop 1: Begin Playback 2: Pause/Unpause 3: Fast Forward/ End Fast Forward 4: Rewind/ End Rewind 5: Begin Transmission Playback 6: Repeat Wait (response only) P3 000 ~ 100: Playback elapsed time in seconds ◆ While stopped, this parameter is 000. • You cannot use this command while the Voice Message List display (PB0) is OFF. • You cannot set additional operations for the P2 parameter during the rewind and fast forward operations.									
	Set	1	2	3	4	5	6	7	8	9		10	P	B	1	P1	P2	;		
Read	1	2	3	4	5	6	7	8	9	10	P	B	1	;						
	Answer	1	2	3	4	5	6	7	8	9	10	P	B	1	P1	P2	P3	P3	P3	;

PB2	Voice Message Channel Registration State										Parameters: P1 1: Playback Channel 1 2: Playback Channel 2 3: Playback Channel 3 4: Playback Channel 4 5: Playback Channel 5 6: Playback Channel 6 P2 0: Unregistered channel 1: Registered channel P3 000 ~ 100: Registered time in seconds • You cannot use this command while the Voice Message List display (PB0) is OFF. • The P3 parameter becomes 000 for unregistered channels.									
	Read	1	2	3	4	5	6	7	8	9		10	P	B	2	P1	;			
Answer	1	2	3	4	5	6	7	8	9	10	P	B	2	P1	P2	P3	P3	P3	;	

PB3	Voice Message Channel Repeat										Parameters: P1 1: Playback Channel 1 2: Playback Channel 2 3: Playback Channel 3 4: Playback Channel 4 5: Playback Channel 5 6: Playback Channel 6 P2 0: Repeat OFF 1: Repeat ON • You cannot use this command while the Voice Message List display (PB0) is OFF. • You cannot set unregistered channels.									
	Set	1	2	3	4	5	6	7	8	9		10	P	B	3	P1	P2	;		
Read	1	2	3	4	5	6	7	8	9	10	P	B	3	P1	;					
	Answer	1	2	3	4	5	6	7	8	9	10	P	B	3	P1	P2	;			

PC CONTROL COMMAND REFERENCE GUIDE

PB4	Voice Message Channel Name										Parameters:
Set	1	2	3	4	5	6 ~ 35		36	37	38	P1 1: Playback Channel 1 2: Playback Channel 2 3: Playback Channel 3 4: Playback Channel 4 5: Playback Channel 5 6: Playback Channel 6
	P	B	4	P1	P2	P3		;			
Read	1	2	3	4	5	6	7	8	9	10	P2 Always a space P3 Up to 30 characters: Channel name
	P	B	4	P1	;						
Answer	1	2	3	4	5	6 ~ 35		36	37	38	<ul style="list-style-type: none"> You cannot use this command while the Voice Message List display (PB0) is OFF. You cannot set unregistered channels.
	P	B	4	P1	P2	P3		;			

PB5	Voice Message Recording Sound Source										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Microphone 1: ACC2 2: USB Audio 3: Optical
	P	B	5	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	<ul style="list-style-type: none"> You cannot use this command while the Voice Message List display (PB0) is OFF.
	P	B	5	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	P	B	5	P1	;						

PB6	Voice Message Recording Total Time										Parameters:
Read	1	2	3	4	5	6	7	8	9	10	P1 000 ~ 100: Duration in seconds
	P	B	6	;							
Answer	1	2	3	4	5	6	7	8	9	10	<ul style="list-style-type: none"> You cannot use this command while the Voice Message List display (PB0) is OFF.
	P	B	6	P1	P1	P1	;				

PC	Output Power										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 (TS-990S) 005 ~ 200: SSB/ CW/ FM/ FSK/ PSK 005 ~ 050: AM
	P	C	P1	P1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	<ul style="list-style-type: none"> If a transmission output limiter is in use, the retrieved output power value will be limited.
	P	C	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	P	C	P1	P1	P1	;					

PL	Speech Processor Input/Output Level										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 (Input level) 000 (minimum) ~ 255 (maximum) P2 (Output level) 000 (minimum) ~ 255 (maximum)
	P	L	P1	P1	P1	P2	P2	P2	;		
Read	1	2	3	4	5	6	7	8	9	10	
	P	L	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	P	L	P1	P1	P1	P2	P2	P2	;		

PRO	Speech Processor										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Speech Processor OFF 1: Speech Processor ON
	P	R	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	P	R	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	P	R	0	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

PR1	Speech Processor Effect Type										Parameters: P1 0: Soft 1: Hard									
	Set	1	2	3	4	5	6	7	8	9		10	P	R	1	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	P	R	1	;						
	Answer	1	2	3	4	5	6	7	8	9	10	P	R	1	P1	;				

PS	Power ON/ OFF										Parameters: P1 0: Power OFF 1: Power ON 2: Power Source OFF (end) during processing (response only) 3: Power Source ON (activate) during processing (response only) 4: During timer recording preparations (response only) 5: During timer recording operation (response only) 6: During timer recording cancellation confirmation display (response only)									
	Set	1	2	3	4	5	6	7	8	9		10	P	S	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	P	S	;							
	Answer	1	2	3	4	5	6	7	8	9	10	P	S	P1	;					
											<ul style="list-style-type: none"> • While the transceiver is in economical standby mode, you cannot use this command to turn the power ON/OFF. • When the transceiver is turned ON using this command, the response command (PS1;) is output. The transceiver cannot accept commands until activation is completed. • During timer recording preparations, you cannot perform setting commands. • During timer recording operation, you cannot perform commands other than ID, ME and PS. 									

