YAESU
The radio

FTDX5000 SERIES
CAT OPERATION
REFERENCE BOOK

YAESU MUSEN CO., LTD.

# CAT (COMPUTER AIDED TRANSCEIVER) OPERATION

OVERVIEW

The CAT (Computer Aided Transceiver) System in the **FTDX5000** series provides control of frequency, VFO, memory, and other settings such as dual-channel memories and diversity reception using an external personal computer. This allows multiple control operations to be fully automated as single mouse clicks or keystroke operations on the computer keyboard.

The **FTDX5000** series has a built-in level converter, allowing direct connection from the rear-panel **CAT** jack to the serial port of your computer without the need of any external boxes. You will need a serial cable for connection to the RS-232C (serial or COM port) connector on your computer. Purchase a *standard serial cable* (not the so-called "null modem" type), ensuring it has the correct gender and number of pins (some serial COM port connectors use a 9-pin rather than 25-pin configuration). If your computer uses a custom connector, you may have to construct the cable. In this case, refer to the technical documentation supplied with your computer for correct data connection.

Vertex Standard does not produce CAT System operating software due to the wide variety of personal computers and operating systems in use today. However, the information provided in this chapter explains the serial data structure and opcodes used by the CAT system. This information, along with the short programming examples, is intended to help you start writing programs on your own. As you become more familiar with CAT operation, you can customize programs later on for your operating needs and discover the true operating potential of this system.

CAT JACK
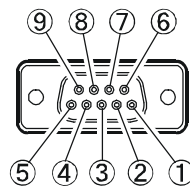
PIN NO.	PIN NAME	I/O	FUNCTION
①	N/A	—	—
②	SERIAL OUT	Output	Outputs the Serial Data from the transceiver to the computer.
③	SERIAL IN	Input	Inputs the Serial Data from the computer to the transceiver.
④	N/A	—	—
⑤	GND	—	Signal Ground
⑥	N/A	—	—
⑦	RTS	Input	When the computer is not ready to receive data, this port goes to "L" for inhibit the transmit data from the transceiver.
⑧	CTS	Output	When the transceiver is not ready to receive data, this port goes to "L" for inhibit the transmit data from the computer.
⑨	N/A	—	—

COM

CAT

RS-232C "Straght" Cable
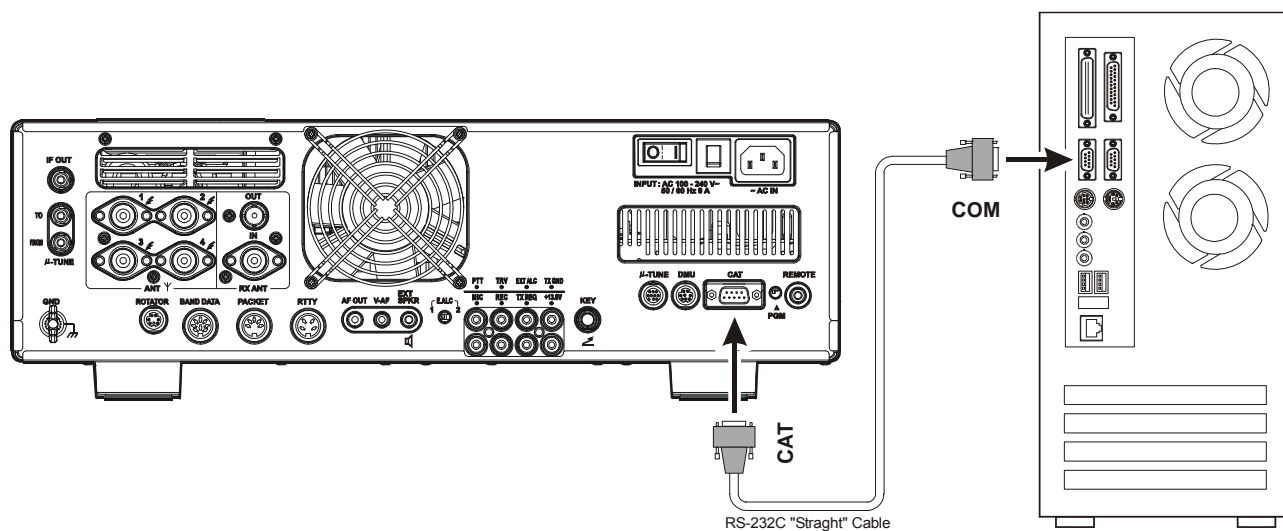
CONTROL COMMAND

A computer control command is composed of an alphabetical command, various parameters, and the terminator that signals the end of the control command.

Example: Set the main band (VFO-A) frequency to 14.250000 MHz.

FA	14250000	;
↑	↑	↑
Command	Parameter	Terminator

There is three for the **FTDX5000** Command as shown below:

> **Set** command: Set a particular condition
> (to the **FTDX5000**)
> **Read** command: Reads an answer
> (from the **FTDX5000**)
> **Answer** command: Transmits a condition
> (from the **FTDX5000**)

For example, note the following in the case of the FA command (Set the main band (VFO-A) frequency):

❒ To set the main band (VFO-A) frequency to 14.250000 MHz, the following command is sent from the computer to the transceiver:
   "**FA14250000;**" (Set command)

❒ To read the main band (VFO-A) frequency, the following command is sent from the computer to the transceiver:
   "**FA;**" (Read command)

❒ When the Read command above has been sent, the following command is returned to the computer:
   "**FA14250000;**" (Answer command)

Alphabetical Commands

A command consists of 2 alphabetical characters.

You may use either lower or upper case characters. The commands available for this transceiver are listed in the "PC Control Command Tables" on the following pages.

Parameters

Parameters are used to specify information necessary to implement the desired command.

The parameters to be used for each command are predetermined. The number of digits assigned to each parameter is also predetermined. Refer to the "Control Command List" and the "Control Command Tables" to configure the appropriate parameters.

When configuring parameters, be careful not to make the following mistakes.

For example, when correct parameter is "**IS0+1000**" (IF SHIFT):

> **IS01000**;
> Not enough parameters specified (No direction (+) given for the IF shift)
> **IS0+100**;
> Not enough digits (Only three frequency digits given)
> **IS0_+_1000**;
> Unnecessary characters between parameters
> **IS0+10000**;
> Too many digits (Five frequency digits given)

Note: If a particular parameter is not applicable to the **FTDX5000**, the parameter digits should be filled using any character except the ASCII control codes (00 to 1Fh) and the terminator (**;**).

