# AR5001D

Digital Processing
Communications Receiver
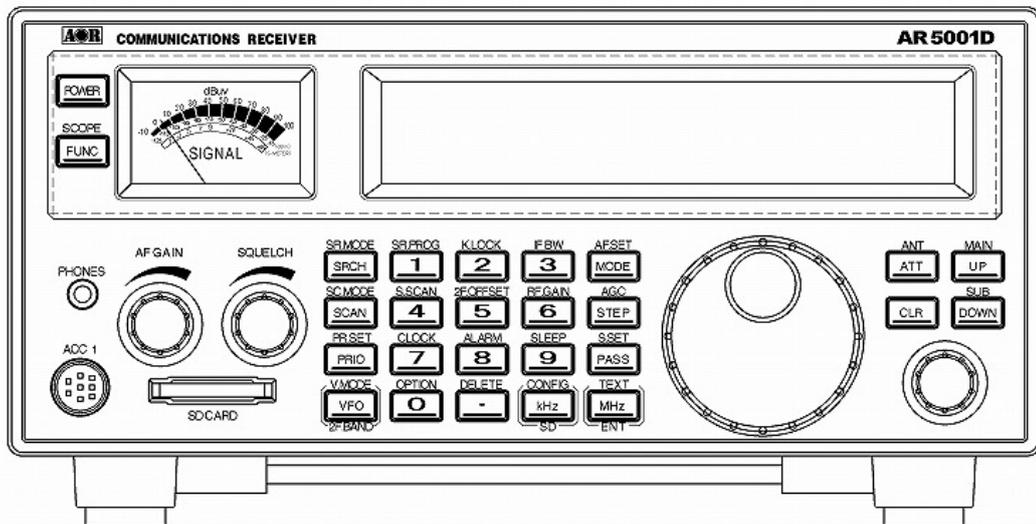
PC Command List

AOR, LTD.

Table of Contents

1   PC CONTROL

1-1   USB (UNIVERSAL INTERFACE BUS)

Connect a PC to the AR5001D using one of the remote control connectors.

The USB (type B) connector is designed to connect directly to the USB port of a PC and AUX 1 connector is to connect to an RS-232C serial port of a PC.

The default setting is USB.

All functions of the AR5001D can be controlled by a PC.

1-1-1   USB DRIVER

Before connecting the AR5001D to a PC, the USB driver for the AR5001D needs to be installed.

The USB driver can be downloaded from the manufacturer's website. (Shown Below)

http://www.ftdichip.com/ftdrivers.htm

Click "VCP Drivers", then select the device name "FT232B".

The following are the specifications for the communication protocol.

Communication speed: 115,200 bps (default), 57,600 bps, 38,400 bps, 19,200 bps, 9,600 bps

Data: 8 bit

Stop bit: 1

Parity: None

Flow control: None or RTS/CTS

Echo: Off

Return Code: (PC→ AR5001D):   <CR><0x0d>   <LF> ignore

Return Code: (AR5001D→ PC):   <CR><LF>(0x0d, 0x0a)

1-2   AUX 1

The AUX 1 is a serial port using an RS-232C cable terminated in a 9-pin connector.

The following are the specifications for the communication protocol.

Communication speed: 115,200 bps (default), 57,600 bps, 38,400 bps, 19,200 bps, 9,600 bps

Data: 8 bit

Stop bit: 1

Parity: None

Flow control: None or RTS/CTS

Echo: Off

With an optional LAN interface unit, the AR5001D can be controlled via the internet. All the control commands for the LAN interface are the same as the USB control commands.

1-3 SYSTEM REQUIREMENTS

Hardware:

- PC with 2GHz Dual Core CPU with 1GB RAM
- USB Port (USB 2.0)
- 16 bit AC-97 compatible audio board
- 1024 x 768 (minimum) resolution video board and monitor
- 2 button mouse with wheel
- CD-ROM drive

Operating System:

- Windows® 2000 SP4, XP SP2 (32 bit version)

1-3-1 USB DRIVER INSTALLATION

1. Unzip the downloaded driver file to any location on the hard drive. (Example: Desktop, My documents, etc.)
2. Connect the supplied AC adapter into the DC power input connector of the AR5001D.
3. Connect the AC adapter to an electrical outlet and then turn on the main power switch on the rear panel of the AR5001D.
4. Turn on the power switch on the front panel.
5. Connect the square end of the USB cable (type B) into the USB connector on the rear panel of the AR5001D.
6. Connect the other end of the USB cable into an available USB port of the PC.
7. The new hardware is found and starts the installation procedure.
8. Note: Sample screen instructions or messages shown below may differ depending the version of Windows® operating system of your PC.

9. Check "No, not this time" and click "Next".

10. Check "Install from a list or specific location [Advanced]" and click "Next".
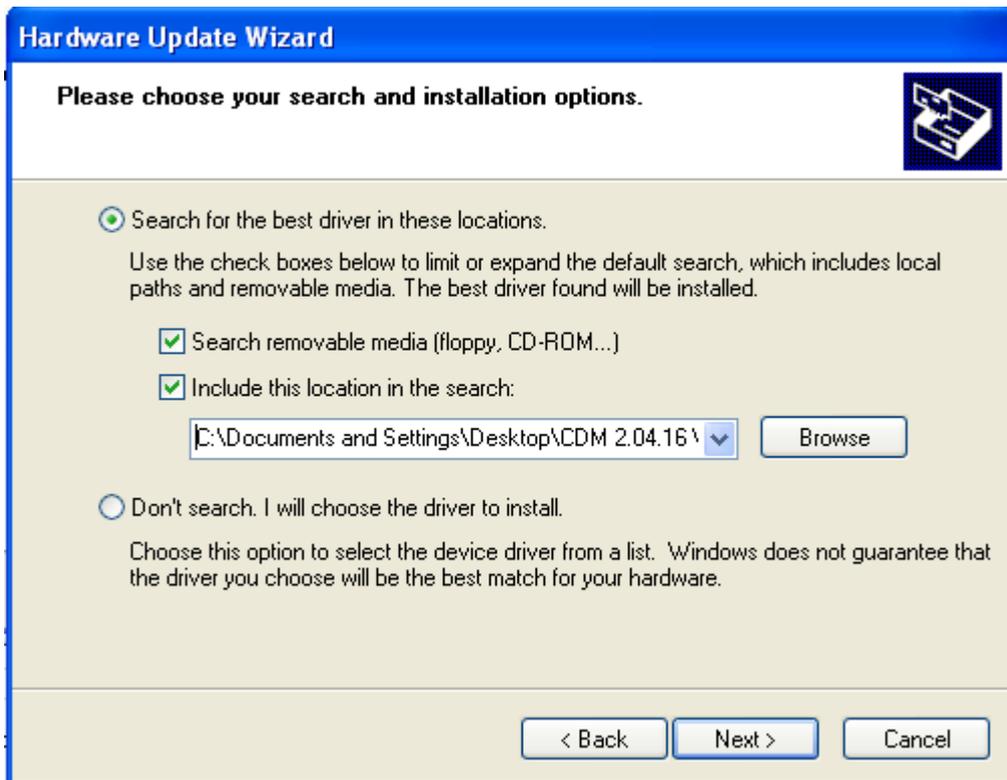
11. Check "Search for the best driver in these locations.", "Include this location in the search:".

Select the folder where the driver data you downloaded is located.

