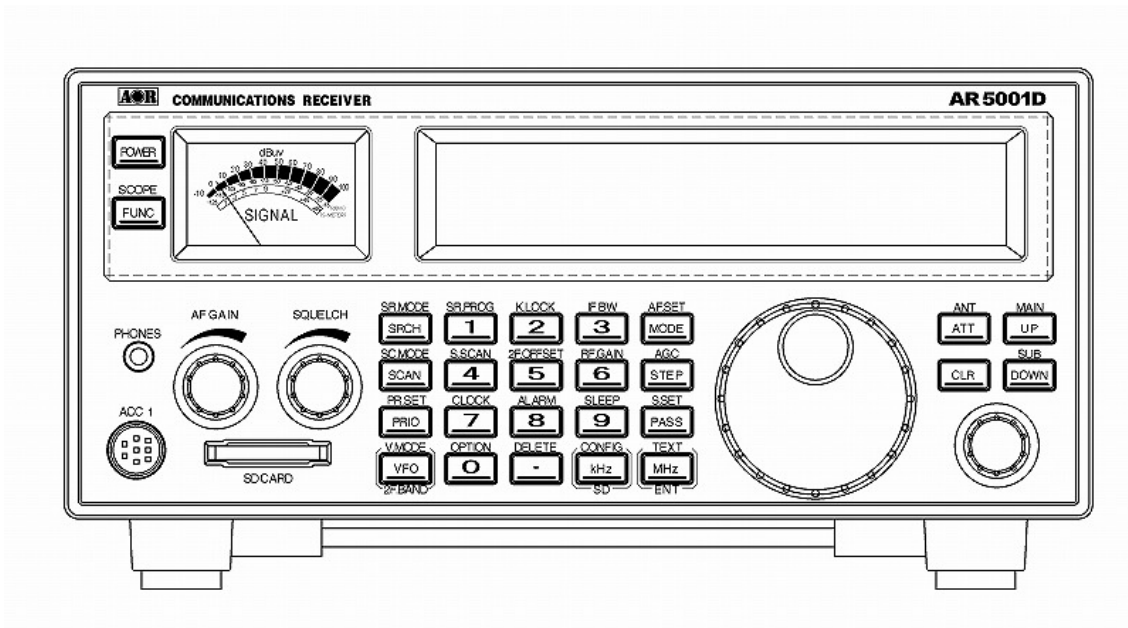




AR5001D

Digital Processing Communications Receiver



PC Command List

AOR, LTD.

Table of Contents

1	PC CONTROL	5
1-1	USB (UNIVERSAL INTERFACE BUS).....	5
1-1-1	USB DRIVER	5
1-2	AUX 1.....	5
1-3	SYSTEM REQUIREMENTS.....	6
1-3-1	USB DRIVER INSTALLATION.....	6
2	CONTROL COMMANDS.....	9
2-1	COMMAND FORMAT	9
2-2	RESPONSE FORMAT	10
2-3	POWER ON/OFF THE AR5001D	10
2-3-1	WAKE UP	10
2-3-2	STANDBY MODE	10
2-3-3	SLEEP TIMER	10
2-3-4	END REMOTE CONTROL	10
2-4	AUDIO GAIN.....	10
2-5	STEP FREQUENCY	10
2-6	FREQUENCY/CHANNEL UP/DOWN	11
2-7	RECEIVE MODES, IF BANDWIDTH, AUTO MODE, DESTINATION.....	11
2-7-1	RECEIVE MODES.....	11
2-7-2	IF BANDWIDTH	12
2-7-3	AUTO MODE	12
2-7-4	DESTINATION	12
2-8	DECODE ASSIST FUNCTIONS.....	13
2-8-1	AUTO NOTCH (NOTCH).....	13
2-8-2	NOISE REDUCTION (NR).....	13
2-8-3	NOISE BLANKER (NB)	13
2-8-4	VOICE DESCAMBLER.....	13
2-8-5	IF SHIFT.....	14
2-8-6	CW PITCH	14
2-8-7	AUTOMATIC GAIN CONTROL (AGC)	14
2-8-8	AUTOMATIC FREQUENCY CONTROL (AFC).....	155
2-8-9	TONE SQUELCH (CTCSS).....	15
2-8-10	DIGITAL CODE SQUELCH (DCS)	15
2-8-11	DTMF CODE.....	16
2-8-12	DE-EMPHASIS	16
2-8-13	LOW PASS FILTER	16
2-8-14	HIGH PASS FILTER	17
2-9	SQUELCH.....	17