Terminator

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

CAT (COMPUTER AIDED TRANSCEIVER) OPERATION

CONTROL COMMAND LIST

COMMAND	FUNCTION	SET	READ	ANS.	AI	COMMAND	FUNCTION	SET	READ	ANS.	AI
AB	VFO-A TO VFO-B	O	X	X	X	MR	MEMORY READ	X	O	O	X
AC	ANTENNA TUNER CONTROL	O	O	O	O	MS	METER SW	O	O	O	O
AG	AF GAIN	O	O	O	O	MW	MEMORY WRITE	O	X	X	X
AI	AUTO INFORMATION	O	O	O	X	MX	MOX SET	O	O	O	O
AM	VFO-A TO MEMORY CHANNEL	O	X	X	X	NA	NARROW	O	O	O	O
AN	ANTENNA NUMBER	O	O	O	O	NB	NOISE BLANKER	O	O	O	O
BA	VFO-B TO VFO-A	O	X	X	X	NL	NOISE BLANKER LEVEL	O	O	O	O
BC	AUTO NOTCH	O	O	O	O	NR	NOISE REDUCTION	O	O	O	O
BD	BAND DOWN	O	X	X	X	OI	OPPOSITE BAND INFORMATION	X	O	O	X
BI	BREAK-IN	O	O	O	O	OS	OFFSET (REPEATER SHIFT)	O	O	O	O
BP	MANUAL NOTCH	O	O	O	O	PA	PRE-AMP (IPO)	O	O	O	O
BS	BAND SELECT	O	X	X	X	PB	PLAY BACK	O	O	O	X
BU	BAND UP	O	X	X	X	PC	POWER CONTROL	O	O	O	O
BY	BUSY	X	O	O	O	PL	SPEECH PROCESSOR LEVEL	O	O	O	O
CA	CLASS-A	O	O	O	O	PR	SPEECH PROCESSOR	O	O	O	O
CH	CHANNEL UP/DOWN	O	X	X	X	PS	POWER SWITH	O	O	O	X
CN	CTCSS NUMBER	O	O	O	O	QI	QMB STORE	O	X	X	X
CO	CONTOUR	O	O	O	O	QR	QMB RECALL	O	X	X	X
CS	CW SPOT	O	O	O	O	QS	QUICK SPLIT	O	X	X	X
CT	CTCSS	O	O	O	O	RA	RF ATTENUATOR	O	O	O	O
DA	DIMMER	O	O	O	X	RC	CLAR CLEAR	O	X	X	X
DN	DOWN	O	X	X	X	RD	CLAR DOWN	O	X	X	X
DP	DISPLAY	O	O	O	O	RF	ROOFING FILTER	O	O	O	O
DS	DIMMER SWITCH	O	O	O	O	RG	RF GAIN	O	O	O	O
ED	ENCORDER DOWN	O	X	X	X	RI	RADIO INFORMATION	X	O	O	O
EU	ENCORDER UP	O	X	X	X	RL	NOISE REDUCTION LEVEL	O	O	O	O
EX	MENU	O	O	O	O	RM	READ METER	X	O	O	O
FA	FREQUENCY VFO-A	O	O	O	O	RO	ROTATOR	O	O	O	X
FB	FREQUENCY VFO-B	O	O	O	O	RS	RADIO STATUS	X	O	O	O
FR	FUNCTION RX	O	O	O	O	RT	CLAR	O	O	O	O
FS	FAST STEP	O	O	O	O	RU	CLAR UP	O	X	X	X
FT	FUNCTION TX	O	O	O	O	SC	SCAN	O	O	O	O
GT	AGC FUNCTION	O	O	O	O	SD	SEMI BREAK-IN DELAY TIME	O	O	O	O
ID	IDENTIFICATION	X	O	O	X	SF	SUB-DIAL FUNCTION	O	O	O	O
IF	INFORMATION	X	O	O	O	SH	WIDTH	O	O	O	O
IS	IF-SHIFT	O	O	O	O	SM	S METER	X	O	O	O
KM	KEYER MEMORY	O	O	O	X	SQ	SQUELCH LEVEL	O	O	O	O
KP	KEY PITCH	O	O	O	O	SV	SWAP VFO	O	X	X	X
KR	KEYER	O	O	O	O	TS	TXW	O	O	O	O
KS	KEY SPEED	O	O	O	O	TX	TX SET	O	O	O	O
KY	CW KEYING	O	X	X	X	UL	UNLOCK	X	O	O	O
LK	LOCK	O	O	O	O	UP	UP	O	X	X	X
LM	LOAD MESSAGE	O	O	O	X	VD	VOX DELAY TIME	O	O	O	O
MA	MEMORY CHANNEL TO VFO-A	O	X	X	X	VF	VRF FILTER	O	O	O	O
MC	MEMORY CHANNEL	O	O	O	X	VG	VOX GAIN	O	O	O	O
MD	MODE	O	O	O	O	VM	[V/M] KEY FUNCTION	O	X	X	X
MG	MIC GAIN	O	O	O	O	VS	VFO SELECT	O	O	O	O
MK	MODE KEY	O	X	X	X	VX	VOX	O	O	O	O
ML	MONITOR LEVEL	O	O	O	O	XT	TX CLAR	O	O	O	O

CONTROL COMMAND TABLES

AB	**VFO-A TO VFO-B**									
Set	1	2	3	4	5	6	7	8	9	10
	A	B	;							
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

AC	**ANTENNA TUNER CONTROL**									
Set	1	2	3	4	5	6	7	8	9	10
	A	C	P1	P2	P3	;				
Read	1	2	3	4	5	6	7	8	9	10
	A	C	;							
Answer	1	2	3	4	5	6	7	8	9	10
	A	C	P1	P2	P3	;				

P1 0: Fixed
P2 0: Fixed
P3 0: Tuner "OFF"
     1: Tuner "ON"
     2: Tuning Start

AG	**AF GAIN**									
Set	1	2	3	4	5	6	7	8	9	10
	A	G	P1	P2	P2	P2	;			
Read	1	2	3	4	5	6	7	8	9	10
	A	G	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10
	A	G	P1	P2	P2	P2	;			

P1 0: Main (VFO-A) Band Receiver
     1: Sub (VFO-B) Band Receiver
P2 000 - 255

AI	**AUTO INFORMATION**									
Set	1	2	3	4	5	6	7	8	9	10
	A	I	P1	;						
Read	1	2	3	4	5	6	7	8	9	10
	A	I	;							
Answer	1	2	3	4	5	6	7	8	9	10
	A	I	P1	;						

P1 0: Auto Information "OFF"
     1: Auto Information "ON"

This parameter is set to "0" (OFF) automatically when the transceiver is turned "OFF."

AM	**VFO-A TO MEMORY CHANNEL**									
Set	1	2	3	4	5	6	7	8	9	10
	A	M	;							
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

AN	**ANTENNA NUMBER**									
Set	1	2	3	4	5	6	7	8	9	10
	A	N	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10
	A	N	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10
	A	N	P1	P3	P4	;				

P1 0: Main (VFO-A) Band
     1: Sub (VFO-B) Band
P2 1: ANT "1"
     2: ANT "2"
     3: ANT "3"
     4: ANT "4"
     5: ANT "RX"
P3 1: ANT "1"
     2: ANT "2"
     3: ANT "3"
     4: ANT "4"
P4 0: ANT "RX" "OFF"
     1: ANT "RX" "ON"

BA	**VFO-B TO VFO-A**									
Set	1	2	3	4	5	6	7	8	9	10
	B	A	;							
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

BC	**AUTO NOTCH**									
Set	1	2	3	4	5	6	7	8	9	10
	B	C	P1	P2	;					
Read	1	2	3	4	5	6	7	8	9	10
	B	C	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10
	B	C	P1	P2	;					

P1 0: Main (VFO-A) Band Receiver
     1: Sub (VFO-B) Band Receiver
P2 0: Auto Notch "OFF"
     1: Auto Notch "ON"

BD	**BAND DOWN**									
Set	1	2	3	4	5	6	7	8	9	10
	B	D	P1	;						
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

P1 0: Main (VFO-A) Band
     1: Sub (VFO-B) Band

CAT (Computer Aided Transceiver) Operation

Control Command Tables

BI — BREAK-IN

	1	2	3	4	5	6	7	8	9	10
Set	B	I	P1	;						
Read	B	I	;							
Answer	B	I	P1	;						

P1 0: Break-in "OFF"
1: Break-in "ON"

BP — MANUAL NOTCH

	1	2	3	4	5	6	7	8	9	10
Set	B	P	P1	P2	P3	P3	P3	;		
Read	B	P	P1	P2	;					
Answer	B	P	P1	P2	P3	P3	P3	;		

P1 0: Main (VFO-A) Band Receiver
1: Sub (VFO-B) Band Receiver
P2 0: Manual NOTCH "ON/OFF"
1: Manual NOTCH LEVEL
P3 When P2=0
000: OFF
001: ON
When P2=1
001 - 400 (NOTCH Frequency : x 10 Hz)

BS — BAND SELECT

	1	2	3	4	5	6	7	8	9	10
Set	B	S	P1	P1	;					
Read										
Answer										

P1 00: 1.8 MHz 06: 18 MHz
01: 3.5 MHz 07: 21 MHz
02: - 08: 24.5 MHz
03: 7 MHz 09: 28 MHz
04: 10 MHz 10: 50 MHz
05: 14 MHz 11: GEN

BU — BAND UP

	1	2	3	4	5	6	7	8	9	10
Set	B	U	P1	;						
Read										
Answer										

P1 0: Main (VFO-A) Band
1: Sub (VFO-B) Band

BY — BUSY

	1	2	3	4	5	6	7	8	9	10
Set										
Read	B	Y	;							
Answer	B	Y	P1	P2	;					

P1 0: Main (VFO-A) Band BUSY "OFF"
1: Main (VFO-A) Band BUSY "ON"
P2 0: Sub (VFO-B) Band BUSY "OFF"
1: Sub (VFO-B) Band BUSY "ON"

CA — CLASS-A

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

P1 0: CLASS-A ON/OFF
1: BIAS LEVEL
P2 When P1=0
000: OFF
001: ON
When P1=1
001 - 100

CH — CHANNEL UP/DOWN

	1	2	3	4	5	6	7	8	9	10
Set	C	H	P1	;						
Read										
Answer										

P1 0: Memory Channel "UP"
1: Memory Channel "DOWN"

CN — CTCSS TONE FREQUENCY

	1	2	3	4	5	6	7	8	9	10
Set	C	N	P1	P2	P2	;				
Read	C	N	P1	;						
Answer	C	N	P1	P2	P2	;				

P1 0: Main (VFO-A) Band Receiver
1: Sub (VFO-B) Band Receiver
P2 0 - 49: Tone Frequency Number

CTCSS Tone Chart

00	67.0 Hz	09	91.5 Hz	18	123.0 Hz	27	162.2 Hz	36	189.9 Hz	45	229.1 Hz
01	69.3 Hz	10	94.8 Hz	19	127.3 Hz	28	165.5 Hz	37	192.8 Hz	46	233.6 Hz
02	71.9 Hz	11	97.4 Hz	20	131.8 Hz	29	167.9 Hz	38	196.6 Hz	47	241.8 Hz
03	74.4 Hz	12	100.0 Hz	21	136.5 Hz	30	171.3 Hz	39	199.5 Hz	48	250.3 Hz
04	77.0 Hz	13	103.5 Hz	22	141.3 Hz	31	173.8 Hz	40	203.5 Hz	49	254.1 Hz
05	79.7 Hz	14	107.2 Hz	23	146.2 Hz	32	177.3 Hz	41	206.5 Hz	—	—
06	82.5 Hz	15	110.9 Hz	24	151.4 Hz	33	179.9 Hz	42	210.7 Hz	—	—
07	85.4 Hz	16	114.8 Hz	25	156.7 Hz	34	183.5 Hz	43	218.1 Hz	—	—
08	88.5 Hz	17	118.8 Hz	26	159.8 Hz	35	186.2 Hz	44	225.7 Hz	—	—

