8. Appendix A (CTCSS/DCS CODE)

8.1. CTCSS Tone

67.0Hz	94.8Hz	131.8Hz	171.3Hz	203.5Hz
69.3Hz	97.4Hz	136.5Hz	173.8Hz	206.5Hz
71.9Hz	100.0Hz	141.3Hz	177.3Hz	210.7Hz
74.4Hz	103.5Hz	146.2Hz	179.9Hz	218.1Hz
77.0Hz	107.2Hz	151.4Hz	183.5Hz	225.7Hz
79.7Hz	110.9Hz	156.7Hz	186.2Hz	229.1Hz
82.5Hz	114.8Hz	159.8Hz	189.9Hz	233.6Hz
85.4Hz	118.8Hz	162.2Hz	192.8Hz	241.8Hz
88.5Hz	123.0Hz	165.5Hz	196.6Hz	250.3Hz
91.5Hz	127.3Hz	167.9Hz	199.5Hz	254.1Hz

8.2. DCS Code

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

9. Appendix B (FONT DATA)

9.1. Font 16 x 8

9.2. Font 8 x 8


0x20 0x21 0x22 0x23 0x24 0x25 0x26 0x27 0x28 0x29 0x2A 0x2B 0x2C 0x2D 0x2E 0x2F
0x30 0x31 0x32 0x33 0x34 0x35 0x36 0x37 0x38 0x39 0x3A 0x3B 0x3C 0x3D 0x3E 0x3F
0x40 0x41 0x42 0x43 0x44 0x45 0x46 0x47 0x48 0x49 0x4A 0x4B 0x4C 0x4D 0x4E 0x4F
0x50 0x51 0x52 0x53 0x54 0x55 0x56 0x57 0x58 0x59 0x5A 0x5B 0x5C 0x5D 0x5E 0x5F
0x60 0x61 0x62 0x63 0x64 0x65 0x66 0x67 0x68 0x69 0x6A 0x6B 0x6C 0x6D 0x6E 0x6F
0x70 0x71 0x72 0x73 0x74 0x75 0x76 0x77 0x78 0x79 0x7A 0x7B 0x7C 0x7D 0x7E 0x7F
0x80 0x81 0x82 0x83 0x84 0x85 0x86 0x87 0x88 0x89 0x8A 0x8B 0x8C 0x8D 0x8E 0x8F
0x90 0x91 0x92 0x93 0x94 0x95 0x96 0x97 0x98 0x99 0x9A 0x9B 0x9C 0x9D 0x9E 0x9F
0xA0 0xA1 0xA2 0xA3 0xA4 0xA5 0xA6 0xA7 0xA8 0xA9 0xAA 0xAB 0xAC 0xAD 0xAE 0xAF
0xB0 0xB1 0xB2 0xB3 0xB4 0xB5 0xB6 0xB7 0xB8 0xB9 0xBA 0xBB 0xBC 0xBD 0xBE 0xBF
0xC0 0xC1 0xC2 0xC3 0xC4 0xC5 0xC6 0xC7 0xC8 0xC9 0xCA 0xCB 0xCC 0xCD 0xCE 0xCF
0xD0 0xD1 0xD2 0xD3 0xD4 0xD5 0xD6 0xD7 0xD8 0xD9 0xDA 0xDB 0xDC 0xDD 0xDE 0xDF

10. Appendix C (PC programming Command)

【 Remote Communication Format 】

BPS rate : 4800/9600/19200/38400/57600/115200 bps
Start/Stop bit : 1 bit, 1 bit
Data Length : 8 bit
Parity Check : None
Code : ASCII
Flow Control : None
Return Code : Carriage Return only

【 FORMAT OF THIS DOCUMENT 】

<COMMAND NAME>
Summary explanation of the function of the command

Controller → Radio
Command format
Radio → Controller
Response format

NOTE

1. Any command is required to wait a response from the scanner, then, next command will be acceptable.

2. All memory access commands are acceptable in only Program Mode.
Use PRG command to enter Program Mode, and EPG command to exit.

3. Error message isn't described in this document, but the scanner returns error message to the controller as follows.
   1) Command format error / Value error : ERR[¥r]
   2) The command is invalid at the time : NG[¥r]

4. [¥r] means "to hit the Enter key" or "to send the Return code".