12. Click "Next".
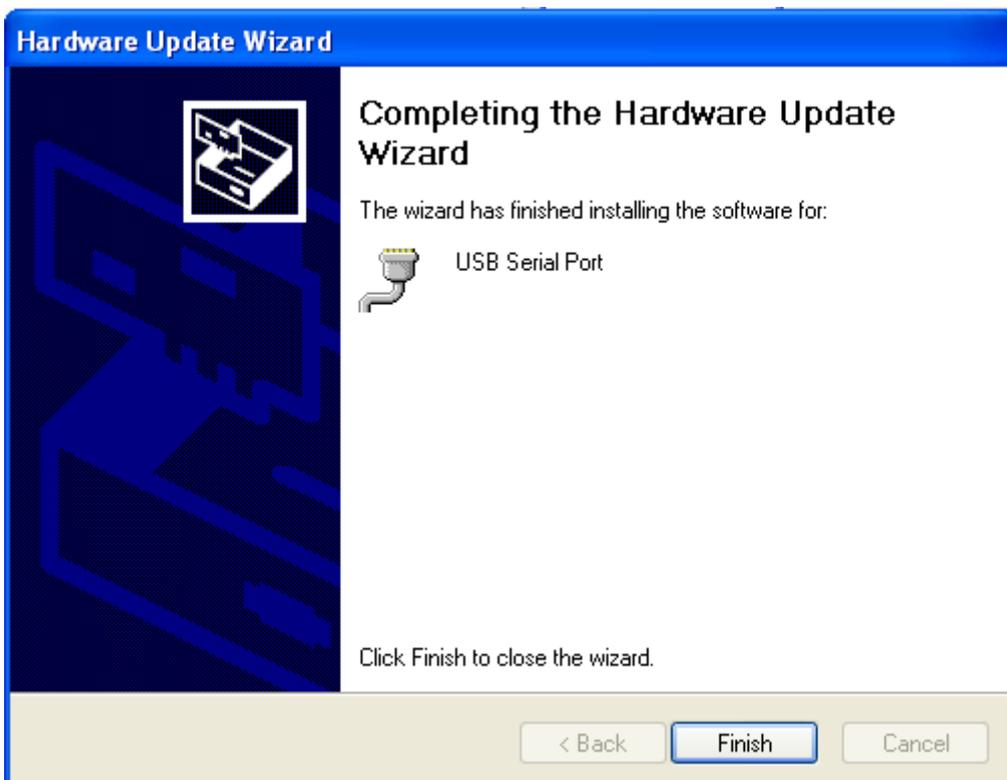
13. When the installation is completed, click "Finish".

14. In order to find the assigned serial port for the USB port, click the **"Start"**, "**Control Pane**l", "**System**", "**Hardware**", "**Device Manager**", "**Ports (COM&LPT)**" on the PC monitor screen.. USB Serial port (COM x) will be indicated. (Note: "x" varies from your PC configuration.) Below screen shows the COM8 has been assigned for the USB port.
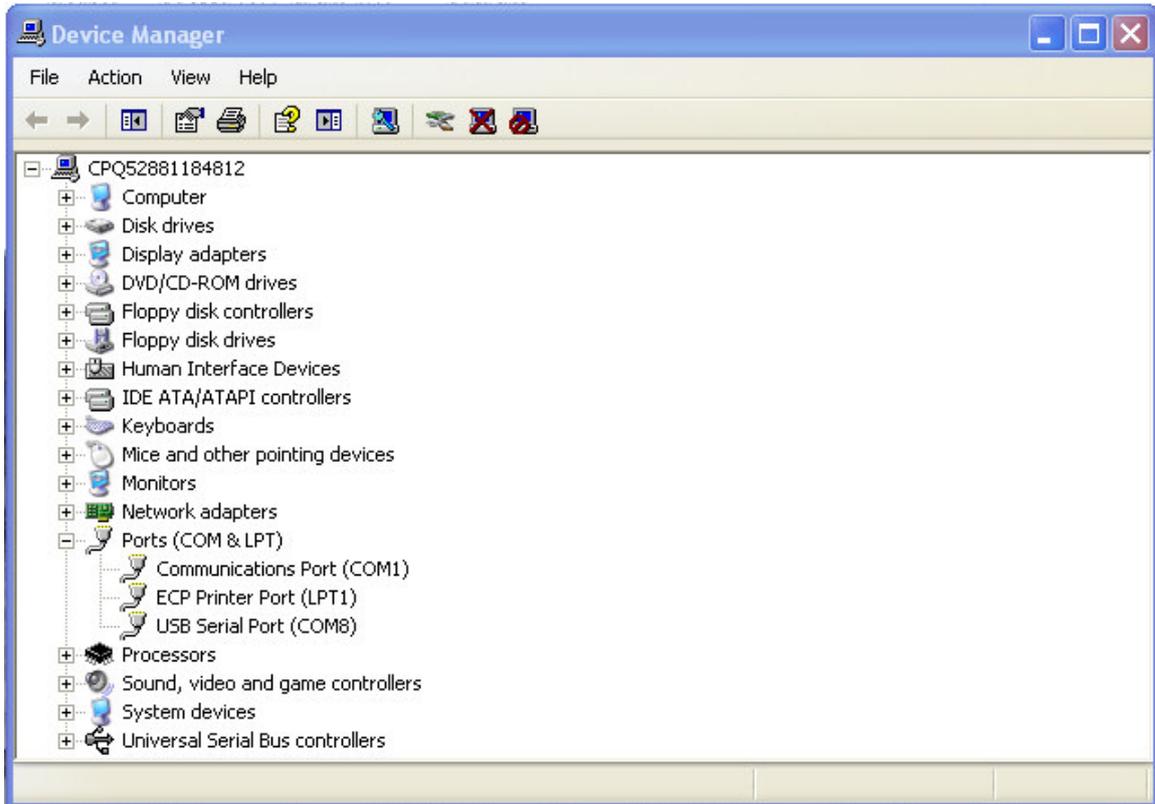
2   CONTROL COMMANDS

2-1   COMMAND FORMAT

<command><CR>

<command><parameter><CR>

<command><parameter 1><SP><parameter 2><SP><parameter 3><CR>

Each command is completed with a <CR>(0x0d).

No space should be put between command and parameter

Note: SP -- Space

Each command consists of two upper case letters (header) (except the SD command) along with operations as required. All commands use ASCII code which **MUST BE IN UPPER CASE** (except for the up arrow key, down arrow key, right arrow key, and left arrow key.)

2-2 RESPONSE FORMAT

Although there is no local echo, a specified response should come back from the AR5001D after confirming the correct command.

If an invalid command is sent to the AR5001D, ? <CR><LF> (0x3f, 0x0d, 0x0a) will be returned as an unrecognized command.

<SP><CR><LF> (0x20, 0x0d, 0x0a) to a valid command (without parameter).
<command><value><SP><CR><LF> to a valid command (with parameter.)

2-3 POWER ON/OFF THE AR5001D

2-3-1 WAKE UP

Any key	Power on	Wake up from stand-by mode (QP command) Note: The main power switch must be in the ON position.

2-3-2 STANDBY MODE

QP	Switches the AR5001D to standby mode	The main power switch must remain in the ON position.

2-3-3 SLEEP TIMER

QT	Sleep Timer	**QTnn**:00 ~ 60 (in minute) (1 minute step) (default: 00) **To read**: QT<CR> **Response**: QTnn
TR	Sleep Timer Display (Displays remaining time)	**TR0**: display off **TR1**: display on (default) (Respond by QT parameter) **To read**: TR<CR> **Response**: TRn

2-3-4 END REMOTE CONTROL

EX	End remote control	

2-4 AUDIO GAIN

VL	**VLnnn** (nnn: 000 ~ 255)	
To read: VL<CR>		
Response: VLnnn		

2-5 STEP FREQUENCY

ST	**STnnnnnn** (entry in Hz format) (nnnnnn: 0 ~ 999.999 (kHz)) *If a decimal is included in "n", it will be recognized as kHz format.* *When "0" is entered, it will be recognized as 1000 kHz,*	(default:100.0kHz)

To read: ST<CR>
Response: STnnnnnn

2-6 FREQUENCY/CHANNEL UP/DOWN

^(1EH)	Up	Frequency / memory channel up
v (1FH)	Down	Frequency/memory channel down

2-7 RECEIVE MODES, IF BANDWIDTH, AUTO MODE, DESTINATION

2-7-1 RECEIVE MODES

(Note: Some functions below 25MHz may not be available due to its configuration.)

Command	Description	Mode	IF Bandwidth	Remarks
MD00	FM	FM		N/A below 25 MHz
MD01	FMST	FM Stereo		N/A below 25 MHz
MD02	AM	AM		
MD03	SAM	Synchronous AM		
MD04	USB	USB		
MD05	LSB	LSB		
MD06	CW	CW		
MD07	ISB	ISB		N/A below 25 MHz
MD08	AIQ	AIQ		AF-IQ output
MD21	WFM1	FM	100K	N/A below 25 MHz
MD22	WFM2	FM	200K	N/A below 25 MHz
MD23	FMST	FM Stereo	200K	N/A below 25 MHz
MD24	NFM	FM	15K	N/A below 25 MHz
MD25	SFM	FM	6K	N/A below 25 MHz
MD26	WAM	AM	15K	
MD27	AM	AM	6K	
MD28	NAM	AM	3K	
MD29	SAM	Synchronous AM	6K	
MD30	USB	USB	3K	
MD31	LSB	LSB	3K	
MD32	CW1	CW	500	
MD33	CW2	CW	200	
MD34	ISB	ISB	6K	N/A below 25 MHz
MD35	AIQ	AIQ	15K	AF-IQ output

MD	MDnn	(nn: 00~08, 21-35) (default: 22)

To read: MD<CR>
Response: MDnn

2-7-2   IF BANDWIDTH

BW	BWn	(n: 0 ~ 9) (default: 7)
		0: 200 Hz
		1: 500 Hz
		2: 1 kHz
		3: 3 kHz
		4: 6 kHz
		5: 15 kHz
		6: 30 kHz
		7: 100 kHz
		8: 200 kHz
		9: 300 kHz
To read: BW<CR>		
Response:BWn		

2-7-3   AUTO MODE

The following parameters are automatically set in AUTO mode:

- Step frequency
- Step frequency adjust
- Receive mode
- IF bandwidth
- Offset frequency (for dual frequency receive)

AU	AUn	(n: 0, 1) (default: 1)
		0: Off
		1: On
To read: AU<CR>		
Response:AUn		

2-7-4   DESTINATION

AZ	AZn	(n: 0 ~ 2)
		0: U.S.A. (default: 0)
		1: Japan
		2: Europe
To read: AZ<CR>		
Response:AZn		

The band plan and receive modes are properly pre-programmed at factory according to its destination.

2-8   DECODE ASSIST FUNCTIONS

2-8-1   AUTO NOTCH (NOTCH)

LS	LSn	(n: 0 ~ 3) (default: 0)
		0: Off
		1: Low
		2: Medium
		3: High
To read: LS<CR>		
Response: LSn		

2-8-2   NOISE REDUCTION (NR)

NR	NRn	(n: 0 ~ 3) (default: 0)
		0: Off
		1: Low
		2: Medium
		3: High
To read: NR<CR>		
Response: NRn		

2-8-3   NOISE BLANKER (NB)

NB	NBn	(n: 0, 1) (default: 0)
		0: Off
		1: On
To read: NB<CR>		
Response: NBn		

2-8-4   VOICE DESCAMBLER

NOTE: This function is not available for the US consumer version.

Available in FM mode.

SC	SCnnn	(n: 000 ~ 127) (default: 000)
		000: Off
		001: 200 (2000Hz)
		002: 204 (2040Hz)
		003: 208 (2080Hz)
		004: 212 (2120Hz)
		:
		124: 692 (6920Hz)
		125: 695 (6950Hz)
		126: 700 (7000Hz)

		127: 700 (7000Hz)

To read: SC<CR>

Response: SCnnn

2-8-5 IF SHIFT

<u>Not available</u> in FM mode.