PT	Side Tone/Pitch Frequency										Parameters: P1 000 ~ 080: 300 Hz to 1100 Hz (in steps of 10 Hz)									
	Set	1	2	3	4	5	6	7	8	9		10	P	T	P1	P1	P1	;		
Read	1	2	3	4	5	6	7	8	9	10	P	T	;							
	Answer	1	2	3	4	5	6	7	8	9	10	P	T	P1	P1	P1	;			

PC CONTROL COMMAND REFERENCE GUIDE

QA		Quick Memory Channel Information										Parameters:
Read		1	2	3	4	5	6	7	8	9	10	P1 0 ~ 9: Quick Memory Channel Number P2 11-digit Main band frequency (Unused high-end digits will become 0.) ◆ When no information is available for a parameter, it is returned as blank. P3 Main band mode (Refer to P2 of the MS command.) ◆ When no information is available for a parameter, it is returned as blank. P4 11-digit Sub band frequency (Unused high-end digits will become 0.) ◆ When no information is available for a parameter, it is returned as blank. P5 Sub band mode (Refer to P2 of the MS command.) ◆ When no information is available for a parameter, it is returned as blank. P6 0: Simplex 1: Split ◆ When no information is available for a parameter, it is returned as blank. P7 0: Dual Reception OFF 1: Dual Reception ON ◆ When no information is available for a parameter, it is returned as blank. • Auto answer is not provided by the AI function.
	Q	A	P1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	Q	A	P1	P2	P2	P2	P2	P2	P2	P2	P2	
		11	12	13	14	15	16	17	18	19	20	
	P2	P2	P2	P2	P3	P4	P4	P4	P4	P4	P4	
		21	22	23	24	25	26	27	28	29	30	
	P4	P4	P4	P4	P4	P4	P5	P6	P7	;		

QD		Quick Memory All Delete										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	No parameters are used with this command. • When the AI function is ON, a response is output when deleting the Quick Memory. • You cannot perform this command when Quick Memory mode is OFF.
	Q	D	;									
Read		1	2	3	4	5	6	7	8	9	10	
	Q	D	;									

QI		Writing the Quick Memory										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	No parameters are used with this command. • Performs the same function as pressing [Q-M.IN]. • When the AI function is ON, a response is output when writing to the Quick Memory.
	Q	I	;									
Read		1	2	3	4	5	6	7	8	9	10	
	Q	I	;									

QR		Quick Memory										Parameters:	
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Quick Memory OFF 1: Quick Memory ON P2 0 ~ 9: Quick Memory channel number ◆ If parameter P1=0, set parameter P2 to 0. ◆ When selecting Quick Memory ON but not setting a channel number, this setting is blank <0x20>.	
	Q	R	P1	P2	;								
Read		1	2	3	4	5	6	7	8	9	10		
	Q	R	;										
Answer		1	2	3	4	5	6	7	8	9	10		
	Q	R	P1	P2	;								
													• When configuring a value above the number of Quick Memory channels set by the menu, an error occurs. • When specifying a blank channel, an error occurs.

PC CONTROL COMMAND REFERENCE GUIDE

RA		Attenuator										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band ◆ This parameter is invalid during the Setting command; the operating band is always selected. Enter any value.
	R	A	P1	P2	;							
Read		1	2	3	4	5	6	7	8	9	10	P2 0: ATT OFF 1: -6 dB 2: -12 dB 3: -18 dB
	R	A	P1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	R	A	P1	P2	;							

RC		RIT/XIT Frequency Clear										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	No parameters are used with this command. • Clears the RIT/XIT frequency regardless if the RIT/XIT function is ON or OFF.
	R	C	;									

RD / RU		RIT/XIT Frequency Up/ Down										Parameters:
Set 1		1	2	3	4	5	6	7	8	9	10	P1 (Set 2 command only) 00000 ~ 09999: Frequency (in Hz) • Use setting 1 to adjust the RIT/XIT frequency by 1 step. • The RU command is used to increase the frequency and the RD command is used to decrease the frequency. • Use the setting 2 to set a RIT/XIT frequency via the P1 parameter. Use the RU command to enter a positive frequency and the RD command to enter a negative frequency.
	R	D/U	;									
Set 2		1	2	3	4	5	6	7	8	9	10	
	R	D/U	P1	P1	P1	P1	P1	;				