CONTROL COMMAND TABLES

CO — CONTOUR

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

P1 0: Main (VFO-A) Band Receiver
   1: Sub (VFO-B) Band Receiver
P2 0: CONTOUR/APF "ON/OFF"
   1: CONTOUR FREQUENCY
P3 When P2=0,
   000: CONTOUR/APF "OFF"
   001: CONTOUR "ON"
   002: APF "ON"
   When P2=1,
   01 - 40 (CONTOUR FREQUENCY)
   100 ~ 4000 Hz

CS — CW SPOT

	1	2	3	4	5	6	7	8	9	10
Set	C	S	P1	;						
Read	C	S	;							
Answer	C	S	P1	;						

P1 0: OFF
   1: ON

CT — CTCSS

	1	2	3	4	5	6	7	8	9	10
Set	C	T	P1	P2	;					
Read	C	T	P1	;						
Answer	C	T	P1	P2	;					

P1 0: Main (VFO-A) Band Receiver
   1: Sub (VFO-B) Band Receiver
P2 0: CTCSS "OFF"
   1: CTCSS ENC/DEC "ON"
   2: CTCSS ENC "ON"

DA — DIMMER

	1	2	3	4	5	6	7	8	9	10
Set	D	A	P1	P1	P2	P2	P3	P3	P4	P4
Read	D	A	;							
Answer	D	A	P1	P1	P2	P2	P3	P3	P4	P4

	11	12	13	14	15	16	17	18	19	20
Set	;									
Read										
Answer	;									

P1 00 - 15: VFD Backlight Brightness Level
P2 00 - 15: Meter Brightness Level
P3 00 - 15: OLE Brightness Level
P4 00 - 15: ELCD (SM-5000) Brightness Level

DN — MIC DWN

	1	2	3	4	5	6	7	8	9	10
Set	D	N	;							
Read										
Answer										

DP — DISPLAY

	1	2	3	4	5	6	7	8	9	10
Set	D	P	P1	;						
Read	D	P	;							
Answer	D	P	P1	;						

P1 0: World Clock Display
   1: Band Scope Display
   2: AF Oscilloscope/Spectrum Analyzer Display
   3: Log Book Display
   4: Temperature/SWR Display
   5: Rotator Display
   6: Memory Channel List Display

※: This command does not activates when the optional Data Managemnt Unit is not attached.

DS — DIMMER SWITCH

	1	2	3	4	5	6	7	8	9	10
Set	D	S	P1	;						
Read	D	S	;							
Answer	D	S	P1	;						

P1 0: DIMMER "OFF"
   1: DIMMER "ON"

ED — ENCORDER DOWN

	1	2	3	4	5	6	7	8	9	10
Set	E	D	P1	P2	P2	;				
Read										
Answer										

P1 0: MAIN ENCORDER
   1: SUB ENCORDER
   2: MAIN Select
   3: SUB Select
P2 01-99: Steps

CONTROL COMMAND TABLES

EU	ENCORDER UP										P1 0: MAIN ENCORDER
Set	1	2	3	4	5	6	7	8	9	10	1: SUB ENCORDER
	E	U	P1	P2	P2	;					2: MAIN Select
Read	1	2	3	4	5	6	7	8	9	10	3: SUB Select
											P2 01-99: Steps
Answer	1	2	3	4	5	6	7	8	9	10	

EX	MENU										P1 : 001-176 (MENU Number)
Set	1	2	3	4	5	6	7	8	nn	**	P2 : Parameter
	E	X	P1	P1	P1	P2	P2	~	P2	;	See Table 1 - Table 3
Read	1	2	3	4	5	6	7	8	9	10	
	E	X	P1	P1	P1	;					
Answer	1	2	3	4	5	6	7	8	nn	**	
	E	X	P1	P1	P1	P2	P2	~	P2	;	

TABLE 1

P1	FUNCTION	P2	BYTE
001	MAIN-FAST-DELAY	0020~4000 (20msec/step)	4
002	MAIN-FAST-HOLD	0000~2000 (20msec/step)	4
003	MAIN-MID-DELAY	0020~4000 (20msec/step)	4
004	MAIN-MID-HOLD	0000~2000 (20msec/step)	4
005	MAIN-SLOW-DELAY	0020~4000 (20msec/step)	4
006	MAIN-SLOW-HOLD	0000~2000 (20msec/step)	4
007	TFT COLOR	0: COOL BLUE, 1: CONTRAST BLUE, 2: FLASH WHITE, 3: CONTRAST UMBER, 4: UMBER	1
008	DIMMER-METER	00~15	2
009	DIMMER-VFD	00~15	2
010	DIMMER-OLE	00~15	2
011	DIMMER-E.LCD	00~15	2
012	BAR DISPLAY SELECT	0: CLAR, 1: CW TUNE	1
013	SUB MTR PEAK HOLD	0: OFF, 1: 0.5, 2: 1.0, 3: 2.0 (sec)	1
014	ROTATOR START UP	0: 0°, 1: 90°, 2: 180°, 3: 270°	1
015	ROTATOR OFFSET ADJ	-30~0 (P2 = 30~00) (2°step)	2
016	QMB MARKER	0: DISABLE, 1: ENABLE	1
017	LEVEL INDICATOR	0000000000000 ~ 1111111111111 (see Page 9)	13
018	INDICATOR	0: VFD, 1: OEL	1
019	SELECT	0: PTN1, 1: PTN2	1
020	RX OUT LEVEL	000~100	3
021	TX OUT LEVEL	000~100	3
022	BEACON TIME	OFF/001~255sec (0: OFF)	3
023	NUMBER STYLE	0: 1290, 1: AUNO, 2: AUNT, 3: A2NO, 4: A2NT, 5: 12NO, 6: 12NT	1
024	CONTEST NUMBER	0000~9999	4
025	CW MEMORY 1	0: TEXT, 1: MESSAGE	1
026	CW MEMORY 2	0: TEXT, 1: MESSAGE	1
027	CW MEMORY 3	0: TEXT, 1: MESSAGE	1
028	CW MEMORY 4	0: TEXT, 1: MESSAGE	1
029	CW MEMORY 5	0: TEXT, 1: MESSAGE	1
030	ANT SELECT	0: BAND, 1: STACK	1
031	BEEP LEVEL	000~100	3
032	CAT RATE	0: 4800, 1: 9600, 2: 19200, 3: 38400 (bps)	1
033	CAT TIME OUT TIMER	0: 10, 1: 100, 2: 1000, 3: 3000 (msec)	1
034	CAT RTS	0: DISABLE, 1: ENABLE	1
035	CAT DATA INDICATOR	0: DISABLE, 1: ENABLE	1
036	MEM GROUP	0: DISABLE, 1: ENABLE	1
037	QUICK SPLIT FREQ	-20 ~ +20 kHz (P2 = -20 ~ +00 ~ +20)	3
038	TRACKING	0: OFF, 1: BAND, 2: FREQ	1
039	TIME OUT TIMER	OFF/01~30min	2
040	TRV OFFSET (14MHz)	30: 30, 31: 31, 32: 32 ~ 44: 44, 45: 45, 46: 46 (MHz)	2
041	TRV OFFSET (28MHz)	30: 30, 31: 31, 32: 32 ~ 44: 44, 45: 45, 46: 46 (MHz)	2
042	TRV OFFSET (50MHz)	30: 30, 31: 31, 32: 32 ~ 44: 44, 45: 45, 46: 46 (MHz)	2
043	uTUNE DIAL STEP	0: DIAL STEP-2, 1: DIAL STEP-1, 2: OFF	1
044	MIC SCAN	0: DISABLE, 1: ENABLE	1
045	MIC SCAN RESUME	0: PAUSE, 1: TIME	1
046	FREQ ADJ	-25~0~+25 (P2 = -25 ~ +00 ~ +25)	3
047	AM LCUT FREQ	00: OFF, 01: 100Hz, ~, 19: 1000Hz (50Hz/step)	2
048	AM LCUT SLOPE	0: 6dB/oct, 1: 18dB/oct	1
049	AM HCUT FREQ	00: OFF, 01: 700Hz, ~, 67: 4000Hz (50Hz/step)	2
050	AM HCUT SLOPE	0: 6dB/oct, 1: 18dB/oct	1
051	AM MIC GAIN	MCVR/FIX(0~100) (P2 = 1000: MCVR, 0000~0100: FIX(0~100))	4
052	AM MIC SEL	0: FRONT, 1: DATA, 2: PC	1
053	CW LCUT FREQ	00: OFF, 01: 100Hz, ~, 19: 1000Hz (50Hz/step)	2
054	CW LCUT SLOPE	0: 6dB/oct, 1: 18dB/oct	1
055	CW HCUT FREQ	00: OFF, 01: 700Hz, ~, 67: 4000Hz (50Hz/step)	2
056	CW HCUT SLOPE	0: 6dB/oct, 1: 18dB/oct	1
057	F-KEYER TYPE	0: OFF, 1: BUG, 2: ELEKEY, 3: ACS	1
058	F-CW KEYER	0: NOR, 1: REV	1
059	R-KEYER TYPE	0: OFF, 1: BUG, 2: ELEKEY, 3: ACS	1
060	R-CW KEYER	0: NOR, 1: REV	1
061	CW AUTO MODE	0: OFF, 1: 50M, 2: ON	1
062	CW BFO	0: USB, 1: LSB, 2: AUTO	1
063	CW BK-IN	0: SEMI, 1: FULL	1
064	CW WAVE SHAPE	0: 1, 1: 2, 2: 4, 3: 6 (msec)	1
065	CW WEIGHT	2.5~3.0~4.5 (P2 = 25~45)	2
066	CW FREQ DISPLAY	0: DIRECT FREQ, 1: PITCH OFFSET	1
067	PC KEYING	0: DISABLE, 1: ENABLE	1