IS	ISxnnn	X: +, - (shift direction) (n: -120 ~ +120) (default: +000) (-1200Hz ~ +1200Hz) Incremental 5 (50Hz) +000: Off

To read: IS<CR>

Response: ISxnnn

2-8-6 CW PITCH

Available in CW mode only.

CW	CWn	(n: 0 ~ 7) (default: 4) 0: 400 Hz 1: 500 Hz 2: 600 Hz 3: 700 Hz 4: 800 Hz 5: 900 Hz 6: 1000 Hz 7: 1100 Hz

To read: CW<CR>

Response: CWn

2-8-7 AUTOMATIC GAIN CONTROL (AGC)

<u>Not available</u> in FM mode.

AC	ACn	(n: 0 ~ 2, F) (default: 2)
		n=0 FAST
		n=1 MEDIUM
		n=2 SLOW
		n=F OFF (Manual)

To read: AC<CR>

Response:ACn

2-8-8 AUTOMATIC FREQUENCY CONTROL (AFC)

Available in FM mode (when the IF bandwidth is less than 30 kHz).

AF	AFn	(n: 0, 1)　　(default: 0)
		0: Off
		1: On
To read: AF<CR>		
Response: AFn		

2-8-9　TONE SQUELCH (CTCSS)

CN	CNnn	(nn: 00 ~ 52, 99)　　(default: 00)
		00: Off
		99: Squelch opens when any tone is detected.

<table>
<tr><td colspan="11" align="center">CTCSS frequencies</td></tr>
<tr><td></td><td>n0</td><td>n1</td><td>n2</td><td>n3</td><td>n4</td><td>n5</td><td>n6</td><td>n7</td><td>n8</td><td>N9</td></tr>
<tr><td>0n</td><td>-</td><td>60.0</td><td>67.0</td><td>69.3</td><td>71.9</td><td>74.4</td><td>77.0</td><td>79.7</td><td>82.5</td><td>85.4</td></tr>
<tr><td>1n</td><td>88.5</td><td>91.5</td><td>94.8</td><td>97.4</td><td>100.0</td><td>103.5</td><td>107.2</td><td>110.9</td><td>114.8</td><td>118.8</td></tr>
<tr><td>2n</td><td>120.0</td><td>123.0</td><td>127.3</td><td>131.8</td><td>136.5</td><td>141.3</td><td>146.2</td><td>151.4</td><td>156.7</td><td>159.8</td></tr>
<tr><td>3n</td><td>162.2</td><td>165.5</td><td>167.9</td><td>171.3</td><td>173.8</td><td>177.3</td><td>179.9</td><td>183.5</td><td>186.2</td><td>189.9</td></tr>
<tr><td>4n</td><td>192.8</td><td>196.6</td><td>199.5</td><td>203.5</td><td>209.5</td><td>210.7</td><td>218.1</td><td>225.7</td><td>229.1</td><td>233.6</td></tr>
<tr><td>5n</td><td>241.8</td><td>250.3</td><td>254.1</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td colspan="11" align="center">(Example)　nn: 13 → 97.4 Hz</td></tr>
</table>

To read: CN<CR>
Response:CNnn

Note: When a CTCSS tone is detected, its frequency will be displayed.

If the decoded tone frequency matches the set frequency, the AR5001D

will display its frequency followed by an asterisk (*).

(Example) CN15 103.5*　The set CTCSS frequency matches the decoded tone frequency.

2-8-10　DIGITAL CODE SQUELCH (DCS)

DC	DCnnn	nnn: see below chart　　(default: 000)
		000: Off
		999: Squelch opens when any DCS code is detected

DCS codes									
017	023	025	026	031	032	036	043	047	050
051	053	054	065	071	072	073	074	114	115
116	122	125	131	132	134	143	145	152	155
156	162	165	172	174	205	212	223	225	226
243	244	245	246	251	252	255	261	263	265
266	271	274	306	311	315	325	331	332	343
346	351	356	364	365	371	411	412	413	423
431	432	445	446	452	454	455	462	464	465
466	503	506	516	523	526	532	546	565	606
612	624	627	631	632	654	662	664	703	712
723	731	732	734	743	754	-	000	999	-

To read: DC<CR>

Response:DCnnn

Note:When the AR5001D is detecting a DCS code, it will be displayed.

If the decoded code matchess the set code, the AR5001D will display

its code followed by an asterisk (*).

(Example) DS131 131*   The set DCS code matches the decoded DCS code.

2-8-11   DTMF CODE

QM	QMn	(n: 0, 1) (default: 0)
		0: Off
		1: On
DX	DX	Displays decoded tones
	DX%	Clear displayed decode tones
To read: QM<CR> or DX<CR>		
Response: QMn or DXcccc……… (Displays the last 15 characters)		

2-8-12   DE-EMPHASIS

EN	ENn	(n: 0, 1) (default: 0)
		0: 50uS
		1: 75uS
To read: EN<CR>		
Response: ENn		

2-8-13   LOW PASS FILTER

LP	LPn	(n: 0 ~ 2) (default: 2)
		0: 3KHz
		1: 6KHz
		2: Thru

To read: LP<CR>
Response: LPn

2-8-14   HIGH PASS FILTER

HP	**HPn**	(n: 0 ~ 2) (default: 0)
		0: Thru
		1: 300Hz
		2: 600Hz
To read: LP<CR>		
Response: LPn		

2-9   SQUELCH

2-9-1   LEVEL SQUELCH (RQ COMMAND)

The RQ command is used to automatically set squelch level according to the receive frequency.

(i.e. if the receive frequency is below 25 MHz, then squelch will be set to HF band.)

RQ	**RQnnn**	(nnn: 000 ~ 255)
	RQnnn.n	(nnn.n: 0.0 ~ 140.0 (dB))
To read: RQ<CR> or RQ.<CR>		
Response:RQannn (a: + or <SP>)		
+: Squelch opens at the set level		
<SP>: Squelch closes at the set level		
RQannn.n (a: + or <SP>)		
+: Squelch opens at the set level		
<SP>: Squelch closes at the set level		
Unit: dB		

2-9-2   LEVEL SQUELCH (HQ COMMAND)

The HQ command is used to set squelch level for HF band and V/UHF band simultaneously.

HQ	**HQuuu<SP>hhh**	uuu: UHF squelch level (uuu: 000 ~ 255)
	or	hhh: HF squelch level (hhh: 000 ~ 255)
	HQuuu.u <SP>hhh.h	uuu.u: 000.0 ~ 140.0 (dB)
		hhh.h: 000.0 ~ 140.0 (dB)
To read: HQ<CR> or HQ.<CR>		
Response:HQ → HQuuu<SP>hhh		
HQ. → HQuuu.u<SP>hhh.h (dB)		

2-9-3　VOICE SQUELCH

VQ	VQn	(n: 0, 1)　　0: Off,　1: On　(default: 0)
VT	VTnnn	nnn:000 ~ 255　Delay time　(default: 008)
VV	VVn	nn: 0 ~ 7　Squelch level　(default: 3)
To read: VQ<CR>　or　VT<CR>　or　VL<CR>		
Response:　VQn　or　VTnnn or　VVn		

2-9-4　NOISE SQUELCH (NQ COMMAND)

The NQ command is used to automatically set squelch level according to the receive frequency.

(i.e. if the receive frequency is below 25 MHz, then squelch will be set to HF band.)

NQ	NQnnn	(nnn: 000 ~ 255)　　　　(default: 016)
To read: NQ<CR>		
Response:NQannn　　(a: + or <SP>)		
+:　　Squelch opens at the set level		
<SP>: Squelch closes at the set level		

2-9-5　NOISE SQUELCH (QN COMMAND)

The QN command is used to set squelch level for HF band and V/UHF band simultaneously.

QN	QNuuu<SP>hhh	uuu: UHF squelch level (uuu: 000 ~ 255) (default: 016)
		hhh: HF squelch level　(hhh: 000 ~ 255) (default: 018)
To read: QN<CR>		
Response:QNuuu<SP>hhh		

2-9-6　NOISE SQUELCH　ON/OFF

NE	NEn	(n: 0, 1)　　　　　(default: 0)
		0: Off
		1: On
To read: NE<CR>		
Response:NEn		

2-10　RF AMPLIFIER, ATTENUATOR

AT	**ATn**　n: 0 ~ 4　　　　　(default: 0)	
	n=0	RF AMP = On,　Attenuator = 0 dB,　Auto attenuator = Off
	n=1	RF AMP = Off,　Attenuator = 0 dB,　Auto attenuator = Off
	n=2	RF AMP = Off,　Attenuator = -10 dB,　Auto attenuator = Off
	n=3	RF AMP = Off,　Attenuator = -20 dB,　Auto attenuator = Off
	n=4	Auto attenuator = On
To read: AT<CR>		

Response:	ATyn	y : 0, 1	0: Auto attenuator Off
			1: Auto attenuator Onf
		n : 0 ~ 3	See above

2-11   ANTENNA SELECT

AN	**ANn**	(n: 0 ~ 4)		(default: 1)	
	n=0	Auto select			
	n=1	Antenna 1,	n=2	Antenna 2	
	n=3	Antenna 3,	n=4	Antenna 4	
To read: AN<CR>					
Response:	ANmn	m : 0 ~ 4	Antenna select setting		
		n : 1 ~ 4	see above		

Note: When the receive frequency is below 25 MHz, antenna connector 2 is automatically selected.

2-12   ANTENNA SELECT PROGRAMMING

Up to 4 receive frequency ranges can be programmed and assigned to the antenna input.

