SDS100
SDS200
Remote Command Specification

Version 1.02
2023/12/22

Date	Version		Contents
2018/04/13	0.01		Created new basd BCD536HP/BCD436HP Remote Command Specification Version 1.05.
2023/12/11	1.01		Append Waterfall
2023/12/22	1.02		Append GST command

No.	Command	Function	Program Mode Only
1	MDL	Get Model Info	
2	VER	Get Firmware Version	
3	KEY	Push KEY	
4	QSH	Go to quick search hold mode	
5	STS	Get Current Status	
6	JNT	Jump Number tag	
7	NXT	Next	
8	PRV	Previous	
9	FQK	Get/Set Favorites List Quick Keys Status	
10	SQK	Get/Set System Quick Keys Status	
11	DQK	Get/Set Department Quick Keys Status	
12	PSI	Push Scanner Information	
13	GSI	Get Scanner Information	
14	GLT	Get xxx list	
15	HLD	Hold	
16	AVD	Set Avoid Option	
17	SVC	Get/Set Service Type Settings	
18	JPM	Jump Mode	
19	DTM	Get/Set Date and Time.	
20	LCR	Get/Set Location and range.	
21	AST	Analize Start	
22	APR	Analize Pauze/Resume	
23	URC	User Record Control	
24	MNU	Menu Mode command	
25	MSI	Menu Status Info	
26	MSV	Menu Set Value	
27	MSB	Menu Structure Back	
28	GST	Get scanner status (for WF)	
29	PWF	Push Waterfall FFT Information	
30	GWF	GetWaterfall FFT Information	

MDL   Get Model Info

Controller → Radio
      (1)   MDL[\r]

Radio → Controller
      (1)   MDL,[MODEL_NAME][\r]
              [MODEL_NAME]   SDS100
                                 SDS200

VER   Get Firmware Version

Controller → Radio
      (1)   VER[\r]

Radio → Controller
      (1)   VER,[VERSION][\r]
              [VERSION]   Version x.xx.xx

KEY   Push KEY

Controller → Radio
      (1)   KEY,[KEY_CODE],[KEY_MODE][\r]

Radio → Controller
      (1)   KEY,OK[\r]

See "key code for KEY Command" sheet for KEY_CODE.

QSH   Go to quick search hold mode

Controller → Radio
      (1)   QSH,[FRQ][\r]

Radio → Controller
      (1)   QSH,OK[\r]

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

STS   Get Current Status

Controller → Radio
      (1)   STS[\r]

Radio → Controller

(1)   STS,[DSP_FORM],[L1_CHAR],[L1_MODE],[L2_CHAR],[L2_MODE],
        [L3_CHAR],[L3_MODE],····,[L20_CHAR],[L20_MODE],
        [RSV],[RSV],[RSV],[RSV],[RSV],
        [RSV],[RSV],[RSV],[RSV][\r]

Note:

STS Command is compatible with old scanner.
PSI is better than STS.
See "Font Data Specification" for not ascii character code.

JNT   Jump Number tag

Controller → Radio
        (1)   JNT,[FL_TAG],[SYS_TAG],[CHAN_TAG][\r]

                [FL_TAG]   Favorites List Number Tag   (0-99)
                [SYS_TAG]   System Number Tag   (0-99)
                [CHAN_TAG]   Channel Number Tag   (0-999)

Radio → Controller
        (1)   JNT,OK[\r]

NXT   Next

Controller → Radio
        (1)   NXT,[tkw],[xxx1],[xxx2],[COUNT][\r]

Radio → Controller
        (2)   NXT,OK\r

                [tkw]   see sheet "tkd and 1st,2nd opt"
                [xxx1]   see sheet "tkd and 1st,2nd opt"
                [xxx2]   see sheet "tkd and 1st,2nd opt"
                [COUNT]   slide counts   (1-8)

PRV   Previous

Controller → Radio
        (1)   PRV,[tkw],[xxx1],[xxx2],[COUNT][\r]

Radio → Controller
        (2)   PRV,OK\r

                [tkw]   see sheet "tkd and 1st,2nd opt"
                [xxx1]   see sheet "tkd and 1st,2nd opt"
                [xxx2]   see sheet "tkd and 1st,2nd opt"
                [COUNT]   slide counts   (1-8)

FQK   Get/Set Favorites List Quick Keys Status

Controller → Radio
        (1)   FQK[\r]
        (2)   FQK,[S0],[S1],......[S99][\r]

Radio → Controller
        (1)   FQK,[S0],[S1],......[S99][\r]
        (2)   FQK,OK\r

        [Quick Key Status (S0-S99)]
                0 : FLQK does not exist
                1 : FLQK exists and is disabled
                2 : FLQK exists and is enabled

        If controller sends 0 (QK does not exist), radiowill ignore 0.