RE		Recording Function										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Recording/Playback stop 1: Begin manual recording/recording in progress 2: Full-time recording storage (setting only) 3: Begin quick playback/playback in progress 4: Pause manual recording/resume recording 5: Pause quick playback/resume playback 6: Recording failure (response only) 7: Playback failure (response only) ◆ The AI function will not perform an auto response when a recording or playback failure occurs due to the operation of the transceiver.
	R	E	P1	;								
Read		1	2	3	4	5	6	7	8	9	10	P2 001 ~ 100: Playback progression (000 when no playback is in progress.) ◆ The AI function performs an auto response every second for the playback progression.
	R	E	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	R	E	P1	P2	P2	P2	;					

RF		RIT/XIT Frequency Up/ Down										Parameters:
Read		1	2	3	4	5	6	7	8	9	10	P1 (RIT/XIT frequency direction) 0: + direction 1: - direction P2 0000 ~ 9999: RIT/XIT frequency in Hz
	R	F	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	R	F	P1	P2	P2	P2	P2	;				

RG		RF Gain										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 000 ~ 255 (in steps of 1)
	R	G	P1	P2	P2	P2	;					
Read		1	2	3	4	5	6	7	8	9	10	
	R	G	P1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	R	G	P1	P2	P2	P2	;					

PC CONTROL COMMAND REFERENCE GUIDE

RL1		Noise Reduction 1 Level									Parameters: P1 0: Main Band 1: Sub Band P2 (NR1 level) 01 ~ 10 99: Initial value setting (setting command only) <Sub Band only>	
Set		1	2	3	4	5	6	7	8	9		10
	R	L	1	P1	P2	P2	;					
Read		1	2	3	4	5	6	7	8	9		10
	R	L	1	P1	;							
Answer		1	2	3	4	5	6	7	8	9	10	
	R	L	1	P1	P2	P2	;					

RL2		Noise Reduction 2 Level									Parameters: P1 0: Main Band 1: Sub Band P2 (NR2 level) 00 (2 ms) ~ 09 (20 ms) 99: Initial value setting (setting command only) <Sub Band only>	
Set		1	2	3	4	5	6	7	8	9		10
	R	L	2	P1	P2	P2	;					
Read		1	2	3	4	5	6	7	8	9		10
	R	L	2	P1	;							
Answer		1	2	3	4	5	6	7	8	9	10	
	R	L	2	P1	P2	P2	;					

RM		Meter									Parameters: P1 1: ALC 2: SWR 3: COMP 4: ID 5: VD 6: TEMP P2 (Read Setting) 0: Do not read 1: Read ◆ When turning the power ON, all meters are reset to “do not read”. P3 0000 ~ 0070: Meter oscillation ◆ This value shows the oscillation (number of dots) of the transceiver digital meter. <ul style="list-style-type: none"> • The meter value of the meter type (multi data input is possible) which has been set, is output. • You can set the type of meter to be displayed using the MT command. • The ALC meter value is output during recording and standby (Even when P2 set to “do not read”). 	
Set		1	2	3	4	5	6	7	8	9		10
	R	M	P1	P2	;							
Read		1	2	3	4	5	6	7	8	9		10
	R	M	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	R	M	P1	P3	P3	P3	P3	;				

RT		RIT ON/OFF, RIT Shift									Parameters: P1 0: RIT OFF 1: RIT ON 2: RIT Shift (setting command only) <ul style="list-style-type: none"> • RIT Shift, supported from the firmware version 1.20. 	
Set		1	2	3	4	5	6	7	8	9		10
	R	T	P1	;								
Read		1	2	3	4	5	6	7	8	9		10
	R	T	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	R	T	P1	;								

RX		Receiver Function Status									Parameters: No parameters are used with this command. <ul style="list-style-type: none"> • A response is output only when the AI function is working. 	
Set		1	2	3	4	5	6	7	8	9		10
	R	X	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	R	X	;									

PC CONTROL COMMAND REFERENCE GUIDE

SB	Sub Band Receiver										Parameters: P1 0: OFF 1: ON									
	Set	1	2	3	4	5	6	7	8	9		10	S	B	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	S	B	;							
Answer	1	2	3	4	5	6	7	8	9	10	S	B	P1	;						

SCO	Scan										Parameters: P1 (Setting only) 0: Scan OFF 1: Scan ON P2 (Scan status) 0: Scan OFF 1: Scan ON (Main Band) 2: Scan ON (Sub Band) P3 0: Outside the Slow Scan frequency range 1: Inside the Slow Scan frequency range ◆ Other than Program Scan, it is always 0.									
	Set	1	2	3	4	5	6	7	8	9		10	S	C	0	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	S	C	0	;						
Answer	1	2	3	4	5	6	7	8	9	10	S	C	0	P2	P3	;				

SC1	Scan Speed										Parameters: P1 1 ~ 9									
	Set	1	2	3	4	5	6	7	8	9		10	S	C	1	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	S	C	1	;						
Answer	1	2	3	4	5	6	7	8	9	10	S	C	1	P1	;					