CONTROL COMMAND TABLES

TABLE 2

P1	FUNCTION	P2	BYTE
068	QSK	0: 15, 1: 20, 2: 25, 3: 30 (msec)	1
069	DATA IN SELECT	0: DATA, 1: PC	1
070	DATA TX GAIN	000~100	3
071	DATA OUT	0: VFO-A, 1: VFO-B	1
072	DATA OUT LEVEL	000~100	3
073	DATA VOX DELAY	0030~0300~3000msec (10msec/step)	4
074	DATA VOX GAIN	000~100	3
075	FM LCUT FREQ	00: OFF, 01: 100Hz, ~ , 19: 1000 Hz (50Hz/step)	2
076	FM LCUT SLOPE	0: 6, 1: 18 (dB/oct)	1
077	FM HCUT FREQ	00: OFF, 01: 700, ~ , 67: 4000 Hz (50Hz/step)	2
078	FM HCUT SLOPE	0: 6 , 1: 18 (dB/oct)	1
079	FM MIC GAIN	MCVR/FIX(0~100) (P2 = 1000: MCVR, 0000~0100: FIX(0~100))	4
080	FM MIC SEL	0: FRONT, 1: DATA, 2: PC	1
081	RPT SHIFT(28MHz)	0000 ~0100 ~ 1000 kHz (10Hz/step)	4
082	RPT SHIFT(50MHz)	0000 ~0100 ~ 1000 ~ 4000 kHz (10Hz/step)	4
083	PKT LCUT FREQ	00: OFF, 01: 100Hz, ~ , 19: 1000 Hz (50Hz/step)	2
084	PKT LCUT SLOPE	0: 6, 1: 18 (dB/oct)	1
085	PKT HCUT FREQ	00: OFF, 01: 700, ~ , 67: 4000 Hz (50Hz/step)	2
086	PKT HCUT SLOPE	0: 6, 1: 18 (dB/oct)	1
087	PKT DISP (SSB)	-3000 ~ 0 ~ +3000 Hz (10Hz/step) (P2 = -3000 ~ +0000 ~ +3000)	5
088	PKT SHIFT (SSB)	-3000 ~ 0 ~ +3000 Hz (10Hz/step) (P2 = -3000 ~ +0000 ~ +3000)	5
089	RTTY LCUT FREQ	00: OFF, 01: 100, ~ , 19: 1000 Hz (50Hz/step)	2
090	RTTY LCUT SLOPE	0: 6, 1: 18 (dB/oct)	1
091	RTTY HCUT FREQ	00: OFF, 01: 700, ~ , 67: 4000 Hz (50Hz/step)	2
092	RTTY HCUT SLOPE	0: 6, 1: 18 (dB/oct)	1
093	POLARITY-R	0: NOR, 1: REV	1
094	POLARITY-T	0: NOR, 1: REV	1
095	RTTY OUT	0: VFO-A, 1: VFO-B	1
096	RTTY OUT LEVEL	000 ~100	3
097	RTTY SHIFT	0: 170, 1: 200, 2: 425, 3: 850 (Hz)	1
098	RTTY TONE	0: 1275, 1: 2125 (Hz)	1
099	SSB LCUT FREQ	00: OFF, 01: 100 ~ 19: 1000Hz (50Hz/step)	2
100	SSB LCUT SLOPE	0: 6, 1: 18 (dB/oct)	1
101	SSB HCUT FREQ	00: OFF, 01: 700 ~ 67: 4000 Hz (50Hz/step)	2
102	SSB HCUT SLOPE	0: 6 1: 18 (dB/oct)	1
103	SSB MIC SELECT	0: FRONT, 1: DATA, 2: PC	1
104	SSB-TX-BPF	0: 50-3000, 1: 100-2900, 2: 200-2800, 3: 300-2700, 4: 400-2600(Hz), 5: 3000WB	1
105	LSB RX-CARRIER	-200Hz~0~+200 Hz (10Hz/step) (P2 = -200 ~ +000 ~ +200)	4
106	USB RX-CARRIER	-200Hz~0~+200 Hz (10Hz/step) (P2 = -200 ~ +000 ~ +200)	4
107	AGC-SLOPE	0: NORMAL, 1: SLOPE	1
108	HEADPHONE MIX	0: SEPARATE, 1: COMBINE-1, 2: COMBINE-2	1
109	IF OUT	0: DISABLE, 1: ENABLE	1
110	MAIN NB LEVEL	000 ~100	3
111	MAIN NB WIDTH	000 ~100	3
112	MAIN-CONTOUR-LEVEL	-40~0~20 (P2 = -40 ~ +00 ~ +20)	3
113	MAIN-CONTOUR-WIDTH	01 ~11	2
114	IF-NOTCH-WIDTH	0: NARROW, 1: WIDE	1
115	MAIN-CW SHAPE	0: SOFT, 1: SHARP	1
116	MAIN-CW SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
117	MAIN-PSK SHAPE	0: SOFT, 1: SHARP	1
118	MAIN-PSK SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
119	MAIN-RTY SHAPE	0: SOFT, 1: SHARP	1
120	MAIN-RTY SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
121	MAIN-SSB SHAPE	0: SOFT, 1: SHARP	1
122	MAIN-SSB SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
123	SUB-CW SHAPE	0: SOFT, 1: SHARP	1
124	SUB-CW SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
125	SUB-PSK SHAPE	0: SOFT, 1: SHARP	1
126	SUB-PSK SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
127	SUB-RTY SHAPE	0: SOFT, 1: SHARP	1
128	SUB-RTY SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
129	SUB-SSB SHAPE	0: SOFT, 1: SHARP	1
130	SUB-SSB SLOPE	0: STEEP, 1: MEDIUM, 2: GENTLE	1
131	FIX 1.8MHz	1.800MHz ~ 1.999MHz 1kHz /step (P2 = 01800 ~ 01999)	5
132	FIX 3.5MHz	3.500MHz ~ 3.999MHz 1kHz /step (P2 = 03500 ~ 03999)	5
133	FIX 5.0MHz	5.250MHz ~ 5.499MHz 1kHz /step (P2 = 05250 ~ 05499)	5
134	FIX 7.0MHz	7.000MHz ~ 7.299MHz 1kHz /step (P2 = 07000 ~ 07299)	5
135	FIX 10MHz	10.100MHz ~ 10.149MHz 1kHz /step (P2 = 10100 ~ 10149)	5
136	FIX 14MHz	14.000MHz ~ 14.349MHz 1kHz /step (P2 = 14000 ~ 14349)	5
137	FIX 18MHz	18.000MHz ~ 18.199MHz 1kHz /step (P2 = 18000 ~ 18199)	5
138	FIX 21MHz	21.000MHz ~ 21.449MHz 1kHz /step (P2 = 21000 ~ 21449)	5
139	FIX 24MHz	24.800MHz ~ 24.989MHz 1kHz /step (P2 = 24800 ~ 24989)	5
140	FIX 28MHz	28.000MHz ~ 29.699MHz 1kHz /step (P2 = 28000 ~ 29699)	5
141	FIX 50MHz	50.000MHz ~ 53.999MHz 1kHz /step (P2 = 50000 ~ 53999)	5
142	DIAL STEP	0: 1, 1: 5Hz, 2: 10Hz	1
143	DIAL CW FINE	0: DISABLE, 1: ENABLE	1
144	UP/DOWN STEP	0: 1MHz, 1: 100kHz	1
145	AM CH STEP	0: 2.5, 1: 5, 2: 9, 3: 10, 4: 12.5kHz	1
146	FM CH STEP	0: 5, 1: 6.25, 2: 10, 3: 12.5, 4: 20kHz, 5: 25kHz	1
147	AM DIAL LOCK	0: DISABLE, 1: ENABLE	1
148	FM DIAL LOCK	0: DISABLE, 1: ENABLE	1
149	FM DIAL STEP	0: 10, 1: 100Hz	1
150	MY BAND	00000000000000 ~ 11111111111111 (see Page 9)	14
151	PRMTRC EQ1 FREQ	00: OFF, 01: 100, 02: 200, 03: 300, 04: 400, 05: 500, 06: 600, 07: 700 (Hz)	2
152	PRMTRC EQ1 LEVEL	-10~0~+10 (P2 = -10 ~ +00 ~ +10)	3
153	PRMTRC EQ1 BWTH	01~10	2
154	PRMTRC EQ2 FREQ	00: OFF, 01: 700, 02: 800, 03: 900, 04: 1000, 05: 1100, 06: 1200, 07: 1300, 08: 1400, 09: 1500 (Hz)	2
155	PRMTRC EQ2 LEVEL	-10~0~+10 (P2 = -10 ~ +00 ~ +10)	3
156	PRMTRC EQ2 BWTH	01~10	2
157	PRMTRC EQ3 FREQ	00: OFF,01: 1500, 02: 1600, 03: 1700,04: 1800, 05: 1900, 06: 2000, 07: 2100, 08: 2200, 09: 2300 10: 2400, 11: 2500, 12: 2600, 13: 2700, 14: 2800, 15: 2900, 16: 3000, 17: 3100, 18: 3200 (Hz)	2

