APPENDIX 1 PC COMMANDS

1.1 Description

Various functions can be controlled with PC commands by connecting the transceiver to a PC by using the KCT-31 cable.

1.2 Transmission System

The following data transmission systems are available.

Interface Type	Serial Interface
Communication System	Full double communication system
Synchronization System	Asynchronous communication system
Start Bit	1 bit
Stop Bit	2 bit
Parity Bit	None
Data	8 bit
Baud Rate	9,600 bps
Flow control	Flow cannot be controlled if the KCT-31 cable is used. Flow can be controlled by assigning CTS or RTS to the AUX port and using a self-made cable.

1.3 Connecting the Transceiver to a PC

Connect the transceiver to the PC by using the optional KCT-31 cable. Following are connectors and signals.

Table 1-1 Connecting the Transceiver to a PC

Connector	Pin No.	Signal Name	Input/ Output	Function
CN7	1	NC	-	-
	2	GND	-	GND
	3	SB	Output	13.6V
CN8	1	NC	-	-
	2	RXD1	Input	Serial data input
	3	TXD1	Output	Serial data output

1.4 Command Format

Command format consists of command, parameter and terminator.

Example:

M	D	3	<CR>
Command		Parameter	Terminator

- **Commands**

  Commands can be configured by entering 2-digit ASCII character codes.

- **Parameter** *1

  A parameter can be configured by entering ASCII character codes. The length and number of the parameter may vary depending on commands and some commands do not have a parameter.

- **Terminator**

  Enter the carriage return code (=0Dh) indicating the end of the command in ASCII format. In this section, the terminator is described as <CR>.

*1 The transceiver exceptionally sends the following special commands.

- Acknowledge

!	<CR>

- Command error

?	<CR>

1.5 Differences from TK-80

There are differences between the TK-80 and TK-90 for control with PC commands.

Table 1-2 Differences from TK-80

Item	TK-80	TK-90
Connecting the Transceiver to a PC	IF-232C is used.	KCT-31 is used.
Flow control	Enabled	Flow cannot be controlled if the KCT-31 cable is used. Flow can be controlled by assigning CTS or RTS to the AUX port and using a self-made cable.
Baud rate	4,800 bps	9,600 bps
Terminator	";" Semicolon (= 3Bh)	Carriage return (=0Dh)

1.6 Command List

Table 1-3 Command List

Command	Name
AC	This command can be used to configure and read the antenna tuner's status.
AG	This command can be used to configure and read the volume level.
AV	This command can be used to configure and read the Anti-VOX Gain.
BY	This command can be used to read the transceiver's busy status.
CS	This command can be used to read the checksum.
DN/UP	This command can be used to increase or decrease the channel number.
FA	This command can be used to configure and read the operating frequency in VFO Mode.
FR	This command can be used to alternate between VFO Mode and Channel Mode.
IF	This command can be used to read the transceiver's status.
LM	This command can be used to order the transceiver to record VGS voice.
MC	This command can be used to configure and read the channel number.
MD	This command can be used to configure and read the Emission Mode.
MG	This command can be used to configure and read the Mic Gain.
MO	This command can be used to configure and read monitor functions.
MR	This command can be used to read channel information.
MW	This command can be used to write channel information to the transceiver.
NB	This command can be used to configure and read Noise Blanker.
PA	This command can be used to configure and read Pre-amplifier.
PB	This command can be used to order the transceiver to play VGS voice.
PC	This command can be used to configure and read the transmit power.
PS	This command can be used to configure and read power status.
PT	This command can be used to configure and read CW pitch frequency.
RA	This command can be used to configure and read Attenuator.
RC	This command can be used to clear the Clarifier frequency.
RD/RU	This command can be used to increase or decrease the Clarifier frequency.
RX/TX	This command can be used to alternate between transmit and receive.
SC	This command can be used to configure and read Scan.
SM	This command can be used to read S meter and RF meter from the transceiver.
SQ	This command can be used to configure and read Squelch Level.
ST	This command can be used to configure and read the VFO frequency step.
VD	This command can be used to configure and read the VOX Delay Time.
VG	This command can be used to configure and read VOX Gain.
VX	This command can be used to configure and read VOX.
Selcall	
C0	This command can be used to configure and read Selcalls.
C1	This command can be used to make a Selcall.
C2	This command can be used to make a Direct Selcall.
C3	This command can be used to read the link status (receiving end) for Selcall.
C4	This command can be used to notify the caller's ID when the transceiver receives a Selcall.
C5	This command can be used to make a Status Call (including special statuses).
C6	This command can be used to make a Direct Status Call.
C7	This command can be used to notify a user that the transceiver has received a Status Call signal.