2-9-1	LEVEL SQUELCH (RQ COMMAND)	17
2-9-2	LEVEL SQUELCH (HQ COMMAND)	17
2-9-3	VOICE SQUELCH	18
2-9-4	NOISE SQUELCH (NQ COMMAND)	18
2-9-5	NOISE SQUELCH (QN COMMAND)	18
2-9-6	NOISE SQUELCH ON/OFF	18
2-10	RF AMPLIFIER, ATTENUATOR	18
2-11	ANTENNA SELECT	19
2-12	ANTENNA SELECT PROGRAMMING	19
2-12-1	PROGRAMMING	19
2-12-2	DELETING PROGRAM	19
2-13	S-METER	20
2-13-1	SIGNAL LEVEL	20
2-13-2	AUTO SIGNAL LEVEL REPORT	20
2-14	AUDIO RECORDER CONTROL	21
2-14-1	CONTROL RELAY STATUS	21
2-14-2	CONTROL RELAY STATUS REPORT	21
2-15	MANUAL RF GAIN	21
2-16	RF BANDPASS FILTER (FOR BELOW 25 MHz)	21
3	RECEIVE COMMANDS	22
3-1	VFO MODE	22
3-2	RECEIVE MODE STATUS	22
3-2-1	RECEIVE STATUS AUTO REPORT	22
3-3	VFO MODE NOISE SQUELCH (DB COMMAND)	23
3-4	VFO MODE VOICE SQUELCH (DA COMMAND)	23
3-5	SEARCH MODE	23
3-5-1	NORMAL SEARCH	23
3-5-2	VFO SEARCH	23
3-5-3	SEARCH BANK	24
3-5-4	PASS FREQUENCY	26
3-5-5	PASS FREQUENCY (PS COMMAND)	27
3-5-6	SEARCH FREQUENCY LIST	27
3-5-7	COPY SEARCH FREQUENCY LIST TO MEMORY BANK	28
3-5-8	FFT SEARCH	28
3-6	MEMORY CHANNEL	29
3-6-1	MEMORY READ MODE	29
3-6-2	MEMORY CHANNEL SETTING (MR COMMAND)	30
3-6-3	MEMORY CHANNEL DATA READ (OUTPUT TO USB PORT)	30
3-6-4	MEMORY CHANNEL REGISTRATION STATUS	31
3-6-5	DELETE MEMORY CHANNEL	31

3-6-6	DELETE MEMORY BANK	31
3-7	SCAN	31
3-7-1	START SCAN	31
3-7-2	SCAN GROUP SETTING	31
3-7-3	MEMORY BANK LINK ON/OFF	32
3-7-4	MEMORY BANK LINK	33
3-7-5	MODE SCAN	33
3-7-6	SCAN MODE NOISE SQUELCH	33
3-7-7	SCAN MODE VOICE SQUELCH	33
3-7-8	SCAN MODE DELAY TIME	34
3-7-9	SCAN MODE PAUSE TIME	34
3-7-10	MEMORY PASS	34
3-7-11	SELECT SCAN	34
3-8	MULTI FREQUENCY RECEIVE	35
3-8-1	DUAL FREQUENCY RECEIVE (DUAL BAND RECEIVE MODE)	35
3-8-2	DUAL FREQUENCY RECEIVE (FREQUENCY OFFSET MODE)	36
3-8-3	TRIPLE FREQUENCY RECEIVE	37
4	OTHER RECEIVE FUNCTIONS	37
4-1	PRIORITY RECEIVE	37
4-1-1	PRIORITY SETUP	37
4-1-2	STARTING PRIORITY RECEIVE	37
4-2	STEP ADJUST	38
4-3	SUB FREQUENCY STEP (FOR SUB DIAL)	38
5	SPECTRUM DISPLAY	38
5-1	START FREQUENCY	38
5-2	END FREQUENCY	38
5-3	CENTER FREQUENCY	39
5-4	SPAN FREQUENCY	39
5-5	SPECTRUM STEP FREQUENCY	39
5-6	MARKER FREQUENCY	39
5-6-1	MARKER FREQUENCY	39
5-6-2	MARKER FREQUENCY / LEVEL AUTO OUTPUT	39
5-6-3	TRANSFER MARKER FREQUENCY TO RECEIVE FREQUENCY	40
5-7	SPECTRUM DATA OUTPUT	40
5-8	HIGH SPEED SPECTRUM DATA OUTPUT	40
6	VIDEO FUNCTION	40
6-1	VIDEO FUNCTION	40
6-2	VIDEO IF REVERSE	40
7	SD CARD	41
7-1	SD CARD INFORMATION	41