SC2	Tone Scan/ CTCSS Scan										Parameters: P1 0: Main Band 1: Sub Band P2 0: Tone/CTCSS Scan OFF 1: Tone Scan 2: CTCSS Scan • You can perform the setting when the scan operating band is in FM mode. • The Tone function turns ON automatically when performing Tone Scan with this command. • The CTCSS function turns ON automatically when performing CTCSS Scan with this command.									
	Set	1	2	3	4	5	6	7	8	9		10	S	C	2	P1	P2	;		
Read	1	2	3	4	5	6	7	8	9	10	S	C	2	P1	;					
Answer	1	2	3	4	5	6	7	8	9	10	S	C	2	P1	P2	;				

SD	Break-in Delay Time										Parameters: P1 0050 ~ 1000 (ms) (in steps of 50)									
	Set	1	2	3	4	5	6	7	8	9		10	S	D	P1	P1	P1	P1	;	
Read	1	2	3	4	5	6	7	8	9	10	S	D	;							
Answer	1	2	3	4	5	6	7	8	9	10	S	D	P1	P1	P1	P1	;			

PC CONTROL COMMAND REFERENCE GUIDE

SEO	Preselector ON/OFF										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Preselector OFF 1: Preselector ON
	S	E	0	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	S	E	0	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	E	0	P1	;						

SE1	Preselector Band Shift										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 (Band shift) 00 ~ 40 (in steps of 1) ◆ The band shift center is 20. When setting the P1 parameter to 99, it returns to the initial value (center). ◆ Setting cannot be performed when the main band frequency is on a preselector non-operation band. ◆ When reading on a non-operation band, the center value is returned. P2 00: 1.8 MHz Band 01: 3.5 MHz Band 02: 5 MHz Band 03: 7 MHz Band 04: 10 MHz Band 05: 14 MHz Band 06: 18 MHz Band 07: 21 MHz Band 08: 24 MHz Band 09: 28 MHz Band 10: Preselector inoperative band
	S	E	1	P1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	
	S	E	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	E	1	P1	P1	P2	P2	;			

PC CONTROL COMMAND REFERENCE GUIDE

SH	Receive Filter High-cut Frequency/ Shift Frequency										Parameters:																																																																																																																							
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2: High-cut Frequency ID <Firmware version 1.20 or later>																																																																																																																							
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k	1800	009	1500	2.9 k	1900	010	1600	3.0 k	2000	011	1700	3.5 k	2100	012	1800	4.0 k	2200	013	1900	5.0 k	2300	014	2000		2400	015	2100		2500	016	2200		2600	017	2300		2700	018	2400		2800	019	2500		2900	020	2600		3000	021	2700		3400	022	2800		4000	023	2900		5000	024	3000			025	3400			026	4000			027	5000		
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- ◆ An error occurs when entering an ID with no assigned frequency for the setting command.
- ◆ Entering a value of 999 results in the initial value being entered.

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Read	1	2	3	4	5	6	7	8	9	10	P2 (High-cut Frequency ID/ Shift Frequency ID) <Firmware version 1.13 or lower>																																																																																																																																																																																		
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SM	S-Meter/Power Meter										Parameters:
Read	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0000 ~ 0070: Meter oscillation ◆ This value shows the oscillation (number of dots) of the transceiver digital meter. ◆ The SM command reads the S-meter during reception and the power meter during transmission. ◆ While receiving, the Sub band value is returned as 0000.
	S	M	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	M	P1	P2	P2	P2	P2	;			

SP	Split Operation Frequency Setting										Parameters:
Set 1	1	2	3	4	5	6	7	8	9	10	P1 0: During no operation/ Complete the setting 1: During the setting/ Start the setting 2: Cancel the setting (Set only) ◆ When using Setting 2, set the P1 parameter to 0. ◆ The "SPLIT" LED blinks during this setting. P2 (Shift direction) 0: + shift 1: - shift P3 1 ~ 9: Shift amount (in kHz) • When performing setting 2, Split operation activates automatically.
	S	P	P1	;							
Set 2	1	2	3	4	5	6	7	8	9	10	
	S	P	P1	P2	P3	;					
Read	1	2	3	4	5	6	7	8	9	10	
	S	P	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	S	P	P1	;							

SQ	Squelch Level										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 000 ~ 255 (in steps of 1): Squelch level
	S	Q	P1	P2	P2	P2	;				
Read	1	2	3	4	5	6	7	8	9	10	
	S	Q	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	Q	P1	P2	P2	P2	;				

PC CONTROL COMMAND REFERENCE GUIDE

SR	Reset										Parameters: P1 1: Menu reset 2: Memory channel reset 3: VFO reset 4: Standard reset 5: Full reset
	Set	1	2	3	4	5	6	7	8	9	
	S	R	P1	;							