Command	Name
C8	This command can be used to notify a user that the transceiver is receiving GPS data while making a Selcall.
C9	This command can be used to notify a user that the transceiver has received a Selcall Memory Code.
D0	This command can be used to notify a user that the transceiver has received a Memory Code.
D1	This command can be used to read a Message Stack.
D2	This command cab be used to notify transmit status with Status Call.
D3	This command can be used to send or receive PC messages while making a Selcall.
ALE	
A0	This function can be used to configure the ALE function and read its status.
A1	This function can be used to change and read the ALE operating mode.
A2	This function can be used to change and read the ALE net.
A3	This function can be used to change and read the ALE channel.
A4	This function can be used to change and read the ALE monitor status.
A5	This function can be used to make various types of ALE calls.
A6	This function can be used to receive various types of ALE calls.
A7	This function can be used to read the link status of the ALE.
A8	This function can be used to output a request status relevant to GPS data transmission.
A9	This function can be used to output GPS data reception information.
B0	This function can be used to configure and read time in the ALE unit.

AC This command can be used to configure and read the antenna tuner's status.

	1	2	3	4	5	6	7	8	9	10
Set	A	C	P1	P2	P3	CR				
Read	A	C	CR							
Answer	A	C	P1	P2	P3	CR				

Parameter

P1: Antenna tuner status (IN/THRU) while the transceiver is receiving. This command is always the same as P2.

P2: Antenna tuner status (IN/THRU) while the transceiver is transmitting
0: THRU, 1: IN

P3: Tuning operation
0: Stop command/ The transceiver is not operating. 1: Start command/ The transceiver is operating.
Configuration example:
Tuning start command: AC111<CR>
Tuning stop command: AC110<CR> (If the KAT-1 is not connected to the transceiver and Antenna Tuner Control is disabled.)
THRU command: AC000<CR>
Reading example:
When the antenna tuner is in IN state: AC110<CR>
When the antenna tuner is in THRU state: AC000<CR>
While the antenna tuner is tuning: AC111<CR>

Note: The status of the antenna tuner cannot be changed from IN to THRU while the transceiver is transmitting.

AG	This command can be used to configure and read the volume level.									
Set	1	2	3	4	5	6	7	8	9	10
	A	G	P1			CR				
Read	1	2	3	4	5	6	7	8	9	10
	A	G	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	G	P1			CR				

Parameter
P1: AF level
Range: 000 to 031

Note:

- If the value configured for this parameter exceeds the highest value, the value is automatically overwritten with the highest value.
- If Lowest Limit is configured for Minimum Volume Type, the value configured for Minimum Volume is automatically configured even if a value smaller than the Minimum Volume is configured with the configuration command. (Refer to 3.4.1 Minimum Volume on page 9.)

AV	This command can be used to configure and read the Anti-VOX Gain.									
Set	1	2	3	4	5	6	7	8	9	10
	A	V	P1			CR				
Read	1	2	3	4	5	6	7	8	9	10
	A	V	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	V	P1			CR				

Parameter
P1: Anti-VOX Gain
Range: 000 to 009
Fixed length

BY	This command can be used to read the transceiver's busy status.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	B	Y	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	B	Y	P1	CR						

Parameter
P1: Busy status
0: The transceiver is not in Busy state.
1: The transceiver is in Busy state.

CS	This command can be used to read the checksum.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	C	S	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	C	S	P1				CR			

Parameter
P1: Checksum
Fixed length

DN/UP	This command can be used to increase or decrease the channel number.									
Set	1	2	3	4	5	6	7	8	9	10
	D/U	N/P	CR							
Read										
Answer										

This command can be used in the same way as **Channel Up** and **Channel Down** keys.
Operation example:
The configured channel changes while transceiver is in Channel Mode.
The configured frequency changes in the configured step while the transceiver is in VFO Mode.

FA	This command can be used to configure and read the operating frequency in VFO mode.									
Set	1	2	3	4	5	6	7	8	9	10
	F	A	P1							
	11	12	13	14	15	16	17	18	19	20
	P1			CR						
Read	1	2	3	4	5	6	7	8	9	10
	F	A	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	F	A	P1							
	11	12	13	14	15	16	17	18	19	20
	P1			CR						

Parameter
P1: Frequency [Hz]
A value of 0 is entered for unused digits.
Configuration example: 7.036000 MHz → “00007036000”

Note: This command is accepted only if the transceiver is in VFO Mode. This operation is disabled while the transceiver is transmitting.

FR	This command can be used to alternate between VFO Mode and Channel Mode.									
Set	1	2	3	4	5	6	7	8	9	10
	F	R	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	F	R	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	F	R	P1	CR						

Parameter
P1: VFO Mode/ Channel Mode
0: VFO
1: Configuration is disabled.
2: Memory Channel

Note:

- This parameter cannot be configured while the transceiver is transmitting or is in Emergency Mode.
- This command is not available when the transceiver is in Unprogrammed state.