7-2	FILE DIRECTORY	41
7-3	DELETE DATA FILE	42
7-4	FORMAT SD CARD	42
7-5	SQUELCH SKIP IN RECORD MODE	43
7-6	RECORDING	43
7-7	PLAYBACK	43
7-8	OPERATION STATUS	44
7-9	SEND MEMORY DATA TO SD CARD	44
7-10	SEND SD MEMORY FILE TO AR5001D	44
7-11	RENAME SD FILE NAMES	45
8	DATA EDITOR	46
9	CONFIGURATION SETTINGS OF OTHER PARAMETERS	46
9-1	SELECTING INTERFACE	46
9-2	COMMUNICATION SPEED	47
9-3	FLOW CONTROL	47
10	OTHER CONTROL COMMANDS	47
10-1	PRODUCT VERSION	47
10-2	RESET	47
10-3	FLASH MEMORY	48
10-4	LEVEL SQUELCH HYSTERISIS	48
10-5	LCD BACKLIT	48
10-6	BEEP LEVEL	48
10-7	BEEP TONE	48
10-8	CALENDER AND CLOCK	48

1 PC CONTROL

1-1 USB (UNIVERSAL INTERFACE BUS)

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

The USB (type B) connector can connect directly to the PC's USB port while the AUX 1 connector is able to connect to the RS-232C serial port.

The default setting is USB.

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

1-1-1 USB DRIVER

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

For your convenience, the USB driver is included on the supplied CD program disk.

If you wish to obtain the latest version of the driver, you can download from the manufacturer's website. (Shown Below)

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

Click "VCP Drivers" and 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 that uses a 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