SS	Program Slow Scan Point Frequency										Parameters: P1 0 ~ 9: Memory channel number for Program Slow Scan P2 0 ~ 4: Slow down frequency spot P3 Slow down frequency (11 digits in Hz)
	Set	1	2	3	4	5	6	7	8	9	
	S	S	P1	P2	P3	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20	
	P3	P3	P3	P3	P3	;					
Read	1	2	3	4	5	6	7	8	9	10	
	S	S	P1	P2	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	S	S	P1	P2	P3	P3	P3	P3	P3	P3	
	11	12	13	14	15	16	17	18	19	20	
	P3	P3	P3	P3	P3	;					

- If no point frequency has been set, parameter P3 is all 0's.
- If parameter P3 is set to all 0's, the point frequency set for parameter P2 is deleted.
- Other than when deleting parameter P3, you cannot set a frequency exceeding the section selected channel lower/upper frequency limits.
- If the specified P1 parameter is an empty Memory channel, the SS command becomes invalid.

SU	Program Scan Section/ Memory Scan Group										Parameters: P1 0: Program Scan section defined memory setting 1: Memory Scan group setting P2 ~ P13 0: Unselected 1: Selected
	Set	1	2	3	4	5	6	7	8	9	
	S	U	P1	P2	P3	P4	P5	P6	P7	P8	
	11	12	13	14	15	16	17	18	19	20	
	P9	P10	P11	P12	P13	;					
Read	1	2	3	4	5	6	7	8	9	10	
	S	U	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	U	P1	P2	P3	P4	P5	P6	P7	P8	
	11	12	13	14	15	16	17	18	19	20	
	P9	P10	P11	P12	P13	;					

Parameter	When Selecting the Program Scan Section	When Setting the Memory Scan Group
P2	The section set in Channel 0	Group 0
P3	The section set in Channel 1	Group 1
P4	The section set in Channel 2	Group 2
P5	The section set in Channel 3	Group 3
P6	The section set in Channel 4	Group 4
P7	The section set in Channel 5	Group 5
P8	The section set in Channel 6	Group 6
P9	The section set in Channel 7	Group 7
P10	The section set in Channel 8	Group 8
P11	The section set in Channel 9	Group 9
P12	Always 0	Group P
P13	Always 0	Group E

SV	Memory Transfer Operation										Parameters: No parameters are used with this command. • Performs the same function as the transceiver [M>V] key.
	Set	1	2	3	4	5	6	7	8	9	
	S	V	;								

TB	Transmit Band/Split										Parameters: P1 0: Main Band (Split OFF) 1: Sub Band (Split ON)
	Set	1	2	3	4	5	6	7	8	9	
	T	B	P1	;							
Read	1	2	3	4	5	6	7	8	9	10	
	T	B	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	T	B	P1	;							

PC CONTROL COMMAND REFERENCE GUIDE

TF0	Transmit Filter										Parameters: P1 0: FIL-A 1: FIL-B 2: FIL-C									
	Set	1	2	3	4	5	6	7	8	9		10	T	F	0	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	T	F	0	;						
	Answer	1	2	3	4	5	6	7	8	9	10	T	F	0	P1	;				

TF1	Transmit Filter Low-cut Frequency										Parameters: P1 0: 10 Hz 1: 100 Hz 2: 200 Hz 3: 300 Hz 4: 400 Hz 5: 500 Hz 9: Initial value setting (setting command only)									
	Set	1	2	3	4	5	6	7	8	9		10	T	F	1	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	T	F	1	;						
	Answer	1	2	3	4	5	6	7	8	9	10	T	F	1	P1	;				

TF2	Transmit Filter High-cut Frequency										Parameters: P1 0: 2500 Hz 1: 2600 Hz 2: 2700 Hz 3: 2800 Hz 4: 2900 Hz 5: 3000 Hz 6: 3500 Hz 7: 4000 Hz 9: Initial value setting (setting command only)									
	Set	1	2	3	4	5	6	7	8	9		10	T	F	2	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	T	F	2	;						
	Answer	1	2	3	4	5	6	7	8	9	10	T	F	2	P1	;				

TMO	Timer										Parameters: P1 0: Timer OFF/ pause 1: Timer ON/ unpaue									
	Set	1	2	3	4	5	6	7	8	9		10	T	M	0	P1	;			
Read	1	2	3	4	5	6	7	8	9	10	T	M	0	;						
	Answer	1	2	3	4	5	6	7	8	9	10	T	M	0	P1	;				