IF	This command can be used to read the transceiver's status.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	I	F	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	I	F	P1							
	11	12	13	14	15	16	17	18	19	20
	P1			P2					P3	
	21	22	23	24	25	26	27	28	29	30
	P3			P4	P5	P6			P7	P8
	31	32	33	34	35	36	37	38	39	40
	P9	P10	P11	P12	P13	P14	CR			

Parameter
P1: The current operating frequency. A value of 0 is entered for unused digits.
P2: Space
P3: Clarifier frequency, ±0400. " " (space) is entered if + (plus) is configured. "-" is entered if "-" (minus) is configured.
P4, P5: Always 0
P6: Channel number
P7: 0 = RX, 1 = TX
P8: Mode (Refer to the MD command parameter.)
P9: 0: VFO Mode, 2: Channel Mode, 3: ALE Mode
P10: Scan status (Refer to the SC command parameter.)
P11 to P14: Always 0

LM	This command can be used to order the transceiver to record VGS voice.									
Set	1	2	3	4	5	6	7	8	9	10
	L	M	P1	P2	CR					
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	L	M	P1	O	CR					

Parameter
P1: VGS-1 channel
1 to 4: Recording channel command
5: Auto Recording channel command
P2: Contents of the operation command
0: Stores or finishes recording (This parameter is disabled while the transceiver is doing Auto Recording.)
1: Recording command (Store command is issued while the transceiver is doing Auto Recording.)
2: Clear command (The same command is issued when the transceiver is doing Auto Recording.)

Note:

- This command is automatically issued when the transceiver finishes recording.
- Each channel can be configured to be used for received audio memo or recording and sending messages by using KPG-102D.
- This function cannot be used if VGS-1 is disabled by using KPG-102D. An error occurs when VGS-1 is enabled while the VGS-1 unit is not installed in the transceiver.
- An error occurs when the recording command is issued while the VGS-1 is operating. However, the transceiver receives the recording stop command.

MC — This command can be used to configure and read the channel number.

	1	2	3	4	5	6	7	8	9	10
Set	M	C	P1			CR				
Read	M	C	CR							
Answer	M	C	P1			CR				

Parameter
P1: Channel number
Range: 001 to 300

Note:

- The transceiver sends an error message if the specified channel cannot be configured.
- This parameter cannot be configured while the transceiver is transmitting.
- If the ALE function is enabled, the ALE channel number can be retrieved. However, no ALE channel number can be configured.

MD — This command can be used to configure and read the emission mode.

	1	2	3	4	5	6	7	8	9	10
Set	M	D	P1	CR						
Read	M	D	CR							
Answer	M	D	P1	CR						

Parameter
P1: Mode
0: Configuration is disabled.
1: LSB
2: USB
3: CW
4: FSK
5: AM
6: DATA

MG — This command can be used to configure and read the Mic Gain.

	1	2	3	4	5	6	7	8	9	10
Set	M	G	P1			CR				
Read	M	G	CR							
Answer	M	G	P1			CR				

Parameter
P1: Mic Gain
Range: 001 to 005

MO	This command can be used to configure and read monitor functions.									
Set	1	2	3	4	5	6	7	8	9	10
	M	O	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	M	O	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	M	O	P1	CR						

Parameter

P1: Monitor status, Selcall reset and unmute status
0: OFF (Selcall reset)
1: ON (Selcall unmute)

Note:

- Monitor is disabled if the **Monitor** key is pressed after Monitor is enabled with this command.
- Configuration is disabled if the transceiver was placed in Selcall Code Entry Mode with the microphone keypad.

MR	This command can be used to read channel information.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	M	R	P1			CR				
Answer	1	2	3	4	5	6	7	8	9	10
	M	R	P1			P2				
	11	12	13	14	15	16	17	18	19	20
	P2			P3						
	21	22	23	24	25	26	27	28	29	30
	P3	P4	P5	P6	P7	P8	P9		P10	P11
	31	32	33	34	35	36	37	38	39	40
	P12	P13								
	41	42	43	44	45	46	47	48	49	50
	P13			CR						

Parameter

P1: Channel number (Refer to the MC command parameter.)
P2: A value of 0 is entered for receive frequency and unused digits.
Entry example: 7099.000 MHz → “07099000”
P3: A value of 0 is entered for transmit frequency and unused digits.
P4: Receive Mode (Refer to the MD command parameter.)
P5: Transmit Mode
P6: Pre-amplifier status (On/Off), 0: OFF, 1: ON
P7: Transmit Power, 0: Inhibit, 1: Low, 2: Medium-Low, 3: Medium, 4: High
P8: Scrambler status (On/Off), 0: OFF, 1: ON
P9: Scrambler Code (00 to 15)
P10: Scan Add, 0: DEL, 1: ADD
P11: Active/ Non Active status of the AUX port, 0: None Active, 1: Active
P12: Selcall, 0: Disabled, 1: Enabled
P13: Spaces (20 h) are entered for the memory name and unused digits.

Note:

- The transceiver sends a value of 0 if the specified channel is vacant. However, P13 returns a blank message.
- ALE channels cannot be read from the transceiver.

MW

This command can be used to write channel information to the transceiver.