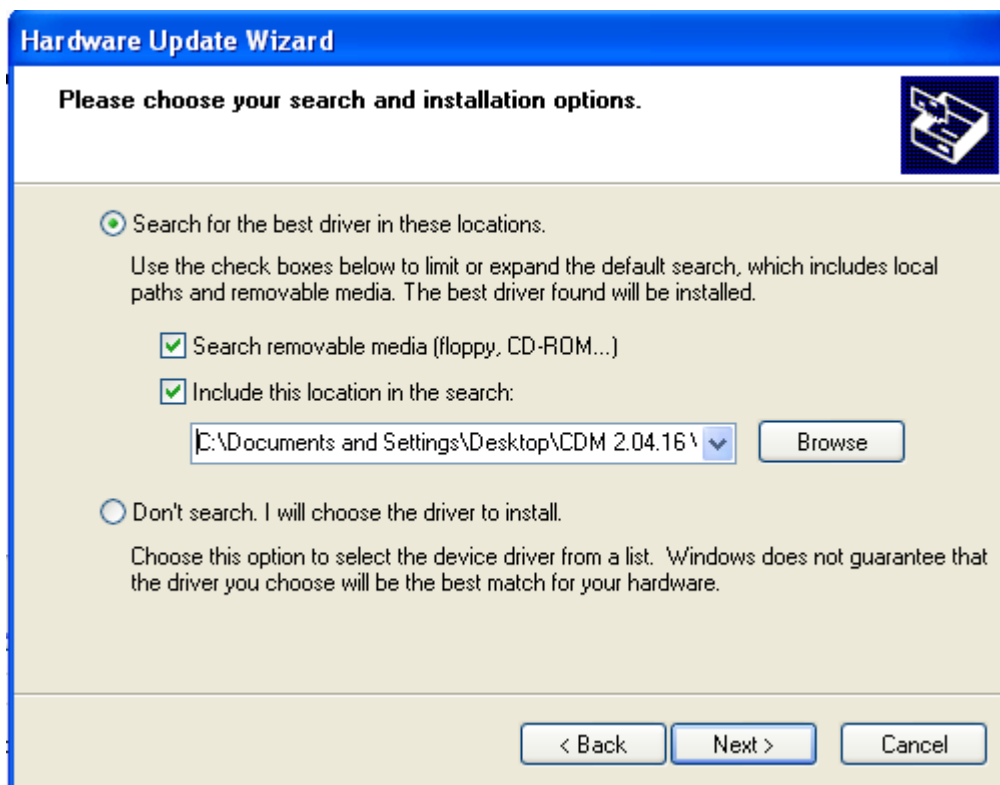
1. Place the supplied driver CD into the PC's CD drive. Copy the driver folder from the CD to any location on the hard drive. (Example: Desktop, My Documents, etc.)
2. Connect the supplied AC adapter into the DC power input connector on the AR5001D.
3. Connect the AC adapter to an electrical outlet and turn on the main power switch located 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 on the PC.
7. When the new hardware is found, the installation procedure begins.
8. Note: The sample screen instructions or messages shown below may differ depending on the version of the Windows® operating system on your PC.



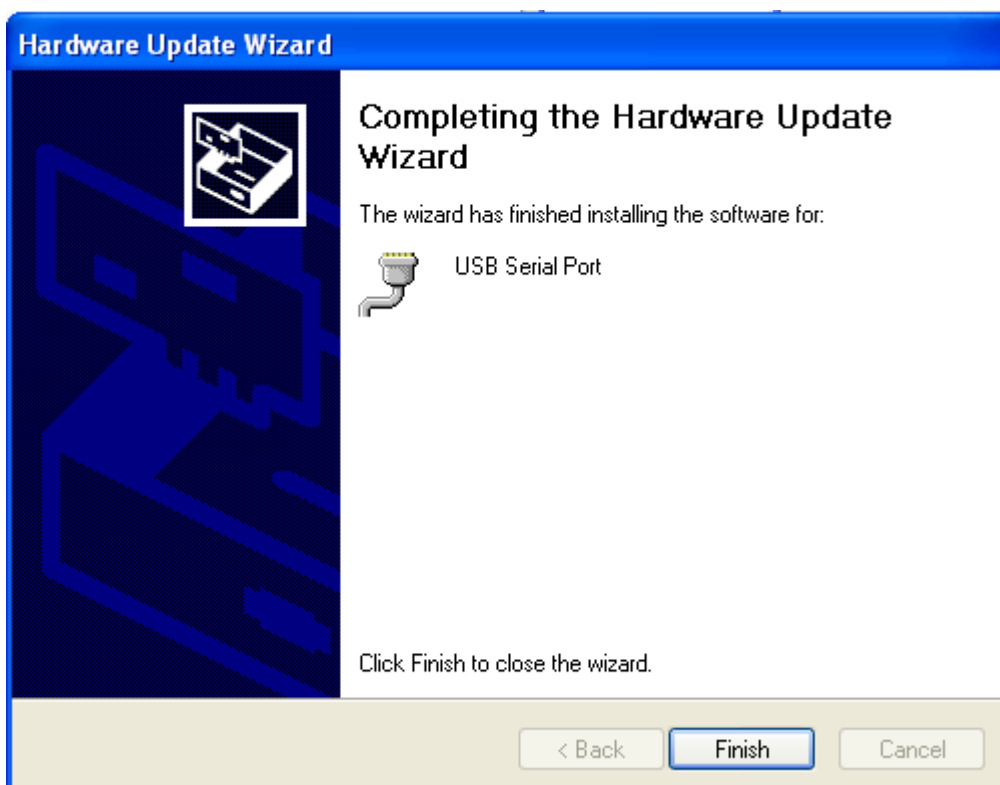
9. Check “No, not this time” and click “Next”.