CONTROL COMMAND TABLES

TABLE 3

P1	FUNCTION	P2	BYTE
158	PRMTRC EQ3 LEVEL	-10~0~+10 (P2 = -10 ~ +00 ~ +10)	3
159	PRMTRC EQ3 BWTH	01~10	2
160	P-PRMTRC EQ1-FREQ	00: OFF, 01: 100, 02: 200, 03: 300, 04: 400, 05: 500, 06: 600, 07: 700 (Hz)	2
161	P-PRMTRC EQ1-LEVEL	-10~0~+10 (P2 = -10 ~ +00 ~ +10)	3
162	P-PRMTRC EQ1-BWTH	01~10	2
163	P-PRMTRC EQ2-FREQ	00: OFF, 01: 700, 02: 800, 03: 900, 04: 1000, 05: 1100, 06: 1200, 07: 1300, 08: 1400, 09: 1500 (Hz)	2
164	P-PRMTRC EQ2-LEVEL	-10~0~+10 (P2 = -10 ~ +00 ~ +10)	3
165	P-PRMTRC EQ2-BWTH	01~10	2
166	P-PRMTRC EQ3-FREQ	00: OFF, 01: 1500, 02: 1600, 03: 1700,04: 1800, 05: 1900, 06: 2000, 07: 2100, 08: 2200, 09: 2300 10: 2400, 11: 2500, 12: 2600, 13: 2700, 14: 2800, 15: 2900, 16: 3000, 17: 3100, 18: 3200 (Hz)	2
167	P-PRMTRC EQ3-LEVEL	-10~0~+10 (P2 = -10 ~ +00 ~ +10)	3
168	P-PRMTRC EQ3-BWTH	01~10	2
169	FINAL BIAS	A(1~100%) (P2 = 0001~0100: A(1~100%))	4
170	TX MAX POWER	0: 10(20), 1: 20(50), 2: 50(100), 3: 100(200) (200W type)	1
171	TX PWR CONTROL	0: ALL MODE, 1: CARRIER	1
172	EXT AMP TX-GND	0: DISABLE, 1: ENABLE	1
173	EXT AMP TUNING PWR	0: 10(20), 1: 20(50), 2: 50(100), 3: 100(200) (200W type)	1
174	VOX SELECT	0: MIC, 1: DATA	1
175	ANTI VOX GAIN	000~100	3
176	EMERGENCY FREQ TX	0: DISABLE, 1: ENABLE	1

Menu Item 017 LEVEL INDICATOR
Command P2 13-Byte Details
1 Byte - - - - - - - - - - - - - - 13-Byte

```
X X X X X X X X X X X X X
                      └ -
                        -
                        -
                      PROCE
                      MIC GAIN
                      RF PWR
                      VOX DELAY
                      CW DELAY
                      -
                      -
                      CW SPEED
                      CW PITCH
```

Menu Item 150 MY BAND SELECT
Command P2 14-Byte Details
1 Byte - - - - - - - - - - - - - - - 14-Byte

```
X X X X X X X X X X X X X X
                      └ TRANSVERTER 50M
                        TRANSVERTER 28M
                        TRANSVERTER 14M
                        GENERAL
                        50 MHz
                        28 MHz
                        24.5 MHz
                        21 MHz
                        18 MHz
                        14 MHz
                        10 MHz
                        7 MHz
                        3.5 MHz
                        1.8 MHz
```
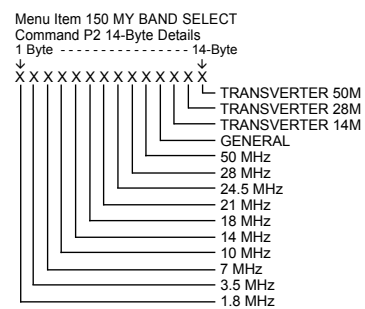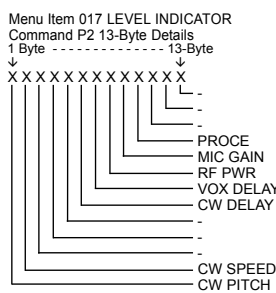
CONTROL COMMAND TABLES

FA — FREQUENCY VFO-A

Set	1	2	3	4	5	6	7	8	9	10
	F	A	P1	P1	P1	P1	P1	P1	P1	P1
	11	12	13	14	15	16	17	18	19	20
	;									

P1 00030000 - 60000000 (Hz)

Read	1	2	3	4	5	6	7	8	9	10
	F	A	;							

Answer	1	2	3	4	5	6	7	8	9	10
	F	A	P1	P1	P1	P1	P1	P1	P1	P1
	11	12	13	14	15	16	17	18	19	20
	;									

FB — FREQUENCY VFO-B

Set	1	2	3	4	5	6	7	8	9	10
	F	B	P1	P1	P1	P1	P1	P1	P1	P1
	11	12	13	14	15	16	17	18	19	20
	;									

P1 00030000 - 60000000 (Hz)

Read	1	2	3	4	5	6	7	8	9	10
	F	B	;							

Answer	1	2	3	4	5	6	7	8	9	10
	F	B	P1	P1	P1	P1	P1	P1	P1	P1
	11	12	13	14	15	16	17	18	19	20
	;									

FR — FUNCTION RX

Set	1	2	3	4	5	6	7	8	9	10
	F	R	P1	;						

Read	1	2	3	4	5	6	7	8	9	10
	F	R	;							

Answer	1	2	3	4	5	6	7	8	9	10
	F	R	P1	;						

P1 0: Main (VFO-A) Band Receiver: RX,   Sub (VFO-B) Band Receiver: "OFF"
1: Main (VFO-A) Band Receiver: Mute, Sub (VFO-B) Band Receiver: "OFF"
2: Main (VFO-A) Band Receiver: RX,   Sub (VFO-B) Band Receiver: RX
3: Main (VFO-A) Band Receiver: Mute, Sub (VFO-B) Band Receiver: RX

FS — FAST STEP

Set	1	2	3	4	5	6	7	8	9	10
	F	S	P1	;						

Read	1	2	3	4	5	6	7	8	9	10
	F	S	;							

Answer	1	2	3	4	5	6	7	8	9	10
	F	S	P1	;						

P1 0: VFO A "OFF" (SET Only)   4: VFO A "OFF", VFO B "OFF"
1: VFO A "ON" (SET Only)   5: VFO A "ON", VFO B "OFF"
2: VFO B "OFF" (SET Only)   6: VFO A "OFF", VFO B "ON"
3: VFO B "ON" (SET Only)   7: VFO A "ON", VFO B "ON"

FT — FUNCTION TX

Set	1	2	3	4	5	6	7	8	9	10
	F	T	P1	;						

Read	1	2	3	4	5	6	7	8	9	10
	F	T	;							

Answer	1	2	3	4	5	6	7	8	9	10
	F	T	P2	;						

P1 0: TX Band = Main (VFO-A) Band ↔ Sub (VFO-B) Band (Toggle)
1: TX Band = Sub (VFO-B) Band ↔ Main (VFO-A) Band (Toggle)
2: TX Band = Main (VFO-A) Band
3: TX Band = Sub (VFO-B) Band
P2 0: TX Band = Main (VFO-A) Band
1: TX Band = Sub (VFO-B) Band

GT — AGC FUNCTION

Set	1	2	3	4	5	6	7	8	9	10
	G	T	P1	P2	;					

Read	1	2	3	4	5	6	7	8	9	10
	G	T	P1	;						

Answer	1	2	3	4	5	6	7	8	9	10
	G	T	P1	P3	;					