Set

1	2	3	4	5	6	7	8	9	10
M	W	P1			P2				
11	12	13	14	15	16	17	18	19	20
P2			P3						
21	22	23	24	25	26	27	28	29	30
P3	P4	P5	P6	P7	P8	P9		P10	P11
31	32	33	34	35	36	37	38	39	40
P12	P13								
41	42	43	44	45	46	47	48	49	50
P13			CR						

Read

Answer

Parameter

P1: Channel number (Refer to the MC command parameter.)
P2: A value of 0 is entered for receive frequency and unused digits.
Entry example: 7099.000 MHz → “07099000”
P3: A value of 0 is entered for transmit frequency and unused digits.
P4: Receive mode (Refer to the MD command parameter.)
P5: Transmit Mode
P6: Pre-amplifier and Attenuator status (On/Off), 0: OFF, 1: Pre-amp ON, 2: ATT ON
P7: Transmit Power, 0: Inhibit, 1: Low, 2: Medium-Low, 3: Medium, 4: High
P8: Scrambler status (On/Off), 0: OFF, 1: ON
P9: Scrambler Code (00 to 15)
P10: Scan Add, 0: DEL, 1: ADD
P11: AUX port status (Active/ Non Active), 0: Non Active, 1: Active
P12: Selcall, 0: Disabled, 1: Enabled
P13: Spaces (20h) are entered for the memory name and unused digits.

Note:

- If channel data is configured by using the MW command while all channels in the transceiver are blank and the transceiver is in UNPROGRAM state, channel data can be refreshed with original data by turning the transceiver OFF and ON again.
- If a channel is added by using the MW command during the scan, the channel is not added to the Scan Add list. The channel data can be refreshed with original data by turning the transceiver OFF and ON again.
- ALE channels cannot be written to the transceiver.

NB

This command can be used to configure and read Noise Blanker.

Set

1	2	3	4	5	6	7	8	9	10
N	B	P1	CR						

Read

1	2	3	4	5	6	7	8	9	10
N	B	CR							

Answer

1	2	3	4	5	6	7	8	9	10
N	B	P1	CR						

Parameter

P1: Noise Blanker status
0: NB OFF
1: NB ON

Note: This command can be used to overwrite the EEPROM. The value configured for this parameter is configured even if the value is changed in User Menu Mode. (Refer to 7.5 Noise Blanker on page 18.)

PA	This command can be used to configure and read Pre-amplifier.									
Set	1	2	3	4	5	6	7	8	9	10
	P	A	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	P	A	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	P	A	P1	CR						

Parameter
P1: Pre-amplifier status
0: Pre-amplifier OFF
1: Pre-amplifier ON

PB	This command can be used to play VGS voice.									
Set	1	2	3	4	5	6	7	8	9	10
	P	B	P1	CR						
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	P	B	P1	CR						

Parameter
P1: Playing channel
0: Stop playing
1: Playing channel 1
2: Playing channel 2
3: Playing channel 3
4: Playing channel 4
5: Playing Auto Recording

Note:

- The command is automatically issued when the transceiver finishes recording.
- Each channel can be configured to be used for received audio memo or recording and sending messages by using KPG-102D. The received audio memo or continuous recording channel is used to request the transceiver to start or stop playing the recorded audio. The message recording/ transmission channel can be used to request the transceiver to start or stop playing and sending the message.
- The transceiver plays and sends the message if the PB command is issued for the message recording/ transmission channel. However, the content of the recorded audio cannot be checked.
- This function cannot be used if VGS-1 is disabled by using KPG-102D. An error occurs when VGS-1 is enabled while the VGS-1 unit is not installed in the transceiver.
- The transceiver automatically responds to a call when the transceiver finishes playing the recorded voice.

PC	This command can be used to configure and read the transmit power.									
Set	1	2	3	4	5	6	7	8	9	10
	P	C	P1			CR				
Read	1	2	3	4	5	6	7	8	9	10
	P	C	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	P	C	P1			CR				

Parameter
P1: Transmit Power
0: Inhibit (reading only)
1: Low
2: Medium-Low
3: Medium
4: High

Note:

- Transmit power higher than the highest transmit power configured for each channel cannot be configured.
- Transmit power cannot be configured if Inhibit is configured for a channel.
- 25 W is configured for transmit power if High is configured in AM Mode. Otherwise, 5 W is configured for transmit power.

PS	This command can be used to configure and read power status.									
Set	1	2	3	4	5	6	7	8	9	10
	P	S	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	P	S	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	P	S	P1	CR						

Parameter
P1: Power status
0: Power OFF
1: Power ON

Note: The following process is required to turn the transceiver ON with the command.
1) Connect SB at Pin 3 of CN7 to 14 V when using the KCT-31 cable.
2) Send a dummy <CR> before sending PS1<CR>.

PT	This command can be used to configure and read CW pitch frequency.									
Set	1	2	3	4	5	6	7	8	9	10
	P	T	P1		CR					
Read	1	2	3	4	5	6	7	8	9	10
	P	T	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	P	T	P1		CR					

Parameter
P1: Pitch frequency
00: (400 Hz)
01: (800 Hz)

Note: Pitch frequency works in conjunction with the Sidetone frequency.