10. Check “Install from a list or specific location [Advanced]” and click “Next”.

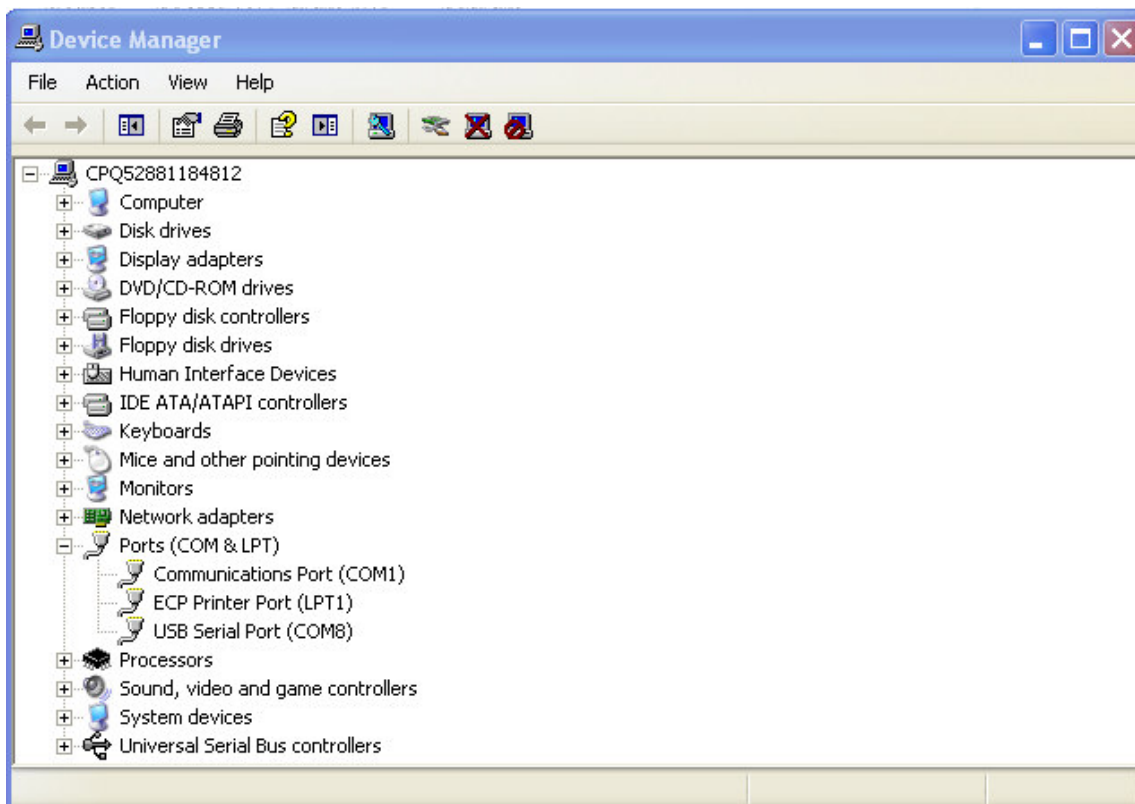


11. Check "Search for the best driver in these locations.", "Include this location in the search:".
Select the path "D:\\Drivers" (or change the letter "D" with one of the CD-ROM drives where the CD-ROM is located.)
If you download the driver, select the folder you copied.
12. Click "Next".



13. When the installation is completed, click "Finish".

14. In order to find the assigned serial port for the USB port, click “**Start**”, “**Control Panel**”, “**System**”, “**Hardware**”, “**Device Manager**”, “**Ports (COM&LPT)**”.
- USB Serial port (COM x) will be indicated. (Note: “x” varies from your PC configuration.)
- The bottom screen shows that 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).