If the programming is yet made, antenna 1 is automatically selected.

2-12-1   PROGRAMMING

AP	**APa<SP>nnnnnnnnnn<SP>mmmmmmmmmm**
	a: 1 ~ 4 (antenna connector)
	nnnnnnnnnn low end frequency (Hz)
	mmmmmmmmmm high end frequency (Hz)
	Note: To enter frequencies in MHz, use a . (decimal) in the parameters.
	For a frequency below 25 MHz, always use antenna 2.
To read: AP<CR> or AP%<CR>	
Response: APa<SP>nnnnnnnnnn<SP>mmmmmmmmmm	
After responding, APa<SP>- - - <SP> will be displayed.	
AP% → Displays all antenna program for antenna 1 ~ 4.	

2-12-2   DELETING PROGRAM

AD	**ADan**	Delete one frequency data for the specific antenna.
	ADa%	Delete all frequency data for the specific antenna.
	AD%%	Delete all frequency data for all antennas.

2-13   S-METER

2-13-1   SIGNAL LEVEL

LM	To read: LM<CR> or LMX<CR>
Response	LM<CR> → LMaxx LMX<CR> → LMnnn.naf
	a: Squelch status nnn.n -- S-meter value in dB
	Space – Squelch open a: Squelch status
	% --- Squelch closed Space – Squelch open
	V: voice squelch open % --- Squelch closed
	A: APCO25 mode V: voice squelch open
	E: APCO25 (encrypted) A: APCO25 mode
	D: CTCSS / CTS squelch E: APCO25 (encrypted)
	xx: S-meter value in 00 ~ FF (Hex.) D: CTCSS / CTS squelch
	f: bit 7 ~ 4: 0100 Fixed value
	bit 3: Remote flag
	1: Serial data received
	from USB/AUX 1
	0: Serial port initialized/
	EX command executed
	bit 2 ~ 0: Count up when
	search/FFT search
	/scan finished one circle.

2-13-2   AUTO SIGNAL LEVEL REPORT

LT	**LTnnnn** (n: 0000 ~ 6000) (default: 0000)
	(in approximately 10 mS step)
	100: One second interval
	0000: Off (default)
	The AR5001D sends s-meter level with above interval.

To read: LT<CR>	
Response:	LTnnnn

2-14   AUDIO RECORDER CONTROL

2-14-1   CONTROL RELAY STATUS

TP	TPn	(n: 0 , 1)
		0: Off (Relay contact open) (default)
		1: On (relay contact closed)
	The relay contact is available at the ACC1 connector to control an external audio recorder device. When the squelch opens, the relay contact will close. When squelch closed, then the relay contact will open.	
To read: TP<CR>		
Response:	TPn	

2-14-2   CONTROL RELAY STATUS REPORT

TC	TCn	(n: 0, 1) (default: 0)
		0: Off (No report)
		1: On (Report by the TP command)
	When the control relay opens or closes during receive, the relay operation status will be output by the TP command if the TC command is set to on. No report will be made if the TC command is set to 0.	
To read: TC<CR>		
Response:	TCn	

2-15   MANUAL RF GAIN

This command is available only when the AGC is set to manual mode.

RG	RGnnn	(nnn: 000 ~ 110) (in dB) (default: 110)
To read: RG<CR>		
Response: RGnnn		

2-16   RF BANDPASS FILTER (FOR BELOW 25 MHz)

HN	HNn	(n: 0, 1) (default: 0)
		0: Off (No filter)
		1: On (Filtered)
	This command is to install the Band Pass Filter (BPF) for below 25 MHz.	
To read: HN<CR>		
Response:	HNn	

3   RECEIVE COMMANDS

3-1   VFO MODE

Vx	Vx	(x: A ~ E)
RF	**RFnnnnnnnnnn**	nnnnnnnnnn (Hz)
		(default:0088.000000) (MHz)
	The Vx command is to select VFO A ~ VFO E.	
	To set the frequency, use the RF command after selecting the VFO.	
	To set the frequency in MHz, use a (.) (decimal).	
To read: RF<CR>		
Response:	RFnnnnnnnnnn	

3-2   RECEIVE MODE STATUS

RX	**RX**	(default: VA RF0088000000 ST100000 AU MD22)
To read: RX<CR>		
Response:	**In VFO mode**:	
	Vx<SP>RFnnnnnnnnnn<SP>STnnnnnna<SP>AUn<SP>MDnn	
	In memory read mode:	
	MR<SP>MXnnnn<SP>MPn<>GAn<>RFnnnnnnnnnn<SP>STnnnnnna	
	<SP> AUn<SP>MDnn<SP>TMcccccccccccc	
	In scan mode:	
	MS<SP>MXnnnn<SP>MPn<SP>GAn<SP>RFnnnnnnnnnn<SP>	
	STnnnnnna<SP>AUn<SP>MDnn<SP>TMcccccccccccc	
	In select scan mode:	
	SM<SP>MXnnnn<SP>MPn<SP>GAn<SP>RFnnnnnnnnnn<SP>STnnnnnna	
	<SP>AUn<SP>MDnn<SP>TMcccccccccccc	
	In search mode:	
	SRnn<SP>RFnnnnnnnnnn<SP>STnnnnnna<SP>AUn<SP>MDnn<SP>	
	TTcccccccccccc	
	In VFO search mode:	
	VS<SP>Vx<SP>RFnnnnnnnnnn<SP>STnnnnnna<SP>AUn<SP>MDnn	
	In FFT search mode:	
	FFnn<SP>FSnn<SP>FT-nnn<SP>RFnnnnnnnnnn	

3-2-1   RECEIVE STATUS AUTO REPORT

RT	**RTnnnn**	(nn: 0000 ~ 6000) (in 10 mS) (default: 0000)
		100 : 1 second
		0000: Off
To read: RT<CR> Respond by RX command		

3-3   VFO MODE NOISE SQUELCH (DB COMMAND)

The DB command is used in VFO mode to automatically set noise squelch level according to the receive frequency.

(i.e. if the receive frequency is below 25 MHz, then squelch will be set to HF band.)

DB	DBnnn	(nnn: 000 ~ 255) (default: 000)
		000: Off
To read: DB<CR>		
Response:DB<SP>nnn		

3-4   VFO MODE VOICE SQUELCH (DA COMMAND)

The DA command is used in VFO mode to set voice squelch level on the current frequency.

DA	DAnnn	(nnn: 000 ~ 255) (default: 048)
		Bit 7: set voice squelch on/off (similar to VQ command)
		Bit 6 ~ 4: set voice squelch level (similar to VV command)
		Bit 3 ~ 0: set voice squelch delay (by 16 times)
		(similar to VT command)
To read: DA<CR>		
Response: DA<SP>nnn	nnn: 000 ~ 255	
	Bit 7: voice squelch on/off (similar to VQ command)	
	Bit 6 ~ 4: voice squelch level (similar to VV command)	
	Bit 3 ~ 0: voice squelch delay (upper 4 bit)	
	(similar to VT command)	

3-5   SEARCH MODE

3-5-1   NORMAL SEARCH

SS	SSnn	(nn : 00 ~ 39) search bank
	SS	Start normal search
LC	LCn	(n: 0, 1) (default: 0)
		0: Frequency data output disabled when signal received
		1: Frequency data output enabled when signal received
To read: SS<CR>, LC<CR>		
Response:	SSnn, LCn	

3-5-2   VFO SEARCH

VS	VSx	(x: A ~ E) VFO number

3-5-2-1   VFO SEARCH DELAY

DD	DDnn	(nn : 00 ~ 99) (0.1 second step)
To read: DD<CR>		

Response:	DDn.n (0.0 ~ 9.9 seconds)

3-5-3 SEARCH BANK

SE	SEnn	(nn: 00 ~ 39) Search Bank number
SR		SLnnnnnnnnnn (Lower limit Frequency, Hz)
		SUnnnnnnnnnn (Upper limit Frequency, Hz)
		STnnnnnn (Search frequency step, Hz) 0 ~ 1000 kHz
		SHnnnnnn (Search step adjust frequency, Hz) 0 ~ 999.999 kHz
		AUn (n: 0, 1) 0: Auto mode Off (default: 1)
		1: Auto mode On
		MDnn (n: 00 ~ 08, 21 ~ 35) (default: 22) Receive mode
		BWn (n: 0 ~ 9) (default: 07) Band width
		ATn (n: 0 ~ 4) (default: 0) RF amplifier, attenuator
		ANn (n: 0 ~ 4) (default: 1) Antenna select
		TTxxxxxxxxxxxx (Enter text as needed, up to 12 characters)

Format:

SEnn\<SP>SLnnnnnnnnnn\<SP>SUnnnnnnnnnn\<SP>STnnnnnn\<SP>AUn\<SP>

SHnnnnnn\<SP>AUn\<SP>MDnn\<SP>BWn\<SP>ATn\<SP>Ann\<SP>TTxxxxxxxxxxxx

Note: Refer to individual command for details of each field

To read: SRnn\<CR>   (nn: 00 ~ 39)   Search bank number

Response:	SEnn\<SP>SLnnnnnnnnnn\<SP>SUnnnnnnnnnn\<SP>STnnnnnn\<SP>AUn\<SP>SHnnnnnn\<SP>AUn\<SP>MDnn\<SP>BWn\<SP>ATn\<SP>Ann\<SP>TTxxxxxxxxxxxx