RA	This command can be used to configure and read Attenuator.									
Set	1	2	3	4	5	6	7	8	9	10
	R	A	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	R	A	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	R	A	P1	CR						

Parameter
P1: Attenuator status
0: Attenuator OFF
1: Attenuator ON

RC	This command can be used to clear the Clarifier frequency.									
Set	1	2	3	4	5	6	7	8	9	10
	R	C	CR							
Read										
Answer										

This PC command can be used to overwrite the EEPROM. The value configured for this parameter is automatically configured even if the value is changed in User Menu Mode. (Refer to 7.3 Clarifier on page 17.)

RD/RU	This command can be used to increase or decrease the Clarifier frequency.									
Set	1	2	3	4	5	6	7	8	9	10
	R	D/U	P1					CR		
Read										
Answer										

Parameter
P1: Frequency step [Hz]
Range: 00000 to 00400

Note:

- If this parameter is omitted, the frequency can be configured in steps of 10 Hz.
- If this parameter is configured, the frequency indicated by the parameter is configured. The frequency is configured in the + (plus) direction if the RU command is used. If the RD command is used, the frequency is configured in the - (minus) direction. A value of less than a single step size (10 Hz) is discarded.
- This PC command can be used to overwrite the EEPROM. The value configured for this parameter is automatically configured even if the value is changed in User Menu. (Refer to 7.3 Clarifier on page 17.)

RX/TX	This command can be used to alternate between transmit and receive.									
Set	1	2	3	4	5	6	7	8	9	10
	R	X	CR							
	T	X	P1	CR						
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	R	X	CR							
	T	X	P1	CR						

Parameter
P1: Transmitting audio line configuration (only TX command)
0: MIC audio
1: DI input audio
The transceiver enters receive mode when it receives the RX command. The transceiver enters transmit mode when it receives the TX command.

Note:

- The transceiver transmits the audio spoken into the microphone if parameter P1 in the TX command is omitted.
- The transceiver does not accept the TX command while transmit capability is disabled.
- The transceiver accepts the TX command only if the transceiver unmutes audio while the transceiver is making a Selcall.

SC	This command can be used to configure and read Scan.									
Set	1	2	3	4	5	6	7	8	9	10
	S	C	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	S	C	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	S	C	P1	CR						

Parameter
P1: Scan status
0: SCAN OFF
1: SCAN ON

Note:

- Scan cannot be enabled while the transceiver is transmitting.
- Scan cannot be enabled while the transceiver is in VFO Mode.
- If the ALE function is enabled, scan state can be retrieved. However, scan state cannot be configured.

SM	This command can be used to read S meter and RF meter from the transceiver.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	S	M	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	S	M	P1				CR			

Parameter
P1: Number of dots on the meter display
Readable range: 0000 to 0005

Note:

- The number of dots on the meter display is sent.
- The S meter appears while the transceiver is receiving and the RF (POWER) meter appears while the transceiver is transmitting.

SQ	This command can be used to configure and read Squelch Level.									
Set	1	2	3	4	5	6	7	8	9	10
	S	Q	P1			CR				
Read	1	2	3	4	5	6	7	8	9	10
	S	Q	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	S	Q	P1			CR				

Parameter
P1: Squelch Level
Range: 000 to 010

ST	This command can be used to configure and read the VFO frequency step.									
Set	1	2	3	4	5	6	7	8	9	10
	S	T	P1		CR					
Read	1	2	3	4	5	6	7	8	9	10
	S	T	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	S	T	P1		CR					

Parameter
P1: Frequency step [Hz]
01: 10 Hz
02: 100 Hz
03: 1 kHz
04: 10 kHz
05: 100 kHz
06: 1 MHz
07: 10 MHz

VD	This command can be used to configure and read the VOX Delay Time.									
Set	1	2	3	4	5	6	7	8	9	10
	V	D	P1				CR			
Read	1	2	3	4	5	6	7	8	9	10
	V	D	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	S	Q	P1				CR			

Parameter
P1: VOX Delay Time
Range: 0000 to 3000 (in steps of 200, Unit: ms)

VG	This command can be used to configure and read VOX Gain.									
Set	1	2	3	4	5	6	7	8	9	10
	V	G	P1			CR				
Read	1	2	3	4	5	6	7	8	9	10
	V	G	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	V	G	P1			CR				

Parameter
P1: VOX Gain
Range: 001 to 009

VX	This command can be used to configure and read VOX.									
Set	1	2	3	4	5	6	7	8	9	10
	V	X	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	V	X	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	V	X	P1	CR						

Parameter
P1: VOX status
0: VOX OFF
1: VOX ON

Note: The transceiver VOX does not operate unless the link is established even if VOX is enabled by the PC command while the transceiver is in VFO Mode.

C0	This command can be used to configure and read Selcalls.									
Set	1	2	3	4	5	6	7	8	9	10
	C	0	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	C	0	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	C	0	P1	CR						

Parameter
P1: Selcall status
0: Selcall OFF
1: Selcall ON

Note: The C0 command is disabled if the transceiver is in User Menu.

C1	This command can be used to make a Selcall.									
Set	1	2	3	4	5	6	7	8	9	10
	C	1	P1			CR				
Read										
Answer										

Parameter
P1: Caller's Selcall ID
000 to 999, *: Wild-card character

Note: The transceiver accepts this command if the transceiver can make a Selcall. If the transceiver cannot accept this command, the transceiver sends the error message (?<CR>).