P1 0: Main (VFO-A) Band   P3 0: AGC "OFF"
1: Sub (VFO-B) Band   1: AGC "FAST"
P2 0: AGC "OFF"   2: AGC "MID"
1: AGC "FAST"   3: AGC "SLOW"
2: AGC "MID"   4: AGC "AUTO-FAST"
3: AGC "SLOW"   5: AGC "AUTO-MID"
4: AGC "AUTO"   6: AGC "AUTO-SLOW"

ID — IDENTIFICATION

Set	1	2	3	4	5	6	7	8	9	10

P1 0362: FTDX5000

Read	1	2	3	4	5	6	7	8	9	10
	I	D	;							

Answer	1	2	3	4	5	6	7	8	9	10
	I	D	P1	P1	P1	P1	;			

CONTROL COMMAND TABLES

IF	INFORMATION									
Set	1	2	3	4	5	6	7	8	9	10
Read	1	2	3	4	5	6	7	8	9	10
	I	F	;							
Answer	1	2	3	4	5	6	7	8	9	10
	I	F	P1	P1	P1	P2	P2	P2	P2	P2
	11	12	13	14	15	16	17	18	19	20
	P2	P2	P2	P3	P3	P3	P3	P3	P4	P5
	21	22	23	24	25	26	27	28	29	30
	P6	P7	P8	P9	P9	P10	;			

P1 001-117 (Memory Channel) P2 VFO-A Frequency (Hz)
P3 Clarifier Direction +: Plus Shift, −: Minus Shift
  Clarifier Offset: 0000 - 9999 (Hz)
P4 0: RX CLAR "OFF" 1: RX CLAR "ON"
P5 0: TX CLAR "OFF" 1: TX CLAR "ON"
P6 MODE 1: LSB 2: USB 3: CW 4: FM 5: AM 6: FSK (RTTY-LSB)
  7: CW-R 8: PKT-L 9: FSK-R (RTTY-USB) A: PKT-FM
  B: FM-N C: PKT-U
P7 0: VFO 1: Memory 2: Memory Tune 3: Quick Memory Bank (QMB) 4: QMB-MT
P8 0: CTCSS "OFF" 1: CTCSS ENC/DEC 2: CTCSS ENC
P9: Tone Number (See Page 5: "CTCSS Tone Chart") 00 ~ 49
P10 0: Simplex 1: Plus Shift 2: Minus Shift

IS	IF-SHIFT									
Set	1	2	3	4	5	6	7	8	9	10
	I	S	P1	-/+	P2	P2	P2	P2	;	
Read	1	2	3	4	5	6	7	8	9	10
	I	S	P1	;						
Answer	1	2	3	4	5	6	7	8	9	10
	I	S	P1	-/+	P2	P2	P2	P2	;	

P1 0: Main (VFO-A) Band Receiver
  1: Sub (VFO-B) Band Receiver
P2 −1000 ~ +1000 Hz

KM	KEYER MEMORY									
Set	1	2	3	4	5	6	7	~	53	**
	K	M	P1	P2	P2	P2	P2	~	P2	;
Read	1	2	3	4	5	6	7	8	9	10
	K	M	P1	;						
Answer	1	2	3	4	5	6	7	~	53	**
	K	M	P1	P2	P2	P2	P2	~	P2	;

P1 1 - 5 : Keyer Memory Channel Number
P2 Message Characters (up to 50 characters)

When the message is complete, add the "}" character at the end to signify the termination of the message.
ex. KM CQ}_ _ ~ _ ; (_ : space)

KP	KEY PITCH									
Set	1	2	3	4	5	6	7	8	9	10
	K	P	P1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10
	K	P	;							
Answer	1	2	3	4	5	6	7	8	9	10
	K	P	P1	P1	;					

P1 00 ~75: 300 Hz ~ 1050 Hz (10 Hz Step)

KR	KEYER									
Set	1	2	3	4	5	6	7	8	9	10
	K	R	P1	;						
Read	1	2	3	4	5	6	7	8	9	10
	K	R	;							
Answer	1	2	3	4	5	6	7	8	9	10
	K	R	P1	;						

P1 0: KEYER "OFF"
  1: KEYER "ON"

KS	KEY SPEED									
Set	1	2	3	4	5	6	7	8	9	10
	K	S	P1	P1	P1	;				
Read	1	2	3	4	5	6	7	8	9	10
	K	S	;							
Answer	1	2	3	4	5	6	7	8	9	10
	K	S	P1	P1	P1	;				

P1 004 - 060 (WPM)

KY	CW KEYING									
Set	1	2	3	4	5	6	7	8	9	10
	K	Y	P1	;						
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

P1 1: Keyer Memory "1" Playback 6: Message Keyer "1" Playback
  2: Keyer Memory "2" Playback 7: Message Keyer "2" Playback
  3: Keyer Memory "3" Playback 8: Message Keyer "3" Playback
  4: Keyer Memory "4" Playback 9: Message Keyer "4" Playback
  5: Keyer Memory "5" Playback A: Message Keyer "5" Playback

LK	LOCK									
Set	1	2	3	4	5	6	7	8	9	10
	L	K	P1	;						
Read	1	2	3	4	5	6	7	8	9	10
	L	K	;							
Answer	1	2	3	4	5	6	7	8	9	10
	L	K	P1	;						

P1 0: VFO A "OFF" (SET Only) 4: VFO A "OFF", VFO B "OFF"
  1: VFO A "ON" (SET Only) 5: VFO A "ON", VFO B "OFF"
  2: VFO B "OFF" (SET Only) 6: VFO A "OFF", VFO B "ON"
  3: VFO B "ON" (SET Only) 7: VFO A "ON", VFO B "ON"

CONTROL COMMAND TABLES

LM — LOAD MESSAGE

	1	2	3	4	5	6	7	8	9	10
Set	L	M	P1	P2	;					
Read	L	M	P1	;						
Answer	L	M	P1	P2	;					

P1 0: DVS
1: P. B

P2 When P1=0
0: DVS (Recording Stop)
1: DVS (CH "1" Recording Start/Stop)
2: DVS (CH "2" Recording Start/Stop)
3: DVS (CH "3" Recording Start/Stop)
4: DVS (CH "4" Recording Start/Stop)
5: DVS (CH "5" Recording Start/Stop)

When P1=1
0: P.B (Recording Stop)
1: P.B (Recording Start)

MA — MEMORY CHANNEL TO VFO-A

	1	2	3	4	5	6	7	8	9	10
Set	M	A	;							
Read										
Answer										

MC — MEMORY CHANNEL

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

P1 001 - 117: Memory Channel Number
001 - 099: Regular Memory Channel
100: P1L
101: P1U
᷉
116: P9L
117: P9U

MD — OPERATING MODE

	1	2	3	4	5	6	7	8	9	10
Set	M	D	P1	P2	;					
Read	M	D	P1	;						
Answer	M	D	P1	P2	;					

P1 0: Main (VFO-A) Band
1: Sub (VFO-B) Band
P2 MODE 1: LSB 2: USB 3: CW 4: FM 5: AM 6: FSK (RTTY-LSB)
7: CW-R 8: PKT-L 9: FSK-R (RTTY-USB) A: PKT-FM
B: FM-N C: PKT-U

MG — MIC GAIN

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

P1 000 - 255

MK — MODE KEY

	1	2	3	4	5	6	7	8	9	10
Set	M	K	P1	;						
Read										
Answer										

P1 KEY 0: LSB
1: USB
2: CW
3: AM / FM
4: FM / FM
5: RTTY
6: PKT

ML — MONITOR LEVEL

	1	2	3	4	5	6	7	8	9	10
Set	M	L	P1	P2	P2	P2	;			
Read	M	L	P1	;						
Answer	M	L	P1	P2	P2	P2	;			

P1 0: MONI "ON/OFF"
1: MONI Level
P2 When P1=0
000: MONI "OFF"
001: MONI "ON"
When P1=1
001 - 255

MR — MEMORY CHANNEL READ

	1	2	3	4	5	6	7	8	9	10
Set										
Read	M	R	P1	P1	P1	;				
Answer	M	R	P1	P1	P1	P2	P2	P2	P2	P2

11	12	13	14	15	16	17	18	19	20
P2	P2	P2	P3	P3	P3	P3	P3	P4	P5

21	22	23	24	25	26	27	28	29	30
P6	P7	P8	P9	P9	P10	;			

P1 Memory Channel Number   P2 Memory Channel Frequency (Hz)
P3 Clarifier Direction +: Plus Shift, –: Minus Shift
Clarifier Offset: 0000 - 9999 (Hz)
P4 0: RX CLAR "OFF"   1: RX CLAR "ON"
P5 0: TX CLAR "OFF"   1: TX CLAR "ON"
P6 MODE 1: LSB 2: USB 3: CW 4: FM 5: AM 6: FSK (RTTY-LSB)
7: CW-R 8: PKT-L 9: FSK-R (RTTY-USB) A: PKT-FM
B: FM-N C: PKT-U
P7 0: VFO 1: Memory
P8 0: CTCSS "OFF" 1: CTCSS ENC/DEC 2: CTCSS ENC
P9 Tone Number (See Page 5: "CTCSS Tone Chart") 00 ~ 49
P10 0: Simplex 1: Plus Shift 2: Minus Shift