5. In set command, only "," parameters are not changed.

6. The set command is aborted if any format error is detected.

Programming Command List

No.	Category	Command	Function	Program Mode Only
1.	Program Control Mode	PRG	Enter Program Mode	
2.		EPG	Exit Program Mode	
3.	System Information	MDL	Get Model Info	
4.		VER	Get Firmware Version	
5.	System Settings	BLT	Get/Set Backlight	O
6.		BSV	Get/Set Battery Info	O
7.		CLR	Clear All Memory	O
8.		BPL	Get/Set Band Plan	O
9.		KBP	Get/Set Key Beep and setting	O
10.		PRI	Get/Set Priority Mode	O
11.	Scan Settings	SCG	Get/Set SCAN Channel Group	O
12.		DCH	Delete Channel	O
13.		CIN	Get/Set Channel Info	O
14.	Search / Close Call Settings	SCO	Get/Set Search/Close Call Settings	O
15.		GLF	Get Global Lockout Freq	
16.		ULF	Unlock Global L/O	
17.		LOF	Lock Out Frequency	O
18.		CLC	Get/Set Close Call Settings	O
19.	Service Search Settings	SSG	Get/Set Service Search Settings	O
20.	Custom Search Settings	CSG	Get/Set Custom Search Group	O
21.		CSP	Get/Set Custom Search Settings	O
22.	Weather Settings	WXS	Get/Set Weather Settings	O
23.	LCD Contrast Settings	CNT	Get/Set LCD Contrast Settings	O
24.	Volume Level Settings	VOL	Get/Set Volume Level Settings	
25.	Squelch Level Settings	SQL	Get/Set Squelch Level Settings	

<COMMAND PRG>
Enter Program Mode

Controller → Radio
① PRG[¥r]
Radio → Controller
① PRG,OK[¥r]
② PRG,NG[¥r]

This command is invalid when the scanner is in Menu Mode, during Direct Entry operation, during Quick Save operation.

The scanner goes to Program Mode.
The scanner displays "Remote Mode" on first line and "Keypad Lock" on second line in Program Mode.

<COMMAND EPG>
Exit Program Mode

Controller → Radio
① EPG[¥r]
Radio → Controller
① EPG,OK[¥r]

The scanner exits from Program Mode.
Then the scanner goes to Scan Hold Mode.

<COMMAND MDL>
Get Model Info

Controller → Radio
① MDL[¥r]
Radio → Controller
① MDL,BC125AT[¥r]

Returns Model Information.

<COMMAND VER>
Get Firmware Version

Controller → Radio
① VER[¥r]
Radio → Controller
① VER,Version 1.00.00[¥r]

Returns Firmware Version.

<COMMAND BLT>
Get/Set Backlight

Controller → Radio
① BLT[¥r]
② BLT,[EVNT][¥r]
Radio → Controller
① BLT, [EVNT],[¥r]
② BLT,OK[¥r]

[EVENT]

AO :ALWAYS ON	AF :ALWAYS OFF
KY : KEYPRESS	SQ : SQUELCH
KS : KEY+SQL	

Get/Set Backlight Setting.
This command is only acceptable in Programming Mode.

<COMMAND BSV >
Get/Set Battery Info

Controller → Radio
① BSV [¥r]
② BSV,[CHARGE_TIME][¥r]

Radio → Controller
① BSV,[CHARGE_TIME] [¥r]
② BSV,OK[¥r]

[CHARGE_TIME] Battery Charge Time (1-16)

<COMMAND CLR>
Clear All Memory

Controller → Radio
① CLR[¥r]
Radio → Controller
① CLR,OK[¥r]

All the memories are set for initial setting.
This command is only acceptable in Programming Mode.

Note :
It takes dozens of seconds.

<COMMAND BPL>
Get/Set Band Plan

Controller → Radio
① BPL[¥r]
② BPL,[PLAN][¥r]
Radio → Controller
① BPL,[PLAN][¥r]
② BPL,OK[¥r]

[PLAN] : Band Plan (0:USA / 1:Canada)

This command is only acceptable in Programming Mode.
Band Plan setting affects frequency step. Issue this command before frequency programming.

<COMMAND KBP>
Get/Set Key Beep and setting

Controller → Radio
① KBP[¥r]
② KBP,[LEVEL],[LOCK][¥r]
Radio → Controller
① KBP,[LEVEL],[LOCK][¥r]
② KBP,OK[¥r]

[LEVEL] : Beep Level (0:Auto / 99:OFF)
[LOCK] : Key Lock status (0:OFF / 1:ON)

Get/Set Key Beep Setting.
This command is only acceptable in Programming Mode.