PC CONTROL COMMAND REFERENCE GUIDE

TM1	Program Timer										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Program Timer OFF 1: Program Timer ON P2 0: Repeat OFF 1: Repeat ON P3 (Sunday) P4 (Monday) P5 (Tuesday) P6 (Wednesday) P7 (Thursday) P8 (Friday) P9 (Saturday) 0: Unselected 1: Selected P10 (Operation classification) 0: ON (On Timer) 1: OFF (Off Timer) 2: ON & OFF (On/Off Timer) 3: REC (Timer Recorder) P11 0000 ~ 2359: Start time ◆ When the P10 parameter is OFF (Off Timer), this configuration is ignored and the response becomes blank. P12 0000 ~ 2359: End time ◆ When the P10 parameter is ON (On Timer), this configuration is ignored and the response becomes blank. P13 (Main band frequency) 11 digit frequency (in Hz). Unused digits are 0. P14 (Main band mode) Refer to the OM command P2 parameter. P15 (Sub band frequency) 11 digit frequency (in Hz). Unused digits are 0. P16 (Sub band mode) Refer to the OM command P2 parameter. P17 (Transmit/Receive state) 0: Simplex 1: Split 2: Dual Reception 3: TF-WATCH
	T	M	1	P1	P2	P3	P4	P5	P6	P7	
	11	12	13	14	15	16	17	18	19	20	
	P8	P9	P10	P11	P11	P11	P11	P12	P12	P12	
	21	22	23	24	25	26	27	28	29	30	
	P12	P13	P13	P13	P13	P13	P13	P13	P13	P13	
	31	32	33	34	35	36	37	38	39	40	
	P13	P13	P14	P15	P15	P15	P15	P15	P15	P15	
41	42	43	44	45	46	47	48	49	50		
P15	P15	P15	P16	P17	;						
Read	1	2	3	4	5	6	7	8	9	10	
	T	M	1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	T	M	1	P1	P2	P3	P4	P5	P6	P7	
	11	12	13	14	15	16	17	18	19	20	
	P8	P9	P10	P11	P11	P11	P11	P12	P12	P12	
	21	22	23	24	25	26	27	28	29	30	
	P12	P13	P13	P13	P13	P13	P13	P13	P13	P13	
	31	32	33	34	35	36	37	38	39	40	
	P13	P13	P14	P15	P15	P15	P15	P15	P15	P15	
41	42	43	44	45	46	47	48	49	50		
P15	P15	P15	P16	P17	;						

TM2	Sleep Timer										Parameters:
Set	1	2	3	4	5	6	7	8	9	10	P1 0: OFF 1: 5 minutes 2: 10 minutes 3: 15 minutes 4: 30 minutes 5: 60 minutes 6: 90 minutes 7: 120 minutes P2 000 ~ 120: Sleep duration (in minutes) ◆ When the timer is OFF, P2 is returned as 000. • The sleep timer operation starts when any value other than OFF is set.
	T	M	2	P1	;						
Read	1	2	3	4	5	6	7	8	9	10	
	T	M	2	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	T	M	2	P1	P2	P2	P2	;			

PC CONTROL COMMAND REFERENCE GUIDE

TN	FM Tone Frequency										Parameters:																																																																																																																							
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 (Tone Frequency)																																																																																																																							
	T	N	P1	P2	P2	;																																																																																																																												
Read	1	2	3	4	5	6	7	8	9	10																																																																																																																								
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P2	Freq. (Hz)	P2	Freq. (Hz)	P2	Freq. (Hz)	P2	Freq. (Hz)	00	67.0	13	103.5	26	159.8	39	199.5	01	69.3	14	107.2	27	162.2	40	203.5	02	71.9	15	110.9	28	165.5	41	206.5	03	74.4	16	114.8	29	167.9	42	210.7	04	77.0	17	118.8	30	171.3	43	218.1	05	79.7	18	123.0	31	173.8	44	225.7	06	82.5	19	127.3	32	177.3	45	229.1	07	85.4	20	131.8	33	179.9	46	233.6	08	88.5	21	136.5	34	183.5	47	241.8	09	91.5	22	141.3	35	186.2	48	250.3	10	94.8	23	146.2	36	189.9	49	254.1	11	97.4	24	151.4	37	192.8	50	1750	12	100.0	25	156.7	38	196.6	99	Default
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11	97.4	24	151.4	37	192.8	50	1750																																																																																																																											
12	100.0	25	156.7	38	196.6	99	Default																																																																																																																											
T	N	P1	P2	P2	;																																																																																																																													

TO	FM Tone/ CTCSS/ Cross-Tone										Parameters:			
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main Band 1: Sub Band P2 0: OFF 1: Tone ON 2: CTCSS 3: Cross-Tone			
	T	O	P1	P2	;									
Read	1	2	3	4	5	6	7	8	9	10				
	T	O	P1	;										
Answer	1	2	3	4	5	6	7	8	9	10				
	T	O	P1	P2	;									

TS	TF-Set										Parameters:	
Set	1	2	3	4	5	6	7	8	9	10	P1 0: TF-Set OFF 1: TF-Set ON	
	T	S	P1	;								
Read	1	2	3	4	5	6	7	8	9	10		
	T	S	;									
Answer	1	2	3	4	5	6	7	8	9	10		
	T	S	P1	;								

TR	Frequency Tracking										Parameters:	
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Frequency tracking OFF 1: Frequency tracking ON	
	T	R	P1	;								
Read	1	2	3	4	5	6	7	8	9	10		
	T	R	;									
Answer	1	2	3	4	5	6	7	8	9	10		
	T	R	P1	;								