CONTROL COMMAND TABLES

MS	METER SW										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: COMP
	M	S	P1	;							1: ALC
Read	1	2	3	4	5	6	7	8	9	10	2: PO
	M	S	;								3: SWR
Answer	1	2	3	4	5	6	7	8	9	10	4: ID
	M	S	P1	;							5: VDD

MW	MEMORY CHANNEL WRITE										
Set	1	2	3	4	5	6	7	8	9	10	P1 Memory Channel Number P2 Memory Channel Frequency (Hz)
	M	W	P1	P1	P1	P2	P2	P2	P2	P2	P3 Clarifier Direction +: Plus Shift, −: Minus Shift
	11	12	13	14	15	16	17	18	19	20	Clarifier Offset: 0000 - 9999 (Hz)
	P2	P2	P2	P3	P3	P3	P3	P3	P4	P5	P4 0: RX CLAR "OFF" 1: RX CLAR "ON"
	21	22	23	24	25	26	27	28	29	30	P5 0: TX CLAR "OFF" 1: TX CLAR "ON"
	P6	P7	P8	P9	P9	P10	;				P6 MODE 1: LSB 2: USB 3: CW 4: FM 5: AM 6: FSK (RTTY-LSB)
Read	1	2	3	4	5	6	7	8	9	10	7: CW-R 8: PKT-L 9: FSK-R (RTTY-USB) A: PKT-FM
											B: FM-N C: PKT-U
Answer	1	2	3	4	5	6	7	8	9	10	P7 0: (Fixed)
											P8 0: CTCSS "OFF" 1: CTCSS ENC/DEC 2: CTCSS ENC

P9 Tone Number (See Page 5: "CTCSS Tone Chart") 00 ~ 49
P10 0: Simplex   1: Plus Shift   2: Minus Shift

MX	MOX SET										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: MOX "OFF"
	M	X	P1	;							1: MOX "ON"
Read	1	2	3	4	5	6	7	8	9	10	
	N	X	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	N	X	P1	;							

NA	NARROW										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	N	A	P1	P2	;						1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 0: OFF
	N	A	P1	;							1: ON
Answer	1	2	3	4	5	6	7	8	9	10	
	N	A	P1	P2	;						

NB	NOISE BLANKER STATUS										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	N	B	P1	P2	;						1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 0: Noise Blanker "OFF"
	N	B	P1	;							1: Noise Blanker "ON"
Answer	1	2	3	4	5	6	7	8	9	10	2: Noise Blanker (Wide) "ON"
	N	B	P1	P2	;						

NL	NOISE BLANKER LEVEL										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	N	L	P1	P2	P2	P2	;				1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 000 - 255
	N	L	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	N	L	P1	P2	P2	P2	;				

NR	NOISE REDUCTION										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	N	R	P1	P2	;						1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 0: Noise Reduction "OFF"
	N	R	P1	;							1: Noise Reduction "ON"
Answer	1	2	3	4	5	6	7	8	9	10	
	N	R	P1	P2	;						

OI	OPPOSITE BAND INFORMATION										
Set	1	2	3	4	5	6	7	8	9	10	P1 Current Memory Channel P2 VFO-B Frequency (Hz)
											P3 Clarifier Direction +: Plus Shift, −: Minus Shift
Read	1	2	3	4	5	6	7	8	9	10	Crarifier Offset: 0000 - 9999 (Hz)
	O	I	;								P4 0: RX CLAR "OFF" 1: RX CLAR "ON"
Answer	1	2	3	4	5	6	7	8	9	10	P5 0: TX CLAR "OFF" 1: TX CLAR "ON"
	O	I	P1	P1	P1	P2	P2	P2	P2	P2	P6 MODE 1: LSB 2: USB 3: CW 4: FM 5: AM 6: FSK (RTTY-LSB)
	11	12	13	14	15	16	17	18	19	20	7: CW-R 8: PKT-L 9: FSK-R (RTTY-USB) A: PKT-FM
	P2	P2	P2	P3	P3	P3	P3	P3	P4	P5	B: FM-N C: PKT-U
	21	22	23	24	25	26	27	28	29	30	P7 0: VFO 1: Memory
	P6	P7	P8	P9	P9	P10	;				P8 0: CTCSS "OFF" 1: CTCSS ENC/DEC 2: CTCSS ENC

P9 Tone Number (See Page 5: "CTCSS Tone Chart") 00 ~ 49
P10 0: Simplex   1: Plus Shift   2: Minus Shift

OS — OFFSET (REPEATER SHIFT)

	1	2	3	4	5	6	7	8	9	10
Set	O	S	P1	P2	;					
Read	O	S	P1	;						
Answer	O	S	P1	P2	;					

P1 0: Main (VFO-A) Band
1: Sub (VFO-B) Band
P2 0: Simplex
1: Plus Shift
2: Minus Shift
※: FM mode only

PA — PRE-AMP (IPO)

	1	2	3	4	5	6	7	8	9	10
Set	P	A	P1	P2	;					
Read	P	A	P1	;						
Answer	P	A	P1	P2	;					

P1 0: Main (VFO-A) Band Receiver
1: Sub (VFO-B) Band Receiver
P2 0: IPO 1
1: AMP 1
2: AMP 2
3: IPO 2

PB — PLAY BACK

	1	2	3	4	5	6	7	8	9	10
Set	P	B	P1	P2	;					
Read	P	B	P1	;						
Answer	P	B	P1	P2	;					

P1 0: DVS
1: P.B
P2 When P1=0
0: DVS (Recording Stop)
1: DVS (CH "1" Playback Start)
2: DVS (CH "2" Playback Start)
3: DVS (CH "3" Playback Start)
4: DVS (CH "4" Playback Start)
5: DVS (CH "5" Playback Start)
When P1=1
0: P.B (Playback Stop)
1: P.B (Playback Start)

PC — POWER CONTROL

	1	2	3	4	5	6	7	8	9	10
Set	P	C	P1	P1	P1	;				
Read	P	C	;							
Answer	P	C	P1	P1	P1	;				

P1 000 - 255

PL — SPEECH PROCESSOR LEVEL

	1	2	3	4	5	6	7	8	9	10
Set	P	L	P1	P1	P1	;				
Read	P	L	;							
Answer	P	L	P1	P1	P1	;				

P1 000 - 255

PR — SPEECH PROCESSOR

	1	2	3	4	5	6	7	8	9	10
Set	P	R	P1	;						
Read	P	R	;							
Answer	P	R	P1	;						

P1 0: Speech Processor "OFF"
1: Speech Processor "ON"
2: Microphone Equalizer "ON"

PS — POWER SWITCH

	1	2	3	4	5	6	7	8	9	10
Set	P	S	P1	;						
Read	P	S	;							
Answer	P	S	P1	;						

P1 0: POWER "OFF"
1: POWER "ON" (Send the PS1; command twice every one second.)

QI — QMB STORE

	1	2	3	4	5	6	7	8	9	10
Set	Q	I	;							
Read										
Answer										

QR — QMB RECALL

	1	2	3	4	5	6	7	8	9	10
Set	Q	R	;							
Read										
Answer										

CONTROL COMMAND TABLES

QS	QUICK SPLIT									
Set	1	2	3	4	5	6	7	8	9	10
	Q	S	;							
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

RA	RF ATTENUATOR										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	R	A	P1	P2	;						1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 0: OFF
	R	A	P1	;							1: 6 dB
Answer	1	2	3	4	5	6	7	8	9	10	2: 12 dB
	R	A	P1	P2	;						3: 18 dB

RC	CLAR CLEAR									
Set	1	2	3	4	5	6	7	8	9	10
	R	C	;							
Read	1	2	3	4	5	6	7	8	9	10
Answer	1	2	3	4	5	6	7	8	9	10

RD	CLAR MINUS OFFSET										
Set	1	2	3	4	5	6	7	8	9	10	P1 0000 - 9999 (Hz)
	R	D	P1	P1	P1	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	
Answer	1	2	3	4	5	6	7	8	9	10	

RF	ROOFING FILTER										
Set	1	2	3	4	5	6	7	8	9	10	P1 P2 0: AUTO P3 1: 15 kHz 8: 300 Hz (Main)
	R	F	P1	P2	;						0: Main (VFO-A) 1: 15 kHz 2: 6 kHz 9: AUTO - 600 Hz (Main)
Read	1	2	3	4	5	6	7	8	9	10	Band Receiver 2: 6 kHz 3: 3 kHz A: AUTO - 300 Hz (Main)
	R	F	P1	;							1: Sub (VFO-B) 3: 3 kHz 4: AUTO - 15 kHz
Answer	1	2	3	4	5	6	7	8	9	10	Band Receiver 4: 600 Hz (Main) 5: AUTO - 6kHz
	R	F	P1	P3	;						5: 300 Hz (Main) 6: AUTO - 3 kHz
											7: 600 Hz (Main)

RG	RF GAIN										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	R	G	P1	P2	P2	P2	;				1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 000 - 255
	R	G	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	R	G	P1	P2	P2	P2	;				