There is no space 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 the 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)) <i>A decimal within "n" means that the value is in kHz. When "0" is entered, it will be recognized as 1000 kHz</i>	(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 the 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

Not available 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)

Not available 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)

AF	AFn	(n: 0, 1) (default: 0) 0: Off 1: On	<p>* AFC does only work in NFM mode with a filter setting up to 30kHz.</p> <p>* It does not automatically retune the receiver to the nearest strong signal.</p> <p>Example: If there is a signal at 150MHz, but the user tunes the receiver to 149.5MHz, the AFC function will NOT retune the receiver to 150MHz!</p> <p>* Real function of AFC: It tunes the IF filter's frequency automatically when an unstable frequency is received. It does not change the receive frequency. Since only IF is changed, there is no "visual" change on the control program's spectrum or frequency display. The change can only be heard on "audio".</p> <p>* It only works if the sending station's frequency shifts are within the selected IF filter's bandwidth. For example: IF=15kHz >> +/-7kHz, IF=30kHz >> +/-15kHz</p>
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.								
CTCSS frequencies										
	n0	n1	n2	n3	n4	n5	n6	n7	n8	N9
0n	-	60.0	67.0	69.3	71.9	74.4	77.0	79.7	82.5	85.4
1n	88.5	91.5	94.8	97.4	100.0	103.5	107.2	110.9	114.8	118.8
2n	120.0	123.0	127.3	131.8	136.5	141.3	146.2	151.4	156.7	159.8
3n	162.2	165.5	167.9	171.3	173.8	177.3	179.9	183.5	186.2	189.9
4n	192.8	196.6	199.5	203.5	209.5	210.7	218.1	225.7	229.1	233.6
5n	241.8	250.3	254.1	-	-	-	-	-	-	-
(Example) nn: 13 → 97.4 Hz										
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 matches 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 DX%	Displays decoded tones Clear displayed decoded 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 RQnnn.n	(nnn: 000 ~ 255) (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 or HQuuu.u <SP>hhh.h	uuu: UHF squelch level (uuu: 000 ~ 255) hhh: HF squelch level (hhh: 000 ~ 255) 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 the 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 simultaneously set the squelch level for HF band and V/UHF band.

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

If left as is, 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 frequencies 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 Deletes one frequency data for the specified antenna.
	ADa% Deletes all frequency data for the specified antenna.
	AD%% Deletes 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 Space – Squelch open % --- Squelch closed V: Voice squelch open A: APCO25 mode E: APCO25 (encrypted) D: CTCSS / CTS squelch xx: S-meter value in 00 ~ FF (Hex.)	nnn.n -- S-meter value in dB a: Squelch status Space – Squelch open % --- Squelch closed V: Voice squelch open A: APCO25 mode E: APCO25 (encrypted) 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 the 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) under 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)
<p>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).</p>		
To read: RF<CR>		
Response:	RFnnnnnnnnnn	

3-2 RECEIVE MODE STATUS

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

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		

Response:	DDn.n (0.0 ~ 9.9 seconds)
------------------	---------------------------

3-5-3 SEARCH BANK

SE SR	<p>SEnn (nn: 00 ~ 39) Search Bank number</p> <p>SLnnnnnnnnnn (Lower limit Frequency, Hz)</p> <p>SUnnnnnnnnnn (Upper limit Frequency, Hz)</p> <p>STnnnnnn (Search frequency step, Hz) 0 ~ 1000 kHz</p> <p>SHnnnnnn (Search step adjust frequency, Hz) 0 ~ 999.999 kHz</p> <p>AUn (n: 0, 1) 0: Auto mode Off (default: 1) 1: Auto mode On</p> <p>MDnn (n: 00 ~ 08, 21 ~ 35) (default: 22) Receive mode</p> <p>BWn (n: 0 ~ 9) (default: 07) Band width</p> <p>ATn (n: 0 ~ 4) (default: 0) RF amplifier, attenuator</p> <p>ANn (n: 0 ~ 4) (default: 1) Antenna select</p> <p>TTxxxxxxxxxxx (Enter text as needed, up to 12 characters)</p>
<p>Format:</p> <p>SEnn<SP>SLnnnnnnnnnn<SP>SUnnnnnnnnnn<SP>STnnnnnn<SP>AUn<SP> SHnnnnnn<SP>AUn<SP>MDnn<SP>BWn<SP>ATn<SP>Ann<SP>TTxxxxxxxxxxx</p> <p style="text-align: center;">Note: Refer to individual command for details of each field</p>	
<p>To read: SRnn<CR> (nn: 00 ~ 39) Search bank number</p>	
Response:	<p>SEnn<SP>SLnnnnnnnnnn<SP>SUnnnnnnnnnn<SP>STnnnnnn<SP>AUn<SP>SH nnnnnn<SP>AUn<SP>MDnn<SP>BWn<SP>ATn<SP>Ann<SP> TTxxxxxxxxxxx</p>