3-5-3-1 SEARCH GROUP SETTING/READ OUT

GS	GSnn	(nn: 00 ~ 19) Search group number
SR		SDnn (nn: 00 ~ 99, FF) Search delay time
		00 ~ 99 : 0.1 second step
		FF: Hold
		SBnnn (nnn: 000 ~ 255) Noise squelch level
		SAnnn (nnn: 000 ~ 255) Voice squelch level
		SPnn (nn: 00 ~ 60) 1 second step
		ASn (n: 0, 1) Auto search store (default: 0)
		0: Off
		1: On
		BQn (n: 0, 1) Bank link (default: 0)
		0: Off
		1: On
		BKaabbccdd….. Search bank link with 2 digit number

Format:GSnn\<SP>SDnn\<SP>SBnnn\<SP>SAnnn\<SP>SPnn\<SP>ASn\<SP>BQn\<SP>B Kaabbccdd……\<CR>
Note: Refer to individual command for details of each field
To read: GS\<CR>, GSnn\<CR>, or GS%%\<CR>
Response: GS\<CR> → Displays the current search group parameters GSnn\<CR> → Displays the designated search group parameters   (nn: 00 ~ 19) GS%%\<CR> → Displays all search group parameters
Results: GSnn\<SP>SDnn\<SP>SBnnn\<SP>SAnnn\<SP>SPnn\<SP>ASn\<SP>BQn \<SP>BS\<SP>b\<SP>b\<SP>b--- (for 40 banks)

3-5-3-2 SEARCH BANK LINK SET

BS	**BSnn\<SP>nn\<SP>nn\<SP….\<CR>**
	(nn : 00 ~ 39, or %%)
	%%: Clear all bank link
To read: BS\<CR>	
Response:	BS\<SP>b\<SP>b\<SP>… (for 40 banks) --\<SP>b

3-5-3-3 SEARCH BANK LINK ON/OFF

BQ	**BQn\<CR>**	(n: 0, 1) (default: 0)
		0: Bank link Off
		1: Bank link On
To read: BQ\<CR>		
Response:	BQn	

3-5-3-4 SEARCH AUTO STORE ON/OFF

AS	**ASn\<CR>**	(n: 0, 1) (default: 0)
		0: Auto store Off
		1: Auto store On
To read: AS\<CR>		
Response:	ASn	

3-5-3-5 SEARCH MODE VOICE SQUELCH

SA	**SAnnn**	(nnn: 000 ~ 255) (default: 000)
		Bit 7: Set voice squelch on/off (similar to VQ command)
		Bit 6 ~ 4: Set voice squelch level (similar to VV command)
		Bit 3 ~ 0: Set voice squelch delay (by 16 times)
		(similar to VT command)
To read: SA\<CR>		

Response: SA<SP>nnn	nnn: 000 ~ 255
	Bit 7: Voice squelch on/off (similar to VQ command)
	Bit 6 ~ 4: Voice squelch level (similar to VV command)
	Bit 3 ~ 0: Voice squelch delay (upper 4 bit)
	(similar to VT command)

3-5-3-6   SEARCH MODE NOISE SQUELCH

SB	SBnnn	(nnn: 000 ~ 255)
		000: Off (default: 000)
To read: SB<CR>		
Response: SB<SP>nnn		

3-5-3-7   SEARCH MODE DELAY TIME

SD	SDnn	(nn: 00 ~ 99, FF) 0.1 second step
		FF: Hold (default: 20 = 2 seconds)
To read: SD<CR>		
Response: SDn.n (n.n : 0.0 ~ 9.9) or SDFF		

3-5-3-8   SEARCH MODE PAUSE TIME

SP	SPnn	(nn: 00 ~ 60) 1 second step
		(default: 00)
To read: SP<CR>		
Response: SP<SP>nn		

3-5-3-9   SEARCH BANK DELETE

QS	**QS** Delete current search bank
	QSnn Delete specified search bank (nn : 00 ~ 39)
	Search bank number

3-5-4   PASS FREQUENCY

PW	1. **PW** → In VFO search mode or search mode, register the current frequency to the current pass bank while search stops.
	2. **PWbb** → In VFO search mode or search mode, register the current frequency to the specified (bb) pass bank while search stops.
	3. **PWmmmmmmmmmm** (Hz) → In VFO search mode, search mode, or FFT search mode, register the specified frequency to the current pass bank.
	PWmmmmmmmmmm (Hz)**<SP>nnnnnnnnnn** (Hz) → In VFO search mode, search mode, or FFT search mode, register the specified frequency range to the current pass bank.

	4. **PWbb\<SP\>mmmmmmmmmm** (Hz) → In VFO search mode, search mode, or FFT search mode, register the current frequency range to the specified (bb) pass bank. **PWbb\<SP\>mmmmmmmmmm** (Hz)**\<SP\>nnnnnnnnnn** (Hz) → In VFO search mode, search mode, or FFT search mode, register the specified frequency range to the specific (bb) pass bank.
	5. **PW%%** → In VFO search mode or search mode, register the current frequency range to all pass banks while search stops.
	6. **PW%%\<SP\>mmmmmmmmmm** (Hz) → Register the current frequency to all pass banks. **PW%%mmmmmmmmm\<SP\>nnnnnnnnnn** (Hz) → , Register the current frequency range to all pass banks.
	After PW command is sent, search function will resume.
PR	**PRnn** Displays pass frequency list (nn: 00 ~ 40) Pass bank number, 40: for VFO search

	PRnn\<SP\>mm\<SP\>xxxxxxxxxx
	      (nn: pass bank number, mm: pass frequency number)
	or,
	   PRnn\<SP\>mm\<SP\>xxxxxxxxxx\<SP\>yyyyyyyyyy
	      (if the pass frequency range is registered.)
	    PRnn\<SP\>mm\<SP\>- - - (End of pass frequency list)

PD	**PDnnmm** (nn: 00 ~ 40) Pass bank number, 40: for VFO search (mm: Pass frequency number) Delete search data and pass frequency on the designated search bank
	PD%% Delete all search data and pass frequencies on all search banks

3-5-5   PASS FREQUENCY (PS COMMAND)

PS	**PSnnnnnnnnnn** (Hz) → In VFO search mode, search mode, or FFT search mode, register the specified frequency to the current search bank.

3-5-6   SEARCH FREQUENCY LIST

FL	There are 1024 channels of search memory in the AR5001D. By executing the FL command, 40 channels of data will be displayed.

FLn	(n: 0 ~ 4, %)	
	0:	Displays the latest 40 channels (frequencies may duplicate.)
	1:	Displays the latest 40 channels (frequency not duplicated)
	2:	Displays 40 channels with the strongest signal (frequency may duplicate).
	3:	Displays 40 channels with the strongest signal (frequency not duplicated.)
	4:	Displays most frequently detected signals.
	% :	Clear search list

3-5-7　COPY SEARCH FREQUENCY LIST TO MEMORY BANK

FM		
FMn	(n: 0 ~ 4, %)	
	0:	Copy the latest 40 channels to Memory bank #38 (frequencies may duplicate.)
	1:	Copy the latest 40 channels to Memory bank #38 (frequency not duplicated)
	2:	Copy 40 channels with the strongest signal to Memory bank #38 (frequency may duplicate).
	3:	Copy 40 channels with the strongest signal to Memory bank #38 (frequency not duplicated.)
	4:	Copy most frequently detected signals to Memory bank #38
	%:	Delete search list

3-5-8　FFT SEARCH

FFT search differs from regular scanning methods (one frequency / step after the other) in that it provides a spectrum [image] up to 10 MHz wide, sampled 15 times per second.

Although the search bank basic settings for normal search and FFT search are done the same way (for Low Frequency, High Frequency, and text settings), in FFT search the following parameters must also be set.

FFT frequency step

Threshold level (signal detection level)

FF	**FFmm\<SP\>FSnn\<SP\>FT-ddd**

		FFmm Search bank (two digits)
		(mm: 00 ~ 39)
		FSnn FFT search step frequency
		(nn: 00 ~ 10)
		00: 5 kHz
		01: 6.25 kHz
		02: 8.333 kHz
		03: 9 kHz
		04: 10 kHz
		05: 12.5 kHz
		06: 20 kHz (default)
		07: 25 kHz
		08: 30 kHz
		09: 50 kHz
		10: 100 kHz
		FT-ddd Threshold level. Once set, only signals over this level will be detected by FFT search.
		-ddd: (0 ~ 110 dB) (default: -80) (dB)
LC		**LCn** n: 0, 1
		0: Disable search result frequency report
		1: Enable search result frequency report
(Note: The FS, FT commands cannot be used alone. **They must always be used in conjunction with the FF command.)**		

3-6   MEMORY CHANNEL

The AR5001D features 2,000 memory channels (50 channels in each of the 40 banks).

The number of memory banks can be reconfigured between 5 ~ 95 (in 5 incremental).

3-6-1   MEMORY READ MODE

MR	**MRmmnn**	mm: 00 ~ 39 (Memory bank) (default: 00)
		nn: 00 ~ 99 (Memory channel) (default: 00)
To read: MRmmnn<CR>		

3-6-2   MEMORY CHANNEL SETTING (MR COMMAND)

MX	MXbbcc<SP>RFnnnnnnnnnn<SP>AUn<SP>…..