TX	Transmission Mode										Parameters:	
Set	1	2	3	4	5	6	7	8	9	10	P1 0: SEND/PTT (normal transmission using the MIC input) 1: DATA SEND/PKS (ACC2/ USB input) 2: TX TUNE	
	T	X	P1	;								
Read	1	2	3	4	5	6	7	8	9	10		
	T	X	P1	;								

PC CONTROL COMMAND REFERENCE GUIDE

UR / UT	RX / TX Equalizer										Parameters: P1: 0 Hz level P2: 300 Hz level P3: 600 Hz level P4: 900 Hz level P5: 1200 Hz level P6: 1500 Hz level P7: 1800 Hz level P8: 2100 Hz level P9: 2400 Hz level P10: 2700 Hz level P11: 3000 Hz level P12: 3300 Hz level P13: 3600 Hz level P14: 3900 Hz level P15: 4200 Hz level P16: 4500 Hz level P17: 4800 Hz level P18: 5100 Hz level 00 ~ 30: Where 00 is +6 dB, 06 is 0 dB, and 30 is -24 dB. ◆ An entered value of 99 for parameters P1 ~ P18 sets that parameter to its initial value. • The levels you select using this command will be stored in the transceiver memory.
Set	1	2	3	4	5	6	7	8	9	10	
	U	R/T	P1	P1	P2	P2	P3	P3	P4	P4	
	11	12	13	14	15	16	17	18	19	20	
	P5	P5	P6	P6	P7	P7	P8	P8	P9	P9	
	21	22	23	24	25	26	27	28	29	30	
	P10	P10	P11	P11	P12	P12	P13	P13	P14	P14	
	31	32	33	34	35	36	37	38	39	40	
Read	1	2	3	4	5	6	7	8	9	10	
	U	R/T	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	U	R/T	P1	P1	P2	P2	P3	P3	P4	P4	
	11	12	13	14	15	16	17	18	19	20	
	P5	P5	P6	P6	P7	P7	P8	P8	P9	P9	
	21	22	23	24	25	26	27	28	29	30	
	P10	P10	P11	P11	P12	P12	P13	P13	P14	P14	
	31	32	33	34	35	36	37	38	39	40	
	P15	P15	P16	P16	P17	P17	P18	P18	;		

VD	VOX Delay Time										Parameters: P1 (Input type) 0: MIC 1: ACC2 2: USB-Audio 3: Optical P2 000 ~ 020: VOX Delay Time (value x 150 ms) 999: Initial value setting (setting command only)
Set	1	2	3	4	5	6	7	8	9	10	
	V	D	P1	P2	P2	P2	;				
Read	1	2	3	4	5	6	7	8	9	10	
	V	D	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	V	D	P1	P2	P2	P2	;				

VGO	VOX Gain										Parameters: P1 (Input type) 0: Microphone 1: ACC2 2: USB-Audio 3: Optical P2 000 ~ 255: VOX Gain level for Microphone input (in steps of 1) 000 ~ 020: VOX Gain level for an input other than the Microphone 999: Initial value setting (setting command only)
Set	1	2	3	4	5	6	7	8	9	10	
	V	G	0	P1	P2	P2	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	
	V	G	0	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	V	G	0	P1	P2	P2	P2	;			

VG1	Anti-VOX Level										Parameters: P1 (Input type) 0: MIC 1: ACC2 2: USB-Audio 3: Optical P2 000 ~ 020: Anti-VOX level 999: Initial value setting (setting command only)
Set	1	2	3	4	5	6	7	8	9	10	
	V	G	1	P1	P2	P2	P2	;			
Read	1	2	3	4	5	6	7	8	9	10	
	V	G	1	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10	
	V	G	0	P1	P2	P2	P2	;			

VRO	Voice Guide										Parameters: P1 1: Voice 1 (Main Band) 2: Voice 2 3: Voice 3 4: Voice 1 (Sub Band)
Set	1	2	3	4	5	6	7	8	9	10	
	V	R	0	P1	;						

PC CONTROL COMMAND REFERENCE GUIDE

VR1		Auto Announce Pause										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Resume 1: Pause ◆ This command will not automatically respond when using the AI function.
	V	R	1	P1	;							
Read		1	2	3	4	5	6	7	8	9	10	
	V	R	1	;								
Answer		1	2	3	4	5	6	7	8	9	10	
	V	R	1	P1	;							

VV		Main Band to Sub Band Copy ([M>S] key operation)										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	No parameters are used with this command.
	V	V	;									

VX		VOX Function										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: VOX OFF 1: VOX ON • This command cannot be set in modes other than SSB/AM/FM. • When reading this command in a mode other than SSB/AM/FM, "0" is returned.
	V	X	P1	;								
Read		1	2	3	4	5	6	7	8	9	10	
	V	X	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	V	X	P1	;								