C2	This command can be used to make a Direct Selcall.									
Set	1	2	3	4	5	6	7	8	9	10
	C	2	P1	CR						
Read										
Answer										

Parameter
P1: Direct Call number
1: Direct Call 1
2: Direct Call 2
3: Direct Call 3
4: Direct Call 4

Note: The transceiver accepts this command if the transceiver can make a Direct Selcall. If the transceiver cannot accept this command, the transceiver sends the error message (?<CR>).

C3	This command can be used to read the link status (receiving end) for Selcall.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	C	3	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	C	3	P1	CR						

Parameter
P1: Link status for Selcall
0: Standby Mode (mute)
1: Linking with the receiving party (unmute)

Note: Selcall can be reset with the MO command.

C4	This command can be used to report the caller's ID when the transceiver receives a Selcall.									
Set										
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	C	4	P1			CR				

Parameter
P1: Caller's Selcall ID
000 to 999

Note: The response command is automatically issued when the transceiver receives a Selcall.

C5	This command can be used to make a Status Call (including special statuses).									
Set	1	2	3	4	5	6	7	8	9	10
	C	5	P1			P2		CR		
Read										
Answer										

Parameter
P1: Caller's Selcall ID
000 to 999, *: Wild-card character
P2: Status number
10 to 80, Special statuses

Note:

- The transceiver accepts this command if the transceiver can make a Status Call. If the transceiver cannot accept this command, the transceiver sends the error message (?<CR>).
- Refer to 20.2.6 Sending a Status on page 60 for special statuses.

C6	This command can be used to make a Direct Status Call.									
Set	1	2	3	4	5	6	7	8	9	10
	C	6	P1	CR						
Read										
Answer										

Parameter
P1: Direct Status Call number
1: Direct Status Call 1
2: Direct Status Call 2
3: Direct Status Call 3
4: Direct Status Call 4

C7	This command can be used to notify a user that the transceiver has received a Status Call signal.									
Set										
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	C	7	P1			P2		CR		

Parameter
P1: Caller's Selcall ID
000 to 999
P2: Status number
10 to 80, Special statuses

Note: The response command is automatically issued when the transceiver receives the Status Call signal.

C8	This command can be used to notify a user that the transceiver is receiving GPS data while making a Selcall.									
Set										
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	C	8	P1			P2				
	11	12	13	14	15	16	17	18	19	20
	P2									
	21	22	23	24	25	26	27	28	29	30
	P2									
	31	32	33	34	35	36	37	38	39	40
	P2									
	41	42	43	44	45	46	47	48	49	50
	P2									CR

Parameter
P1: Caller's Selcall ID
000 to 999
P2: GPS data, $GPGLL sentence in NMEA format (Variable length, Max. 44 byte)

Note:

- The response command is automatically issued when the transmitting party sends GPS data.
- GPS data example:
$GPGLL,4916.452349,N,12311.123215,W,225444.00,A,A*6A

C9	This command can be used to notify a user that the transceiver has received a Selcall Memory Code.									
Set	1	2	3	4	5	6	7	8	9	10
	C	9	P1	CR						
Read										
Answer										

Parameter
P1: Memory Code configuration
0: CODE A
1: CODE B
2: CODE C
3: CODE D

Note: The C9 command is available only if Selcall is enabled and the transceiver is waiting for a Selcall.

D0	This command can be used to notify a user that the transceiver has received a Memory Code.									
Set										
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	D	0	P1							CR

Parameter
P1: Received Memory Code (Fixed length: 7 byte)

Note: The response command is automatically issued when the transceiver receives a Memory Code.

D1	This command can be used to read a Message Stack.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	D	1	P1	CR						
Answer	1	2	3	4	5	6	7	8	9	10
	D	1	P1	P2			P3		CR	

Parameter
P1: Message stack number
1 to 5
P1: Caller's Selcall ID
000 to 999
P3: Status number
10 to 80, Special statuses

D2	This command cab be used to notify transmit status with a Status Call.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	D	2	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	D	2	P1	CR						

Parameter
P1: Status Call status
0: Standby Mode
1: Waiting for ACK
2: Status message transmission completed
3: Status message transmission failed (automatic response only)

Note: The response command is automatically issued in conjunction with the change of status after the transceiver finishes sending the Status Call signal.

D3 This command can be used to send or receive PC messages while making a Selcall.

Set

1	2	3	4	5	6	7	8	9	10
D	3	P1			P2				
11	12	13	14	15	16	17	18	19	20
P2									
21	22	23	24	25	26	27	28	29	30
P2									
31	32	33	34	35	36	37	38	39	40
P2									
41	42	43	44	45	46	47	48	49	50
P2									
51	52	53	54	55	56	57	58	59	60
P2			CR						

Read

Answer

1	2	3	4	5	6	7	8	9	10
D	3	P1			P2				
11	12	13	14	15	16	17	18	19	20
P2									
21	22	23	24	25	26	27	28	29	30
P2									
31	32	33	34	35	36	37	38	39	40
P2									
41	42	43	44	45	46	47	48	49	50
P2									
51	52	53	54	55	56	57	58	59	60
P2			CR						

Parameter

P1: Caller's Selcall ID
000 to 999 (Wild-card character can be used when configuring the parameter.)