	MXbbcc: bb: 00 ~ 39 (Memory bank)
	               cc: 00 ~ 95 (Memory channel)
	
	RFnnnnnnnnnn Frequency (Hz) or
	                Frequency with decimal (MHz) (i.e. 123.5 (MHz))
	
	GAn: n: 0, 1 (Memory select, de-select)
	               0: De-select (default)
	               1: Select
	
	MPn: n: 0, 1 (Memory pass)
	               0: No
	               1: Yes
	
	STnnnnnn: nnnnnn: Step frequency Range: 0 ~ 1000 kHz
	                nnnnnn: Hz or kHz with decimal (i.e. 12.5 (kHz))
	                   0: 1000 kHz
	
	SHnnnnnn: nnnnnn: Step frequency Range: 0 ~ 999.999 kHz
	                nnnnnn: Hz or kHz with decimal (i.e. 12.5 (kHz))
	
	AUn: n: 0, 1 (Auto mode)
	               0: Off
	               1: On
	
	BWn: n: 0 ~ 9 (IF bandwidth)
	
	MDnn: nn : 00 ~ 08, 21 ~ 35 (Receive mode)
	
	ATn: n: 0 ~ 4 (RF attenuator / amplifier)
	
	ANn: n: 0 ~ 4 (Antenna select)
	
	TMcccccccccccc: Memory text tag (up to 12 characters)

	Note: Refer to individual command for details of each field.

3-6-3   MEMORY CHANNEL DATA READ (OUTPUT TO USB PORT)

MA	**MAnnmm** or **MAnn**	nn: 00 ~ 39 (Memory bank) mm: 00 ~ 99 (Memory channel) nn: 00 ~ 39 (Memory bank)
Response: MAnnmm →		
MXnnmm<CR>GAn<SP>MPn<SP>RFnnnnnnnnnn<SP>MDnn<SP>ATyn<SP> ANmn<SP>TMcccccccccccc MAnn → All channel data of the designated memory bank		

3-6-4   MEMORY CHANNEL REGISTRATION STATUS

MZ	MZbb	Acquire memory channel registration status.

Response: MZbb<SP>nnxxxxxxxxxxxxxxxxxxxxxxxxxx

               nn: Assigned number of memory channel for the specified bank (default: 50)

               xx……… : Status of memory channels (00 ~ 99)

               Converts 2 characters into hexadecimal data from LSB.

     (Example):   When only one memory channel is registered in memory bank 00,

         → **MZ00<SP>50<SP>010000000000000000000000000**

3-6-5   DELETE MEMORY CHANNEL

MQ	**MQ**: Delete current memory channel of the current memory bank
	MQmm: Delete ccurrent memory channel (mm) of the current memory bank
	MQ%%: Delete current memory bank
	MQ%%nn: Delete designated memory bank
	MQnnmm: Delete memory channel (mm) of the memory bank (nn)

3-6-6   DELETE MEMORY BANK

MB	**MBnn**: nn: Bank number

3-7   SCAN

3-7-1   START SCAN

MS	**MSmm** mm: 00 ~ 39 (Memory bank)
	If the memory frequency is registered to pass frequency lit, it will be skipped.

3-7-2   SCAN GROUP SETTING

GM	**GMnn<SP>XDnn<SP>XBnnn<SP>XAnnn<SP>XMnn<SP>MLn<SP>**
	BKaabbccdd…..

		The AR5001D features 20 scan groups.
		GMnn: nn: 00 ~ 19 (Scan bank number) (default: 00)
		XDnn: nn: 00 ~ 99 (Squelch delay time) (in 0.1 sec.)
		(Time before resuming scan after signal dropped) (default: 20)
		XBnnn: nnn: 000 ~ 255 (Noise squelch level)
		XAnnn: nnn: 000 ~ 255 (Voice squelch level)
		XPnn: nn: 00 ~ 60 (Scan pause) (in 1 second)
		(default: 00 → Off)
		XMnn: nn: 00 ~ 08, 21 ~ 35, FF (Mode scan)
		FF → Scan allmode
		MLn: n: 0, 1 (Bank link) (default: 0)
		0: Off 1: On
BK		**BKaabbccdd….**: Linked bank number
		(Example: Link 02 → 05 → 11, then BK020511.
		(Note: Scan bank 00 cannot be linked.)
		To delete bank, enter **BK<CR>**.

To read: GM<CR> or GMnn<CR>   or   GM%%<CR>

Response: GM → Displays current scan group contents.

GMnn → Displays designated scan group contents.   (nn: 00 ~ 19)

GM%% → Displays all scan group contents.

Results:

GMnn<SP>XDn.n<SP>XB<SP>nnn<SP>XA<SP>nnn<SP>XPnn<SP>XMnn<SP>

      MLn<SP>BM<SP>b<SP>b<SP>b…. (for 40 banks)..b

      GMnn: Scan group number

      XDnn: Scan delay time

      XBnnn: Noise squelch setting

      XAnnn: Voice squelch setting

      XPnn: Scan pause time

      XMnn: Mode scan

      MLn: Bank link On/Off

      BM<SP>b…: Linked bank number

3-7-3   MEMORY BANK LINK ON/OFF

ML	**MLn**	n: 0, 1 (default: 00)
		0: Off
		1: On

To read: ML<CR>

Response: MLn

3-7-4   MEMORY BANK LINK

BM	BMnn<SP>nn<SP>nn<SP>….	(nn: 00 ~ 39, %%) Memory bank number
		%%: Link clear
To read: BM<CR>		
Response: BM<SP>b<SP>b<SP>b…. (40 banks) …..		
Note: When bank is not linked, "b" will be displayed as "-".		

3-7-5   MODE SCAN

XM	XMnn	(nn: 00 ~ 08, 21 ~ 35, FF) FF: All mode (default)

Group	Modes
FM	00: FM, 21: WFM1, 22: WFM2, 24: NFM, 25: SFM
FM ST	01: FM ST, 23: FM ST
AM	02: AM, 26: WAM, 27: AM, 28: NAM
SAM	03: SAM, 29: SAM
USB	04: USB, 30: USB
LSB	05: LSB, 31: LSB
CW	06: CW, 32: CW1, 33: CW2
ISB	07: ISB, 34: ISB
AIQ	08: AIQ, 35: AIQ

To read: XM<CR>

Response: XMnn

3-7-6   SCAN MODE NOISE SQUELCH

XB	XBnnn	(nn: 000 ~ 255) 000: Off (default: 000)
To read: XB<CR>		
Response: XB<SP>nnn		

3-7-7   SCAN MODE VOICE SQUELCH

XA	XAnnn	(nnn: 000 ~ 255) (default: 000)
		Bit 7: Set voice squelch on/off (similar to VQ command)
		Bit 6 ~ 4: Set voice squelch level (similar to VV command)
		Bit 3 ~ 0: Set voice squelch delay (by 16 times)
		(similar to VT command)
To read: XA<CR>		

Response: XA\<SP\>nnn	nnn: 000 ~ 255
	Bit 7: Voice squelch on/off (similar to VQ command)
	Bit 6 ~ 4: Voice squelch level (similar to VV command)
	Bit 3 ~ 0: Voice squelch delay (upper 4 bit)
	(similar to VT command)

3-7-8   SCAN MODE DELAY TIME

XD	XDnn	(nn: 00 ~ 99) 0.1 second step
		(default: 20 = 2 seconds)
To read: XD\<CR\>		
Response: XDn.n (n.n : 0.0 ~ 9.9)		

3-7-9   SCAN MODE PAUSE TIME

XP	XPnn	(nn: 00 ~ 60) 1 second step
		(default: 00)
To read: XP\<CR\>		
Response: XPnn		

3-7-10   MEMORY PASS

MP	**MPn**	n: 0, 1
		0: Off
	or	1: On
	MPnn	nn: 00 ~ 39, or %% (Memory bank)
		%%: Off for all memory banks
To read: MP\<CR\>		
Response: MPn		

3-7-11   SELECT SCAN

Select scan function allows you to scan only a selection of the frequencies that were previously saved as memory channels. A maximum of 100 channels within a bank can be scanned.

3-7-11-1   START SELECT SCAN

SM	**SM** (direct command)

3-7-11-2   SELECT SCAN SETTING

GA	**GAn**: n: 0, 1, or %%
	0: Select scan Off
	1: Select scan On
	%%: Select Off for all memory banks, channels

To read: GA<CR>
Response: GAn

3-7-11-3   SELECT SCAN MEMORY CLEAR

GD	**GD**	Clear select scan memory (direct command)

3-7-11-4   READ SELECT MEMORY

GR	**GR**	Read select memory (direct command)
To read: GR<CR>		
Response: GRnnnn<SP>MXnnmm<SP>RFnnnnnnnnnn<SP>TMcccccccccccc		

3-8   MULTI FREQUENCY RECEIVE

The Duo frequency / Tri frequency receive functions allow you to monitor two or three separate frequencies simultaneously.

3-8-1   DUO FREQUENCY RECEIVE (DUO BAND RECEIVE MODE)

One frequency below 25 MHz set on the VFO-E (as a sub band) and an another frequency above 25 MHz set on the VFO (other than VFO-E, as a main band) can be received simultaneously.

The received audio for both frequencies are available from the headphone jack independently. Mixed audio for both signals is available at the external speaker jack.

Below are the conditions for Duo frequency receive function:

(For main band)

- Frequency must be <u>above</u> 25 MHz.
- The FM stereo mode is not available in this mode.
- The receiver must be in VFO mode and it must be set on other than VFO-E.
- The antenna input must use number 1.

(For sub band)

- Frequency must be <u>below</u> 25 MHz.
- The VFO must be set to VFO-E.

3-8-1-1   DUO FREQUENCY RECEIVE

VW	**VWnm**: n: A ~ D (VFO), @
	@: Duo receive off (default)
	m: 0, 1
	0: VFO-n (main band) (default)
	1: VFO-E (sub band)
To read: VW<CR>	
Response: VWnm	

3-8-1-2　AUDIO OUTPUT BALANCE

VH	**VHnnn**:　　n: 000 ~ 255　　　(default: 128)
	000: Main band 100%,　Sub band 0 %
	128: Main band 50%,　Sub band 50%
	255: Main band 0%,　Sub band 100%
To read: VH\<CR\>	
Response: VHnnn	

3-8-2　DUO FREQUENCY RECEIVE (FREQUENCY OFFSET MODE)

One frequency above 25 MHz is set as a main frequency and an another frequency which is
in the range of within +/- 5MHz from the main frequency set as an offset frequency can be received
simultaneously.