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

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

Format: GSnn<SP>SDnn<SP>SBnnn<SP>SAnnn<SP>SPnn<SP>ASn<SP>BQn<SP>BKaabbccdd.....<CR>	
Note: Refer to individual command for details on 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 SFFF		

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.

	<p>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.</p> <p>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.</p>
	<p>5. PW%% → In VFO search mode or search mode, register the current frequency range to all pass banks while search stops.</p>
	<p>6. PW%%<SP>mmmmmmmmmm (Hz) → Register the current frequency to all pass banks.</p> <p>PW%%mmmmmmmmmm<SP>nnnnnnnnnn (Hz) → , Register the current frequency range to all pass banks.</p>
	After PW command is sent, search function will resume.
PR	<p>PRnn Displays pass frequency list (nn: 00 ~ 40) Pass bank number, 40: for VFO search</p>
	<p>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)</p>
PD	<p>PDnmm (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</p>
	<p>PD%% Delete all search data and pass frequencies on all search banks</p>

3-5-5 PASS FREQUENCY (PS COMMAND)

PS	<p>PSnnnnnnnnnn (Hz) → In VFO search mode, search mode, or FFT search mode, register the specified frequency to the current search bank.</p>
-----------	---

3-5-6 SEARCH FREQUENCY LIST

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

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

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

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

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
-----------	---

LC	<p>FFmm Search bank (two digits) (mm: 00 ~ 39)</p> <p>FSnn FFT search step frequency (nn: 00 ~ 10)</p> <p>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</p> <p>FT-ddd Threshold level. Once set, only signals over this level will be detected by FFT search. -ddd: (0 ~ 110 dB) (default: -80) (dB)</p> <p>LCn n: 0, 1 0: Disable search result frequency report 1: Enable search result frequency report</p>
	<p>(Note: The FS, FT commands cannot be used alone. They must always be used in conjunction with the FF command.)</p>

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

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

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

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

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

3-6-4 MEMORY CHANNEL REGISTRATION STATUS

MZ	MZbb	Acquire memory channel registration status.
<p>Response: MZbb<SP>nnxxxxxxxxxxxxxxxxxxxxxxxxxxxx</p> <p>nn: Assigned number of memory channel for the specified bank (default: 50)</p> <p>xx..... : Status of memory channels (00 ~ 99)</p> <p>Converts 2 characters into hexadecimal data from LSB.</p> <p>(Example): When only one memory channel is registered in memory bank 00, → MZ00<SP>50<SP>010000000000000000000000</p>		

3-6-5 DELETE MEMORY CHANNEL

MQ	<p>MQ: Delete current memory channel of the current memory bank</p> <p>MQmm: Delete ccurrent memory channel (mm) of the current memory bank</p> <p>MQ%%: Delete current memory bank</p> <p>MQ%%nn: Delete designated memory bank</p> <p>MQnnmm: Delete memory channel (mm) of the memory bank (nn)</p>
-----------	---

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	<p>GMnn<SP>XDnn<SP>XBnnn<SP>XAnnn<SP>XMnn<SP>MLn<SP></p> <p>BKaabbccdd.....</p>
-----------	---