P2: Message (Variable length, Max. 48 byte)
Characters in front of <CR> are configured for a message. 20h is configured for space.

Note:

- The response command is automatically issued when the transceiver receives a PC message.
- The transceiver receiving the PC message transmission command notifies an operator of the transmission status by using the following D2 commands:

Transceiver Status	Display	D2 Command
If the transceiver is waiting to receive the ACK after sending a message.	SEND DATA	D21
When the transceiver receives the ACK	COMPLETE	D22
If the transceiver cannot receive the ACK even if the transceiver re-transmits for the configured number of times.	NO REPLY	D23
If the transceiver returns to the standby (channel) display.	Standby (channel) display	D20

- The transceiver can send a PC message only if the transceiver is waiting to receive a Selcall.
- The transceiver accepts this command if the transceiver can make a Status Call. If the transceiver cannot accept this command, the transceiver sends the error message (?<CR>).

A0	This command can be used to configure the ALE function and read its status.									
Set	1	2	3	4	5	6	7	8	9	10
	A	0	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	A	0	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	0	P1	CR						

Parameter
P1: ALE status
0: ALE Off
1: ALE On
Note: ALE cannot be enabled if Selcall is enabled.

A1	This command can be used to change and read the ALE operating mode.									
Set	1	2	3	4	5	6	7	8	9	10
	A	1	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	A	1	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	1	P1	CR						

Parameter
P1: Operating mode
0: Net Mode
1: Channel Mode
2: VFO Mode

A2	This command can be used to change and read the ALE net.									
Set	1	2	3	4	5	6	7	8	9	10
	A	2	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	A	2	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	2	P2			CR				

Parameter
P1: Net switching direction
0: Descending order (List No.: Large to Small)
1: Ascending order (List No.: Small to Large)
P2: Net Address (Variable length: A maximum of 15 digits)
Note: The transceiver does not accept this configuration command while the transceiver is in Channel Mode.

A3	This command can be used to change and read an ALE channel.									
Set	1	2	3	4	5	6	7	8	9	10
	A	3	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	A	3	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	3	P2			CR				

Parameter
P1: ALE channel switching direction
0: Descending order (List No.: Large to Small)
1: Ascending order (List No.: Small to Large)
P2: Channel Number (3 digits)
Note: The transceiver does not accept this configuration command while the transceiver is in Net Mode.

A4	This function can be used to change and read the ALE monitor status.									
Set	1	2	3	4	5	6	7	8	9	10
	A	4	P1	CR						
Read	1	2	3	4	5	6	7	8	9	10
	A	4	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	4	P1	CR						

Parameter
P1: ALE Monitor status
0: Off
1: On

<table>
<tr><td>A5</td><td colspan="10">This function can be used to make various types of ALE calls.</td></tr>
<tr><td rowspan="10">Set</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><td>10</td></tr>
<tr><td>A</td><td>5</td><td>P1</td><td colspan="7">P2</td></tr>
<tr><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td></tr>
<tr><td colspan="8">P2</td><td colspan="2">P3 (Variable length)</td></tr>
<tr><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td></tr>
<tr><td colspan="3">P3 (Variable length)</td><td>CR</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="10"></td></tr>
<tr><td colspan="10"></td></tr>
<tr><td>Read</td><td colspan="10"></td></tr>
<tr><td>Answer</td><td colspan="10"></td></tr>
</table>

Parameter

P1: Call Type
- 0: Terminate
- 1: Sounding
- 2: Individual Call
- 3: Net Call
- 4: LQA score exchange (Individual Call)
- 5: LQA score exchange (Net Call)

P2: Caller Address (Fixed at 15 digits; ALE Address: spaces are used for unused digits.)
- * If the call type is anything other than an Individual Call with LQA score exchange (Individual Call), this parameter is omitted.
- * Configure “@?@” when making an AllCall. However, a channel cannot be specified by using the LQA score exchange.

P3: AMD message (Variable length: A maximum of 90 digits)
- *This parameter is omitted when it is unnecessary.

Note:

- ♦ The Self Address registered for the selected Net is used. The Self Address configured for Net No.1 is used in Channel Mode.
- ♦ The transceiver makes a Net Call to the selected Net. The transceiver makes a Net Call to Net No.1 in Channel Mode.
- ♦ Operations other than Terminate cannot be done while the link is established.
- ♦ The link cannot be terminated while the transceiver is in standby mode.

Configuration Example

Sending Terminate:
A50<CR>

Sending Sounding:
A51<CR>

Making an Individual Call:
A52SAM_____<CR> (If the caller address is SAM.)
A52SAM_____HELLO<CR> (If the caller address is SAM and the message is HELLO.)

Making a Net Call
A53<CR>
A53HELLO<CR> (If the message is HELLO.)