<COMMAND PRI>
Get/Set Priority Mode

Controller → Radio
① PRI[¥r] : Get Priority Mode Setting
② PRI,[PRI_MODE][¥r]
Radio → Controller
① PRI,[PRI_MODE][¥r]
② PRI,OK[¥r]

[PRI_MODE] : Priority Setting (0:OFF / 1:ON / 2:PLUS ON / 3:DND)

Get/Set Priority Mode.
This command is only acceptable in Programming Mode.

<COMMAND SCG>
Get/Set SCAN Channel Group

Controller → Radio
① SCG[¥r]
② SCG,##########[¥r]
Radio → Controller
① SCG,##########[¥r]
② SCG,OK[¥r]

########## (each # is 0 or 1) : 0 : valid / 1 : invalid

The Order of Range is as same as LCD Icon (1 – 9,0).
Get/Set current status of the channel storage bank select.
This command is only acceptable in Programming Mode.

<COMMAND DCH>
Delete Channel

Controller → Radio
① DCH,[INDEX][¥r]
Radio → Controller
① DCH,OK[¥r]

[INDEX] : Channel Index(1-500) ex) CH1 = 1

This command deletes a Channel.
This command is only acceptable in Programming Mode.

<COMMAND CIN>
Get/Set Channel Info

Controller → Radio
① CIN,[INDEX][¥r]
② CIN,[INDEX],[NAME],[FRQ],[MOD],[CTCSS/DCS],[DLY],[LOUT],[PRI][¥r]
Radio → Controller
① CIN,[INDEX],[NAME],[FRQ],[MOD],[CTCSS/DCS],[DLY],[LOUT],[PRI][¥r]
② CIN,OK[¥r]

[INDEX]	: Channel Index(1-500)	
[NAME]	: Name (max.16char)	
[FRQ]	: Channel Frequency	ex) 290000
[MOD]	: Modulation	(AUTO/AM/FM/NFM)
[CTCSS/DCS]	: CTCSS/DCS Status	(0-231)
	*See ***CTCSS/DCS CODE*** LIST about the details of this code.	
[DLY]	: Delay Time	(-10,-5,0,1,2,3,4,5)
[LOUT]	: Lockout	(0:Unlocked / 1:Lockout)
[PRI]	: Priority	(0:OFF / 1:ON)

Get/Set Channel Information.
In set command, only "," parameters are not changed.
The set command is aborted if any format error is detected.
This command is only acceptable in Programming Mode.

<COMMAND SCO>
Get/Set Search/Close Call Settings

Controller → Radio
① SCO[¥r]
② SCO,[DLY],[CODE_SRCH][¥r]
Radio → Controller
① SCO,[DLY],[CODE_SRCH][¥r]
② SCO,OK[¥r]

[DLY]	: Delay Time	(-10,-5,0,1,2,3,4,5)
[CODE_SRCH]	: CTCSS/DCS Search	(0:OFF / 1:ON)

Get/Set Search/Close Call Settings.
In set command, only "," parameters are not changed.
The set command is aborted if any format error is detected.
This command is only acceptable in Programming Mode.

<COMMAND GLF>
Get Global Lockout Freq

Controller → Radio
① GLF[¥r]
② GLF,[***][¥r]
Radio → Controller
① GLF,[FRQ][¥r]
GLF,-1[¥r]
② GLF,OK[¥r]

[FRQ]	: Lockout Frequency	(0250000-5120000)
[***]	: Don't care	(to retrieve 1'st L/O frequency)

This command is used to get Global L/O frequency list.
You should call this command again and again to get all-global L/O frequency until the scanner returns "-1".
"-1" means that no more L/O frequency exists.

<COMMAND ULF>
Unlock Global L/O

Controller → Radio
① ULF,[FRQ][¥r]
Radio → Controller
① ULF,OK[¥r]

[FRQ] : Lockout Frequency (250000-5120000)

This command unlocks a L/O frequency.
The frequency is deleted from L/O list.

<COMMAND LOF >
Lock Out Frequency

Controller → Radio
① LOF,[FRQ][¥r]
Radio → Controller
① LOF,OK[¥r]

[FRQ] : Frequency (250000-5120000)

This command locks out a frequency.
The frequency is added to L/O list.
This command is only acceptable in Programming Mode.