The received audio for both frequencies is available at the headphone jack independently.
Mixed audio for both signals is available at the external speaker jack.

Either VFO mode or Memory mode can be used with this function.

Below are the conditions for Duo frequency receive function:
- The main frequency must be <u>above</u> 25 MHz.
- The offset frequency must be <u>within +/- 5MHz</u> from the main frequency.
- Both frequencies must be in the same receive modes.
- FM stereo is not available in this mode.

3-8-2-1　FREQUENCY OFFSET

WF	**WFpnnnnnnnnnnnn**:　(Hz)
	p: +, -　(Offset direction)
	nnnnnnnnnn: 0 ~ 5 MHz (default: 0)
To read: WF\<CR\>	
Response: WFpnnnnnnnnnn	

3-8-2-2　FREQUENCY OFFSET (MAIN OFFSET FREQUENCY)

WM	**WMpnnnnnnnnnnnn**:　(Hz)
	p: +, -　(Offset direction)
	nnnnnnnnnn: 0 ~ 5 MHz (default: 0)
	While the center frequency of 10MHz bandwidth is fixed, <u>the offset frequency</u> <u>from the center frequency</u> (set by this command) will become the <u>main frequency</u>.
	<u>The offset frequency from the main frequency</u> (set by WF command) will become

	the sub frequency.
To read: WM<CR>	
Response: WMpnnnnnnnnnn	

3-8-2-3   DUO FREQUENCY RECEIVE

WR	**WRn**: n: 0, 1
	0: Duo receive Off (default)
	1: Duo receive On
To read: WR<CR>	
Response: WRn	

3-8-2-4   AUDIO OUTPUT BALANCE

WV	**WVnnn**: n: 000 ~ 255 (default: 128)
	000: Main band 100%, Sub band 0 %
	128: Main band 50%, Sub band 50%
	255: Main band 0%, Sub band 100%
To read: WV<CR>	
Response: WVnnn	

3-8-3   TRI FREQUENCY RECEIVE

Below is the procedure to activate the Tri frequency receive function:

- Set two separate frequencies as the main band according to the instructions on (3-8-2 Duo frequency receive (Frequency offset receive))
- Set another frequency below 25 MHz as a sub band.

4   OTHER RECEIVE FUNCTIONS

4-1   PRIORITY RECEIVE

4-1-1   PRIORITY SETUP

PP	**PPnnmm**
	nn: 00 ~ 39 (Memory bank) (default: 00)
	mm: 00 ~ 49 (Memory channel) (default:00)
TI	**TInn**
	nn: 01 ~ 99 (in second) (Time interval)
	(default: 10)
To read: PP<CR>, TI<CR>	
Response: PPnnmm, TInn	

4-1-2   STARTING PRIORITY RECEIVE

PO	POn: n: 0, 1
	0: Priority Off (default)
	1: Priority On
To read: PO<CR>	
Response: POn	

4-2   STEP ADJUST

SH	SHnnnnnn: nnnnnn: (in Hz) Range:0 ~ 999.999 kHz
	(default: 000.000)
To read: SH<CR>	
Response: SHnnnnnn	

4-3   SUB FREQUENCY STEP (FOR SUB DIAL)

SJ	SJx: x: 0 ~ A (in Hex.) (default: 0)
	0: Same with main dial step frequency
	1: x 10
	2: 100Hz
	3: 500Hz
	4: 1kHz
	5: 5kHz
	6: 10kHz
	7: 50kHz
	8: 100kHz
	9: 500kHz
	A: 1000kHz (1MHz)
To read: SJ<CR>	
Response: SJx	

5   SPECTRUM DISPLAY

5-1   START FREQUENCY

TF	TFnnnnnnnnnn: nnnnnnnnnn (Hz)
	(default: 83.000) (MHz)
To read: TF<CR>	
Response: TFnnnnnnnnnn	

5-2   END FREQUENCY

EF	**EFnnnnnnnnnn**: nnnnnnnnnn (Hz)
	(default: 93.000) (MHz)
To read: EF<CR>	
Response: EFnnnnnnnnnn	

5-3   CENTER FREQUENCY

CF	**CFnnnnnnnnnn**: nnnnnnnnnn (Hz)
	(default: 88.000) (MHz)
To read: CF<CR>	
Response: CFnnnnnnnnnn	

5-4   SPAN FREQUENCY

FP	**FPnnnnnnnnnn**: nnnnnnnnnn (Hz)
	(default: 10.000) (MHz)
To read: FP<CR>	
Response: FPnnnnnnnnnn	

5-5   SPECTRUM STEP FREQUENCY

FE	**FEnnnnnn**: nnnnnn (Hz)
	(default: 62.500) (kHz)
	The value is equal to 1/160 of the frequency span.
To read: FE<CR>	
Response: FEnnnnnn	

5-6   MARKER FREQUENCY

5-6-1   MARKER FREQUENCY

KF	**KFnnnnnnnnnn**: nnnnnnnmmm (Hz)
	(default: 88.000) (MHz)
	The entered value may be changed according to the frequency span and frequency range.
To read: KF<CR>	
Response: KFnnnnnnnnnn	

5-6-2   MARKER FREQUENCY / LEVEL AUTO OUTPUT

KC	**KCn** n: 0, 1
	0: Disable data output (default)
	1: Enable data output

To read: KC<CR>	
Response: KCn	Data output**:**MKnnnnnnnnnn –mmm (-mmm: signal level (in dB))

5-6-3   TRANSFER MARKER FREQUENCY TO RECEIVE FREQUENCY

KG	KG
	(Direct command)

5-7   SPECTRUM DATA OUTPUT

GL	Output the level data of each frequency on the screen.
	GL<SP><CR><LF>/<SP><CR><LF>
	(Note: The separator (/<CR><LF>) has 160 lines.
To read: GL<CR>	
Response: Fnnnnnnnnnnnn L-ddd (for 1 line of data)	

5-8   HIGH SPEED SPECTRUM DATA OUTPUT

FD	Output the level data of each frequency on the screen in high speed.
	Convert the signal strength data of one horizontal dot into 1 byte character. Then repeat this step for a total of 160 characters and output these data followed by the OK response (<SP><CR><LF>).
	To convert the output data to a signal strength level, subtract 0x20 (in hexadecimal), then add -100dB.
	FD<SP><CR><LF>
To read: FD<CR>	
Response: FDdddddddd…..(160 characters) … ddd	

6   VIDEO FUNCTION

6-1   VIDEO FUNCTION

TV	**TVn** n: 0, 1 (default: 0)
	0: Video function off
	1: Video function off
	(Note: Video output is available only from the video output connector on the rear panel.)
To read: TV<CR>	
Response: TVn	

6-2   VIDEO IF REVERSE

VN	Some video transmitters utilize reversed frequency shift modulation in order to scramble the signal.

VNn	n: 0, 1 (default: 0)
	0: Normal shift
	1: Reverse shift

To read: VN<CR>

Response: VNn

7   SD CARD

7-1   SD CARD INFORMATION

SD<SP>INF	SD<SP>INF
	Displays the card's capacity, memory usage.

To read: SD<SP>INF<CR>

Response:

SD<SP>INF<SP>Free:nnnnnnnnnnKB(tt.hh)<SP>Total:mmmmmmmmmmKB<SP>

        nnnnnnnnnn: Remaining capacity (in KB)

        tt.t: Possible recordable time

        (Note: Maximum record size is 2GB/file)

        mmmmmmmmmm: Total capacity

Error message: SD<SP>INF<SP>CardBusy ---- Busy processing

              SD<SP>INF<SP>NoCard   --- SD card not detected

              SD<SP>INF<SP>FAT12   --- Unusable SD card (FAT12 format)

              SD<SP>INF<SP>error   ---- Other errors

7-2   FILE DIRECTORY

SD<SP>DIR	SD<SP>DIR
	Displays the card's file directory.

To read: SD<SP>DIR<CR>

Response: Following message will display for <u>each file</u>

WAV file:
    SD<SP>DIR<SP>ffffffff.WAV<SP>hh:mm:ss.s<SP>yyyy/mm/dd<SP>hh:mm:ss
Others:
    SD<SP>DIR<SP>ffffffff.eee<SP><SP>nnnnnnnnnn<SP><SP>yyyy/mm/dd
     <SP>hh:mm:ss
 	
               ffffffff.eee: File name, extention
               hh:mm:ss.s: Recordable time in WAV file
               nnnnnnnnnn: File size (in Byte)
               yyyy/mm/dd: File time stamp
   At the end of file data: SD<SP>DIR<SP>nnnFile(s)
               nnn: Number of files
Error message: SD<SP>DIR<SP>CardBusy   ---- Busy processing
               SD<SP>DIR<SP>NoCard   --- SD card not detected
               SD<SP>DIR<SP>FAT12   --- Unusable SD card (FAT12 format)
               SD<SP>DIR<SP>error   ---- Other errors

7-3   DELETE DATA FILE

SD<SP>DEL	**SD<SP>DEL<SP>ffffffff.eee**
	Delete the designated file
Response: SD<SP>DEL<SP>Completed	

Error message: SD<SP>DEL<SP>CardBusy   ---- Busy processing
               SD<SP>DEL<SP>NoCard   --- SD card not detected
               SD<SP>DEL<SP>FAT12   --- Unusable SD card (FAT12 format)
               SD<SP>DEL<SP>NoFile   --- No file
                SD<SP>DEL<SP>error ---- Other errors	