RI	RADIO INFORMATION										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Hi-SWR 7: MAIN RX P2 0: OFF
											1: MIC-EQ 8: SUB RX 1: ON
Read	1	2	3	4	5	6	7	8	9	10	2: CLASS-A
	R	I	P1	;							3: REC
Answer	1	2	3	4	5	6	7	8	9	10	4: PLAY
	R	I	P1	P2	;						5: MAIN TX
											6: SUB TX

RL	NOISE REDUCTION LEVEL										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	R	L	P1	P2	P2	;					1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 01 - 15
	R	L	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	R	L	P1	P2	P2	;					

RM	READ METER										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Depends of the front panel's METER knob
											1: S Meter (Main) 5: PO Meter
Read	1	2	3	4	5	6	7	8	9	10	2: S Meter (Sub) 6: SWR Meter
	R	M	P1	;							3: COMP Meter 7: ID Meter
Answer	1	2	3	4	5	6	7	8	9	10	4: ALC Meter 8: VDD Meter
	R	M	P1	P2	P2	P2	;				P2 0 - 255

CONTROL COMMAND TABLES

RO — ROTATOR

	1	2	3	4	5	6	7	8	9	10
Set	R	O	P1	;						
Read	R	O	;							
Answer	R	O	P1	P2	P2	P2	P3	P3	P3	;

P1 0: OFF
 1: Counter Clockwise
 2: Clockwise
 3: SPEED 1 % DOWN
 4: SPEED 1 % UP
P2 DIRECTION (0 - 450)
P3 SPEED (0 - 100 %)

RS — RADIO STATUS

	1	2	3	4	5	6	7	8	9	10
Set										
Read	R	S	;							
Answer	R	S	P1	;						

P1 0: NORMAL MODE
 1: MENU MODE

RT — CLAR

	1	2	3	4	5	6	7	8	9	10
Set	R	T	P1	;						
Read	R	T	;							
Answer	R	T	P1	;						

P1 0: RX Clarifier "OFF"
 1: RX Clarifier "ON"

RU — RX CLARIFIER PLUS OFFSET

	1	2	3	4	5	6	7	8	9	10
Set	R	U	P1	P1	P1	P1	;			
Read										
Answer										

P1 0000 - 9999 (Hz)

SC — SCAN

	1	2	3	4	5	6	7	8	9	10
Set	S	C	P1	;						
Read	S	C	;							
Answer	S	C	P1	;						

P1 0: Scan "OFF"
 1: Scan "ON" (Upward)
 2: Scan "ON" (Downward)

SD — CW BREAK-IN DELAY TIME

	1	2	3	4	5	6	7	8	9	10
Set	S	D	P1	P1	P1	P1	;			
Read	S	D	;							
Answer	S	D	P1	P1	P1	P1	;			

P1 0020 - 5000 (mS)

SF — SUB VFO-B KNOB FUNCTION

	1	2	3	4	5	6	7	8	9	10
Set	S	F	P1	P1	;					
Read	S	F	;							
Answer	S	F	P1	P1	;					

P1 00: BAND   07: S-DIAL
 01: -   08: CLAR
 02: GRP
 03: MCH
 04: -
 05: -
 06: -

SH — WIDTH

	1	2	3	4	5	6	7	8	9	10
Set	S	H	P1	P2	P2	;				
Read	S	H	P1	;						
Answer	S	H	P1	P2	P2	;				

P1 0: Main (VFO-A) Band Receiver
 1: Sub (VFO-B) Band Receiver
P2 00 [Default]

SSB NARROW 01: 200 02: 400 03: 600 04: 850 05: 1100
 06: 1350 07: [1500]
SSB WIDE 07: 1500 08: 1650 09: 1800 10: 1950 11: 2100
 12: 2250 13: [2400] 14: - - - - 15: 2500 16: 2600
 17: 2700 18: 2800 19: 2900 20: 3000 21: 3200
 22: 3400 23: 3600 24: 3800 25: 4000
CW NARROW 01: 50 02: 100 03: 150 04: 200 05: 250
 06: 300 07: 350 08: 400 09: 450 10: [500]
CW WIDE 10: 500 11: 800 12: 1200 13: 1400 14: 1700
 15: 2000 16: [2400]
RTTY NARROW 01: 50 02: 100 03: 150 04: 200 05: 250
 06: [300] 07: 350 08: 400 09: 450 10: 500
RTTY WIDE 10: [500] 11: 800 12: 1200 13: 1400 14: 1700
 15: 2000 16: 2400
PSK NARROW 01: 50 02: 100 03: 150 04: 200 05: 250
 06: [300] 07: 350 08: 400 09: 450 10: 500
PSK WIDE 10: [500] 11: 800 12: 1200 13: 1400 14: 1700
 15: 2000 16: 2400

CONTROL COMMAND TABLES

SM	**S-METER READING**										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band S-meter
											1: Sub (VFO-B) Band S-meter
Read	1	2	3	4	5	6	7	8	9	10	P2 000 - 255
	S	**M**	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	**M**	P1	P2	P2	P2	;				

SQ	**SQUELCLH LEVEL**										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver
	S	**Q**	P1	P2	P2	P2	;				1: Sub (VFO-B) Band Receiver
Read	1	2	3	4	5	6	7	8	9	10	P2 000 - 255
	S	**Q**	P1	;							
Answer	1	2	3	4	5	6	7	8	9	10	
	S	**Q**	P1	P2	P2	P2	;				

SV	**SWAP VFO**										
Set	1	2	3	4	5	6	7	8	9	10	
	S	**V**	;								
Read	1	2	3	4	5	6	7	8	9	10	
Answer	1	2	3	4	5	6	7	8	9	10	

TS	**TXW**										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: TXW "OFF"
	T	**S**	P1	;							1: TXW "ON"
Read	1	2	3	4	5	6	7	8	9	10	
	T	**S**	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	T	**S**	P1	;							

TX	**TX SET**										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: RADIO TX "OFF" CAT TX "OFF"
	T	**X**	P1	;							1: RADIO TX "OFF" CAT TX "ON"
Read	1	2	3	4	5	6	7	8	9	10	2: RADIO TX "ON" CAT TX "OFF" (Answer)
	T	**X**	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	T	**X**	P1	;							

UL	**PLL UNLOCK STATUS**										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: PLL "Lock"
											1: PLL "Unlock"
Read	1	2	3	4	5	6	7	8	9	10	
	U	**L**	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	U	**L**	P1	;							

UP	**MIC UP**										
Set	1	2	3	4	5	6	7	8	9	10	
	U	**P**	;								
Read	1	2	3	4	5	6	7	8	9	10	
Answer	1	2	3	4	5	6	7	8	9	10	

VD	**VOX DELAY TIME**										
Set	1	2	3	4	5	6	7	8	9	10	P1 0020 - 5000 mS (20 mS multiples)
	V	**D**	P1	P1	P1	P1	;				
Read	1	2	3	4	5	6	7	8	9	10	
	V	**D**	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	V	**D**	P1	P1	P1	P1	;				

VF	**VRF FILTER**											
Set	1	2	3	4	5	6	7	8	9	10	P1 0: Main (VFO-A) Band Receiver	P3 +: Plus Shift
	V	**F**	P1	P2	P3	P4	;				1: Sub (VFO-B) Band Receiver	–: Minus Shift
Read	1	2	3	4	5	6	7	8	9	10	P2 0: OFF	P4 0 - 9 (Step)
	V	**F**	P1;								1: ON	P5 000 - 255
Answer	1	2	3	4	5	6	7	8	9	10	2: Default set	P6 0: VRF
	V	**F**	P1	P2	P5	P5	P5	P6	;			1: μTUNE

CONTROL COMMAND TABLES

VG	VOX GAIN										
Set	1	2	3	4	5	6	7	8	9	10	P1 000 - 255
	V	G	P1	P1	P1	;					
Read	1	2	3	4	5	6	7	8	9	10	
	V	G	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	V	G	P1	P1	P1	;					

VM	VFO-A TO MEMORY CHANNEL										
Set	1	2	3	4	5	6	7	8	9	10	
	V	M	;								
Read	1	2	3	4	5	6	7	8	9	10	
Answer	1	2	3	4	5	6	7	8	9	10	

VS	VFO SELECT										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: VFO-A
	V	S	P1	;							1: VFO-B
Read	1	2	3	4	5	6	7	8	9	10	
	V	S	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	V	S	P1	;							

VX	VOX STATUS										
Set	1	2	3	4	5	6	7	8	9	10	P1 0: VOX "OFF"
	V	X	P1	;							1: VOX "ON"
Read	1	2	3	4	5	6	7	8	9	10	
	V	X	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	V	X	P1	;							

XT	TX CLAR										
Set	1	21	3	4	5	6	7	8	9	10	P1 0: TX CLAR "OFF"
	X	T	P1	;							1: TX CLAR "ON"
Read	1	2	3	4	5	6	7	8	9	10	
	X	T	;								
Answer	1	2	3	4	5	6	7	8	9	10	
	X	T	P1	;							

YAESU
The radio

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