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

3-7-3 MEMORY BANK LINK ON/OFF

ML	MLn	n: 0, 1 0: Off 1: On	(default: 00)
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)																				
		<table border="1"> <thead> <tr> <th>Group</th> <th>Modes</th> </tr> </thead> <tbody> <tr> <td>FM</td> <td>00: FM, 21: WFM1, 22: WFM2, 24: NFM, 25: SFM</td> </tr> <tr> <td>FM ST</td> <td>01: FM ST, 23: FM ST</td> </tr> <tr> <td>AM</td> <td>02: AM, 26: WAM, 27: AM, 28: NAM</td> </tr> <tr> <td>SAM</td> <td>03: SAM, 29: SAM</td> </tr> <tr> <td>USB</td> <td>04: USB, 30: USB</td> </tr> <tr> <td>LSB</td> <td>05: LSB, 31: LSB</td> </tr> <tr> <td>CW</td> <td>06: CW, 32: CW1, 33: CW2</td> </tr> <tr> <td>ISB</td> <td>07: ISB, 34: ISB</td> </tr> <tr> <td>AIQ</td> <td>08: AIQ, 35: AIQ</td> </tr> </tbody> </table>	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
		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 1: On
	or	
	MPnn	nn: 00 ~ 39, or %% (Memory bank) %%: Off for all memory banks
To read: MP<CR>		
Response: MPn		

3-7-11 SELECT SCAN

The 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>TMccccccccccc		

3-8 MULTI FREQUENCY RECEIVE

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

3-8-1 DUAL FREQUENCY RECEIVE (DUAL 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 Dual frequency receive function:

(For main band)

- Frequency must be above 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 below 25 MHz.
- The VFO must be set to VFO-E.

3-8-1-1 DUAL 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 DUAL 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 Dual frequency receive function:

- The main frequency must be above 25 MHz.
- The offset frequency must be within +/- 5MHz 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	WFpnnnnnnnnnn: (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	WMpnnnnnnnnnn: (Hz) p: +, - (Offset direction) nnnnnnnnnn: 0 ~ 5 MHz (default: 0)
While the center frequency of 10MHz bandwidth is fixed, <u>the offset frequency 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 <u>sub</u>	

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

3-8-2-3 DUAL 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 TRIPLE FREQUENCY RECEIVE

The following is the procedure to activate the Triple frequency receive function:

- Set two separate frequencies as the main band according to the instructions on (3-8-2 Dual 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: nnnnnnnnn (Hz) (default: 88.000) (MHz)
To read: CF<CR>	
Response: CFnnnnnnnnnn	

5-4 SPAN FREQUENCY

FP	FPnnnnnnnnnn: nnnnnnnnn (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: FnnnnnnnnnnL-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: FDddddddd.....(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>ffffff.WAV<SP>hh:mm:ss.s<SP>yyyy/mm/dd<SP>hh:mm:ss
Others: SD<SP>DIR<SP>ffffff.eee<SP><SP>nnnnnnnnnn<SP><SP>yyyy/mm/dd <SP>hh:mm:ss
ffffff.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>ffffff.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>ffffff 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>ffffff 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>ffffff	
	Send memory data in the AR5001D to the SD card	
	Recording file name: fffffff.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>ffffff
	Read memory file (ffffff.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>ffffff.eee<SP>gggggggg	
	Rename the (ffffff.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-Ccccccccccccc<SP>Dddddddddddddd C: Controller board D: Decoder board
VRF	VRF (Direct command)
To read: VRF<CR>	
Response:	VER-F:fffffffff<SP>D:ppppppppppp 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 reinitialized.
RS2	RS2 (Direct command)
Response:	Reinitializes the configuration parameters and VFO data, however, memory channel contents are not reinitialized.
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
--	--

Manufacturer: **AOR, LTD.**
 2-6-4, Misuji, Taito-Ku,
 Tokyo, 111-0055, Japan
 URL: www.aorja.com

US distributor: **AOR USA, INC.**
 20655 S. Western Ave. Suite 112
 Torrance, CA 90501
 Phone: 310-787-8615
 Fax: 310-787-8619
 URL: www.aorusa.com
 e-mail: info@aorusa.com

Ver. 5.1
Printed in Japan