7-4   FORMAT SD CARD

SD<SP>FMT	**SD<SP>FMT** or **SD<SP>FMT<SP>nnn** nnn: 000 ~ 240 (Time out timer) (in minute) (default: 3)	

Response:	While in formatting → SD\<SP\>FMT\<SP\> NowFormatting…
	When finished → SD\<SP\>FMT\<SP\>Completed formmating
Error message:	SD\<SP\>FMT\<SP\>CardBusy ---- Busy processing
	SD\<SP\>FMT\<SP\>NoCard --- SD card not detected
	SD\<SP\>FMT\<SP\>FAT12 --- Unusable SD card (FAT12 format)
	SD\<SP\>FMT\<SP\>TimeOut --- Time out
	SD\<SP\>FMT\<SP\>error ---- Other errors

7-5   SQUELCH SKIP IN RECORD MODE

SD\<SP\>RSQ	**SD\<SP\>RSQn**
	n: 0, 1 (default: 0)
	0: Continuous recording
	1: Pause while squelch opens
To read: SD\<SP\>RSQ	
Response: SD\<SP\>RSQn	

7-6   RECORDING

SD\<SP\>REC	**To start recording → SD\<SP\>REC\<SP\>/**
	or
	SD\<SP\>REC\<SP\>ffffffff
	ffffff**:** file name (in wav format)
	(If the file name already exists, it will be overwritten.)
	To stop recording → SD\<SP\>REC\<SP\>/
Error message:	SD\<SP\>REC\<SP\>CardBusy ---- Busy processing
	SD\<SP\>REC\<SP\>NoCard --- SD card not detected
	SD\<SP\>REC\<SP\>FAT12 --- Unusable SD card (FAT12 format)
	SD\<SP\>REC\<SP\>CardFull --- Card is full
	SD\<SP\>REC\<SP\>NowPlaying ---- Playback
	SD\<SP\>REC\<SP\>error ------ Other errors

7-7   PLAYBACK

SD\<SP\>PLY	**To playback → SD\<SP\>PLY\<SP\>/**
	or
	SD\<SP\>PLY\<SP\>ffffffff
	ffffff**:** file name (in wav format)
	To stop playback → SD\<SP\>PLY\<SP\>/

Error message:	SD\<SP\>PLY\<SP\>CardBusy	---- Busy processing
	SD\<SP\>PLY\<SP\>NoCard	--- SD card not detected
	SD\<SP\>PLY\<SP\>FAT12	--- Unusable SD card (FAT12 format)
	SD\<SP\>PLY\<SP\>NoFile	--- No file
	SD\<SP\>PLY\<SP\>NowRecording	---- In recording
	SD\<SP\>PLY\<SP\>error	------ Other errors

7-8   OPERATION STATUS

SD\<SP\>PST	SD\<SP\>PST	
To read: SD\<SP\>PST		
Response: SD\<SP\>PSTn	n: 0 ~ 3 (default: 0)	
	0: Standby mode (No record, playback)	
	1: In recording (Squelch skip: off)	
	2: In playing back	
	3. In recording (Squelch skip: on)	
Error message:	SD\<SP\>PST\<SP\>CardBusy ---- Busy processing	
	SD\<SP\>PST\<SP\>NoCard --- SD card not detected	
	SD\<SP\>PST\<SP\>FAT12 --- Unusable SD card (FAT12 format)	
	SD\<SP\>PST\<SP\>error ------ Other errors	

7-9   SEND MEMORY DATA TO SD CARD

SD\<SP\>MMW	SD\<SP\>MMW\<SP\>ffffffff	
	Send memory data in the AR5001D to the SD card	
	Recordig file name: ffffffff.mmd	
	(If the file name already exists, it will be overwritten.)	
Response:	At the beginning of processing → SD\<SP\>MMW\<SP\>start	
	When finished → SD\<SP\>MMW\<SP\>Completed	
Error message:	SD\<SP\>MMW\<SP\>CardBusy ---- Busy processing	
	SD\<SP\>MMW\<SP\>NoCard --- SD card not detected	
	SD\<SP\>MMW\<SP\>FAT12 --- Unusable SD card (FAT12 format)	
	SD\<SP\>MMW\<SP\>CardFull --- Card Full	
	SD\<SP\>MMW\<SP\>error ------ Other errors	

7-10   SEND SD MEMORY FILE TO AR5001D

SD\<SP\>MMR	SD\<SP\>MMR\<SP\>ffffffff	
	Read memory file (ffffffff.mmd) in the SD card and send it to AR5001D.	

Response:	At the beginning of processing → SD<SP>MMR<SP>start
	When finished → SD<SP>MMR<SP>Completed
Error message:	SD<SP>MMR<SP>CardBusy ---- Busy processing
	SD<SP>MMR<SP>NoCard --- SD card not detected
	SD<SP>MMR<SP>FAT12 --- Unusable SD card (FAT12 format)
	SD<SP>MMR<SP>NoFile --- No File
	SD<SP>MMR<SP>DataFormatError --- Incorrect data format
	SD<SP>MMR<SP>error ------ Other errors

7-11   RENAME SD FILE NAMES

SD<SP>REN	SD<SP>REN<SP>ffffffff.eee<SP>gggggggg
	Rename the (ffffffff.eee) file to (gggggggg.eee)
Response:	When finished → SD<SP>REN<SP>Completed
Error message:	SD<SP>REN<SP>CardBusy ---- Busy processing
	SD<SP>REN<SP>NoCard --- SD card not detected
	SD<SP>REN<SP>FAT12 --- Unusable SD card (FAT12 format)
	SD<SP>REN<SP>NoFile --- No File
	SD<SP>REN<SP>FileExists --- The selected already exists
	SD<SP>REN<SP>error ------ Other errors

8 DATA EDITOR

DE		Transfer, copy, or delete data	
		DEnn<SP>xxxx<SP>yyyy	
			nn: Process number (see below)
			xxxx: Channel origin (see below)
			yyyy: Channel destination (see below)

nn	Process
00	Transfer memory bank xx to memory bank yy.
02	Copy memory bank xx to memory bank yy.
04	Transfer search bank xx to search bank yy.
06	Copy search bank xx to search bank yy.
08	Transfer memory channel xxxx to memory channel yyyy.
10	Copy memory channel xxxx to memory channel yyyy.
12	Transfer scan group xx to scan group yy.
14	Copy scan group xx to scan group yy.
16	Transfer search group xx to search group yy.
18	Copy search group xx to search group yy.
21	Delete memory bank xx.
22	Delete search bank xx.
23	Delete memory channel xxxx.
(24)	Cancel Pass setting of all channels on memory bank xx. (Note: Recommend to use MPnn command.)
(25)	Cancel Pass setting of all channels on search bank xx. (Note: Recommend to use PDnn%% command.)
26	Delete all memory banks.
27	Delete all search banks.
30	Copy current scan data to VFOx. (x: 0 ~ 5)
32	Copy current search data to VFOx. (x: 0 ~ 5)
34	Copy VFOx to VFOy (x, y: 0 ~ 5)

9 CONFIGURATION SETTINGS OF OTHER PARAMETERS

9-1 SELECTING INTERFACE

CL		**CLn**	n: 2, 3 (default: 2)	
			2: USB	
			3: AUX	
			(USB will be selected if n=0)	

	(AUX 1 will be selected if n=1)
To read: CL<CR>	
Response: CLmn	m: 0, 1 0: USB 1: AUX n: 2, 3 (see above)

9-2　COMMUNICATION SPEED

UB	UBn	n: 0 ~ 4　　　(default: 0) 0: 115,200 bps 1: 57,600 bps 2: 38,400 bps 3: 19,200 bps 4: 9,600 bps
To read: UB<CR>		
Response: UBn		

9-3　FLOW CONTROL

SF	SFn	n: 0, 1　　　(default: 0) 0: None 1: Hardware
To read: SF<CR>		
Response: SFn		

10　OTHER CONTROL COMMANDS

10-1　PRODUCT VERSION

VR	VR　(Direct command)
To read: VR<CR>	
Response:	VER-Ccccccccccccccc<SP>Ddddddddddddddd C: Controller board　　D: Decoder board
VRF	VRF　(Direct command)
To read: VRF<CR>	
Response:	VER-F:ffffffffff<SP>D:pppppppppp F: FPGA version　　D:DSP version

10-2　RESET

RS	RS　(Direct command)

Response:	Reinitializes the configuration parameters, however, VFO and memory channel contents are not be reinitialized.
RS2	RS2 (Direct command)
Response:	Reinitializes the configuration parameters and VFO data, however, memory channel contents are not reinitialzed.
RS!	RS! (Direct command)
Response:	Reinitializes the receiver and returns it to factory's default settings.

10-3 FLASH MEMORY

MM	MM (Direct command)	
Response:	Save current settings to flash memory.	

10-4 LEVEL SQUELCH HYSTERISIS

QH	QHn	n: 0 ~ 9 (in dB) (default: 6)
To read: QH<CR>		
Response: QHn		

10-5 LCD BACKLIT

BL	BLn	n: 0, 1 (default: 1)
		0: Off
		1: On
To read: BL<CR>		
Response: BLn		

10-6 BEEP LEVEL

BP	BPn	n: 0 ~ 7 (default: 1)
To read: BP<CR>		
Response: BPn		

10-7 BEEP TONE

BT	BTn	n: 1, 2
		1: Beeps when command accepts
		2: Beeps on error

10-8 CALENDER AND CLOCK

CK	CKyyyymmddhhmmss	
	Yyyy: year	
	mm: month	

| | | dd: day
hh: hour (0 ~ 23)
mm: minute
ss: second |

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