XO		Transverter Offset Direction and Frequency										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 (For the transceiver frequency, the transverter frequency can be set in either direction) 0: + direction 1: - direction P2 Offset frequency in Hz (11 digits in Hz) • The frequency which the difference frequency to the frequency which is acquired by the FA/FB command (subtraction) becomes the transverter display frequency. • The settings in which the transverter display frequency becomes 0 or the setting exceeds 4,294,967,295 Hz causes an error.
	X	O	P1	P2	P2	P2	P2	P2	P2	P2	P2	
	11	12	13	14	15	16	17	18	19	20		
Read		1	2	3	4	5	6	7	8	9	10	
	X	O	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	X	O	P1	P2	P2	P2	P2	P2	P2	P2	P2	
	11	12	13	14	15	16	17	18	19	20		

XT		XIT ON/OFF, XIT Shift										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: XIT OFF 1: XIT ON 2: XIT Shift (setting command only) • XIT Shift, supported from the firmware version 1.20.
	X	T	P1	;								
Read		1	2	3	4	5	6	7	8	9	10	
	X	T	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	X	T	P1	;								

XV		Transverter ON/OFF										Parameters:
Set		1	2	3	4	5	6	7	8	9	10	P1 0: Transverter OFF 1: Transverter ON
	X	V	P1	;								
Read		1	2	3	4	5	6	7	8	9	10	
	X	V	;									
Answer		1	2	3	4	5	6	7	8	9	10	
	X	V	P1	;								

PC CONTROL COMMAND REFERENCE GUIDE

00	Notification of Restart										Parameters: No parameters are used with this command.
	1	2	3	4	5	6	7	8	9	10	
Read	0	0	;								<ul style="list-style-type: none"> When the transceiver is automatically restarted by a function such as reset, this command is output. If the AI function is OFF, this command is not output.

LAN EXCLUSIVE COMMAND TABLES

##CN	LAN Connection Command										Parameters: P1 0: Connection Denied 1: Connection Authorized
	1	2	3	4	5	6	7	8	9	10	
Read	#	#	C	N	;						<ul style="list-style-type: none"> If a LAN connection already exists, performing this command will result in a connection denial.
Answer	#	#	C	N	P1	;					

##DD2	Display Data Output Control (Bandscope Display Information For High-Speed Output)										Parameters: P1 Bandscope spectrum display information (1280 digits) 640 spectrum information are each expressed as 2 ASCII digits. Two digits at the beginning are spectrum information of the left side, and two digits at the end become the spectrum information of the right side. The range of value for each spectrum information is from 00h ~ 8Ch (hexadecimal numbering). 00h shows the state where the spectrum is extended to the top (signal strength = 0 dB) and 8Ch shows a state where the spectrum is not displayed (signal strength = -100 dB). The respective spectrum information is converted to ASCII code of the hexadecimal number of from the upper byte digits. For 8Ch, the order becomes "8", "C".
	1	2	3	4	5	6 ~ 1285	1286	1287	1288		
Answer	#	#	D	D	2	P1	;				<ul style="list-style-type: none"> When the AI function is ON, the data is output at a constant period by the LAN terminal when the DD0 command is set to the high-speed output. When the transceiver is not displaying the bandscope, it is not output.

##DD3	Display Data Output Control (Subscope Display Information For High-Speed Output)										Parameters: P1 Subscope Spectrum Display Information (570 digits) 285 spectrum information are each expressed as 2 ASCII digits. Two digits at the beginning are spectrum information of the left side, and two digits at the end become the spectrum information of the right side. The range of value for each spectrum information is from 00h ~ 32h (hexadecimal numbering). 00h shows the state where the spectrum is extended to the top (signal strength = 0 dB) and 32h shows a state where the spectrum is not displayed (signal strength = -50 dB). The respective spectrum information is converted to ASCII code of the hexadecimal number of from the upper byte digits. For 32h, the order becomes "3", "2".
	1	2	3	4	5	6 ~ 1285	1286	1287	1288		
Answer	#	#	D	D	3	P1	;				<ul style="list-style-type: none"> When the AI function is ON, the data is output at a constant period by the LAN terminal when the DD0 command is set to the high-speed output. When the transceiver is not displaying the subscope, it is not output.

PC CONTROL COMMAND REFERENCE GUIDE

##ID	LAN Connection Login Command										Parameters:
Read	1	2	3	4	5	6	7	8	9	10	P1 1 ~ 8: Account length
	#	#	l	D	P1	P2	P3	(P3)	(P3)	(P3)	P2 1 ~ 8: Password length
	(P3)	(P3)	(P3)	(P3)	(P4)	(P4)	(P4)	(P4)	(P4)	(P4)	P3 (User account) User account data entered as ASCII code
	21	22	23	24	25	26	27	28	29	30	P4 (User password) User password data entered as ASCII code
Answer	(P4)	(P4)	;								P5 0: Authorization Failure 1: Authorization Successful
	1	2	3	4	5	6	7	8	9	10	
	#	#	l	D	P5	;					<ul style="list-style-type: none"> For example, if the user account name is "kenwood" and the password is "admin", enter the following: ##ID75kenwoodadmin

KENWOOD