Making an AllCall
A52@?@<CR>
A52@?@_____HELLO<CR> (If the message is HELLO.)

Sending the LQA score exchange (Individual Call):
A54TOM<CR>
A54TOM_____HELLO<CR> (If the message is HELLO.)

A6	This command can be used to receive various types of ALE calls.									
Set										
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	A	6	P1	P2						
	11	12	13	14	15	16	17	18	19	20
	P2								P3 (Variable length)	
	21	22	23	24	25	26	27	28	29	30
	P3 (Variable length)			CR						

Parameter
P1: Call Type
1: Sounding
2: Individual Call
3: Net Call
4: AllCall
5: Emergency Call
P2: Caller Address (Fixed at 15 digits; ALE Address: spaces are used for unused digits.)
P3: AMD message (Variable length: A maximum of 90 digits)

Note: The response command is automatically sent when the transceiver receives various calls.

Configuration Example
Receiving Sounding:
A61SAM_____<CR> (If the caller address is SAM.)
Receiving an Individual Call:
A62SAM_____<CR> (If the caller address is SAM.)
A62SAM_____HELLO<CR> (If the caller address is SAM and the message is HELLO.)
Receiving a Net Call
A63SAM_____<CR> (If the caller address is SAM.)
A63SAM_____HELLO<CR> (If the caller address is SAM and the message is HELLO.)
Receiving an AllCall
A64SAM_____<CR> (If the caller address is SAM.)
A64SAM_____HELLO<CR> (If the caller address is SAM and the message is HELLO.)
Emergency Call
A65SAM_____<CR> (If the caller address is SAM.)

A7	This command can be used to read the link status of the ALE.									
Set										
Read	1	2	3	4	5	6	7	8	9	10
	A	7	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	A	7	P1	CR						

Parameter
P1: Link status
0: Available State (Standby)
1: Linking State (Linking)
2: Linked State (Link has been established.)
3: Call failed.

Note: The response command is automatically sent when the link status changes.

A8	This command can be used to output a request status relevant to GPS data transmission.									
Set	1	2	3	4	5	6	7	8	9	10
	A	8	P1		P2					
	11	12	13	14	15	16	17	18	19	20
	P2									P3
	21	22	23	24	25	26	27	28	29	30
	P3									
	31	32	33	34	35	36	37	38	39	40
	P3				P4			CR		
Read										
Answer										

Parameter
P1: Request type
82: GPS data transmission request
83: GPS data automatic transmission stop request
84: GPS data automatic transmission resume request
P2: Target Address (Fixed at 15 digits; ALE Address: spaces are used for unused digits.)
P3: Own Address (Fixed at 15 digits; ALE Address: spaces are used for unused digits.)
If spaces are configured for all digits, the Self Address configured for the selected Net is used.
P4: Channel (000, 001 to 100)
* If 000 is configured, Channel is automatically selected by the LQA.

Note:
- The received GPS data is transferred with the A9 command.
- A call fails an unavailable channel is configured at P4.

A9	This command can be used to output the GPS data reception information.									
Set										
Read										
Answer	1	2	3	4	5	6	7	8	9	10
	A	9	P1							
	11	12	13	14	15	16	17	18	19	20
	P1							P2		
	21	22	23	24	25	26	27	28	29	30
	P2									
	31	32	33	34	35	36	37	38	39	40
	P2									
	41	42	43	44	45	46	47	48	49	50
	P2									
	51	52	53	54	55	56	57	58	59	60
	P2									
	61	62	63	64	65	66	67	68	69	70
	P2	CR								

Parameter
P1: Target Address (Fixed at 15 digits; ALE address with more than 3 digits: spaces are used for unused digits.)
P2: GPS data (NMEA format with variable length (a maximum of 44 digits) ($GPGLL sentence)

Note: The response command is automatically sent when the transceiver receives GPS data.

GPS Data Example
$GPGLL,4916.452349,N,12311.123215,W,225444.00,A,A*6A

B0 This command can be used to configure and read time in the ALE unit.

Set	1	2	3	4	5	6	7	8	9	10
	B	0	P1	P2				P3		P4
	11	12	13	14	15	16	17	18	19	20
	P4	P5		P6		P7		CR		
Read	1	2	3	4	5	6	7	8	9	10
	B	0	CR							
Answer	1	2	3	4	5	6	7	8	9	10
	B	0	P1	P2				P3		P4
	11	12	13	14	15	16	17	18	19	20
	P4	P5		P6		P7		CR		

Parameter

P1: (Fixed at space(s))
P2: Year (4 digits)
P3: Month (2 digits)
P4: Date (2 digits)
P5: Hour (2 digits)
P6: Minutes (2 digits)
P7: Seconds (2 digits)

Note:

- The time is entered in 24-hour format.
- If 12-hour format is configured, AM or PM is omitted for the time of the response command.
- The transceiver sends an error message (?<CR>) if the time cannot be configured. The transceiver sends the response command if the time is configured.

Configuration Example

When configuring 1:00:00 p.m. April 1, 2006 for the time and date: B0 20060401130000<CR>