<COMMAND CLC>
Get/Set Close Call Settings

Controller → Radio
① CLC[¥r]
② CLC,[CC_MODE],[ALTB],[ALTL],[CC_BAND],[LOUT][¥r]
Radio → Controller
① CLC,[CC_MODE],[ALTB],[ALTL],[CC_BAND],[LOUT][¥r]
② CLC,OK[¥r]

[CC_MODE] : Mode (0:OFF / 1:CC PRI / 2:CC DND / 3:CC ONLY)
[ALTB] : Alert Beep (0:OFF / 1:ON)
[ALTL] : Alert Light (0:OFF / 1:ON)
[CC_BAND] : Close Call Band (5digit #####)
(each # is 0 or 1) |||||
0 means OFF |||||
1 means ON ||||+--- UHF
|||+---- MILITARY AIR
||+----- VHF HIGH
|+------ CIVIL AIR
+------- VHF LOW
[LOUT] : Lockout for CC Hits with Scan (0:Lockout / 1:Unlocked)

Get/Set Close Call Settings.
In set command, only "," parameters are not changed.
The set command is aborted if any format error is detected.
This command is only acceptable in Programming Mode.

<COMMAND SSG>
Get/Set Service Search Group

Controller → Radio
① SSG[¥r]
② SSG,##########[¥r] : Status of Each Search Range
Radio → Controller
① SSG,##########[¥r]
② SSG,OK[¥r]

########## (each # is 0 or 1) : 0 : valid / 1 : invalid

```
||||||||||
|||||||||+----- Racing
||||||||+------ FRS/GMRS/MURS
|||||||+------- CB Radio
||||||+-------- Military Air
|||||+--------- Civil Air
||||+---------- Railroad
|||+----------- Marine
||+------------ Ham Radio
|+------------- Fire/Emergency
+-------------- Police
```

The Order of Range is as same as LCD Icon (1 – 9,0).
Get/Set current status of the Service Search Bank.
This command is only acceptable in Programming Mode.

<COMMAND CSG>
Get/Set Custom Search Group

Controller → Radio
③ CSG[¥r]
④ CSG,##########[¥r] : Status of Each Search Range
Radio → Controller
③ CSG,##########[¥r]
④ CSG,OK[¥r]

########## (each # is 0 or 1) : 0 : valid / 1 : invalid

The Order of Range is as same as LCD Icon (1 – 9,0).
Get/Set current status of the custom search range.
This command is only acceptable in Programming Mode.

<COMMAND CSP>
Get/Set Custom Search Settings

Controller → Radio
① CSP,[SRCH_INDEX][¥r]
② CSP,[SRCH_INDEX],[LIMIT_L],[LIMIT_H][¥r]
Radio → Controller
① CSP,[SRCH_INDEX],[LIMIT_L],[LIMIT_H],[¥r]
② CSP,OK[¥r]

[SRCH_INDEX]	: Index	(1-10)
[LIMIT_L]	: Lower Limit Frequency	(250000-5120000)
[LIMIT_H]	: Upper Limit Frequency	(250000-5120000)

Get/Set Custom Search Settings.
In set command, only "," parameters are not changed.
The set command is aborted if any format error is detected.
This command is only acceptable in Programming Mode.

<COMMAND WXS>
Get/Set Weather Settings

Controller → Radio
① WXS[¥r]
② WXS,[ALT_PRI][¥r]
Radio → Controller
① WXS,[ALT_PRI][¥r]
② WXS,OK[¥r]

[ALT_PRI] : Weather Alert Priority (0:OFF / 1:ON)

Get/Set Weather Priority Settings.
This command is only acceptable in Programming Mode.

<COMMAND CNT>
Get/Set LCD Contrast Settings

Controller → Radio
① CNT[¥r]
② CNT,[CONTRAST][¥r]
Radio → Controller
① CNT,[CONTRAST][¥r]
② CNT,OK[¥r]

[CONTRAST] : LCD Contrast (1 - 15)
The default value is set when the set value is outside the range (1-15).
Get/Set LCD Contrast Settings.
This command is only acceptable in Programming Mode.

<COMMAND VOL>
Get/Set Volume Level Settings

Controller → Radio
① VOL[¥r]
② VOL,[LEVEL][¥r]
Radio → Controller
① VOL,[LEVEL][¥r]
② VOL,OK[¥r]

[LEVEL] : Volume Level (0 - 15)

<COMMAND SQL>
Get/Set Squelch Level Settings

Controller → Radio
① SQL[¥r]
② SQL,[LEVEL][¥r]
Radio → Controller
① SQL,[LEVEL][¥r]
② SQL,OK[¥r]

[LEVEL] : Squelch Level (0:OPEN / 1-14 / 15:CLOSE)

CTCSS/DCS CODE LIST

NONE / SEARCH

MODE	CODE	MODE	CODE	MODE	CODE
NONE / All	0	SEARCH	127	NO_TONE	240

CTCSS

MODE	CODE	CTCSS 114.8Hz	80	CTCSS 179.9Hz	97
CTCSS 67.0Hz	64	CTCSS 118.8Hz	81	CTCSS 183.5Hz	98
CTCSS 69.3Hz	65	CTCSS 123.0Hz	82	CTCSS 186.2Hz	99
CTCSS 71.9Hz	66	CTCSS 127.3Hz	83	CTCSS 189.9Hz	100
CTCSS 74.4Hz	67	CTCSS 131.8Hz	84	CTCSS 192.8Hz	101
CTCSS 77.0Hz	68	CTCSS 136.5Hz	85	CTCSS 196.6Hz	102
CTCSS 79.7Hz	69	CTCSS 141.3Hz	86	CTCSS 199.5Hz	103
CTCSS 82.5Hz	70	CTCSS 146.2Hz	87	CTCSS 203.5Hz	104
CTCSS 85.4Hz	71	CTCSS 151.4Hz	88	CTCSS 206.5Hz	105
CTCSS 88.5Hz	72	CTCSS 156.7Hz	89	CTCSS 210.7Hz	106
CTCSS 91.5Hz	73	CTCSS 159.8Hz	90	CTCSS 218.1Hz	107
CTCSS 94.8Hz	74	CTCSS 162.2Hz	91	CTCSS 225.7Hz	108
CTCSS 97.4Hz	75	CTCSS 165.5Hz	92	CTCSS 229.1Hz	109
CTCSS 100.0Hz	76	CTCSS 167.9Hz	93	CTCSS 233.6Hz	110
CTCSS 103.5Hz	77	CTCSS 171.3Hz	94	CTCSS 241.8Hz	111
CTCSS 107.2Hz	78	CTCSS 173.8Hz	95	CTCSS 250.3Hz	112
CTCSS 110.9Hz	79	CTCSS 177.3Hz	96	CTCSS 254.1Hz	113

DCS

MODE	CODE	DCS 223	163	DCS 446	199
DCS 023	128	DCS 225	164	DCS 452	200
DCS 025	129	DCS 226	165	DCS 454	201
DCS 026	130	DCS 243	166	DCS 455	202
DCS 031	131	DCS 244	167	DCS 462	203
DCS 032	132	DCS 245	168	DCS 464	204
DCS 036	133	DCS 246	169	DCS 465	205
DCS 043	134	DCS 251	170	DCS 466	206
DCS 047	135	DCS 252	171	DCS 503	207
DCS 051	136	DCS 255	172	DCS 506	208
DCS 053	137	DCS 261	173	DCS 516	209
DCS 054	138	DCS 263	174	DCS 523	210
DCS 065	139	DCS 265	175	DCS 526	211
DCS 071	140	DCS 266	176	DCS 532	212
DCS 072	141	DCS 271	177	DCS 546	213
DCS 073	142	DCS 274	178	DCS 565	214
DCS 074	143	DCS 306	179	DCS 606	215
DCS 114	144	DCS 311	180	DCS 612	216
DCS 115	145	DCS 315	181	DCS 624	217
DCS 116	146	DCS 325	182	DCS 627	218
DCS 122	147	DCS 331	183	DCS 631	219
DCS 125	148	DCS 332	184	DCS 632	220
DCS 131	149	DCS 343	185	DCS 654	221
DCS 132	150	DCS 346	186	DCS 662	222
DCS 134	151	DCS 351	187	DCS 664	223
DCS 143	152	DCS 356	188	DCS 703	224
DCS 145	153	DCS 364	189	DCS 712	225
DCS 152	154	DCS 365	190	DCS 723	226
DCS 155	155	DCS 371	191	DCS 731	227
DCS 156	156	DCS 411	192	DCS 732	228
DCS 162	157	DCS 412	193	DCS 734	229
DCS 165	158	DCS 413	194	DCS 743	230
DCS 172	159	DCS 423	195	DCS 754	231
DCS 174	160	DCS 431	196		
DCS 205	161	DCS 432	197		
DCS 212	162	DCS 445	198		