SQK   Get/Set System Quick Keys Status

Controller → Radio
        (1)   SQK,[FAV_QK][\r]
        (2)   SQK,[FAV_QK],[S0],[S1],......[S99][\r]

Radio → Controller
        (1)   SQK,[FAV_QK],[SYS_QK],[S0],[S1],......[S99][\r]
        (2)   SQK,OK[\r]

        [Quick Key Status (S0-S99)]
                0 : SQK does not exist
                1 : SQK exists and is disabled
                2 : SQK exists and is enabled

        If controller sends 0 (QK does not exist), radiowill ignore 0.

DQK   Get/Set Department Quick Keys Status

Controller → Radio
        (1)   DQK,[FAV_QK],[SYS_QK][\r]
        (2)   DQK,[FAV_QK],[SYS_QK],[S0],[S1],......[S99][\r]

Radio → Controller
        (1)   DQK,[FAV_QK],[SYS_QK],[S0],[S1],......[S99][\r]
        (2)   DQK,OK[\r]

        [Quick Key Status (S0-S99)]
                0 : DQK does not exist
                1 : DQK exists and is disabled
                2 : DQK exists and is enabled

        If controller sends 0 (QK does not exist), radiowill ignore 0.

PSI   Push Scanner Information
----

          format will be XML.
          See PSI,GSI tab

GSI   Get Scanner Information
----

          format will be XML.
          See PSI,GSI tab

GLT   Get xxx list

GLT is command which PC get xx list form scanner.

          See "GLT command" sheet to detail.

HLD   Hold

HLD is command to hold system, department, channel.
It can't hold favorites list and site frequency.

          Controller → Radio
                    HLD,[tkw],[xxx1],[xxx2][\r]

                    tkw: see sheet "tkd and 1st,2nd opt"
                    xxx1   see sheet "tkd and 1st,2nd opt"
                    xxx2   see sheet "tkd and 1st,2nd opt"

          Radio → Controller
                    HLD,OK[\r]

AVD   Set Avoid Option

AVD is command to avoid or unavoid.
It can't avoid favorites list and site frequency.

          Controller → Radio
                    AVD,[tkw],[xxx1],[xxx2][STATUS][\r]

                    tkw: see sheet "tkd and 1st,2nd opt"
                    xxx1   see sheet "tkd and 1st,2nd opt"
                    xxx2   see sheet "tkd and 1st,2nd opt"

                    [STATUS 1:Permanent Avoid
                            2:Temporary Avoid
                            3:Stop Avoiding

          Radio → Controller
                    AVD,OK[\r]

Note:Please use the GSI or GLT command if you need to get avoid status

---
SVC   Get/Set Service Type Settings

Controller → Radio

    (1)   SVC[\r]
    (2)   SVC,[PST1],[PST2],...,[PST37],[CST1],...,[CST10][\r]

Radio → Controller

    (1)   SVC,[PST1],[PST2],...,[PST37],[CST1],...,[CST10][\r]
    (2)   SVC,OK[\r]

    [PSTx]   0: Off (Not Scan)
                 1: On (Scan)

JPM   Jump Mode

Controller → Radio

    (1)   JPM,[JUMP_MODE],[INDEX][\r]

    [JUMP_MODE]   SCN_MODE
                     CTM_MODE
                     QSH_MODE
                     CC_MODE
                     WX_MODE
                     FTO_MODE
                     WF_MODE
                     IREC_MODE
                     UREC_MODE
                     TDIS_MODE
                     CDIS_MODE

    [INDEX]   SCN_MODE :   Chanel Index
                  CTM_MODE :   Reserve
                  QSH_MODE :   Reserve
                  CC_MODE :   Reserve
                  WX_MODE :   NORMAL
                                     A_ONLY
                                     SAME_1
                                     SAME_2
                                     SAME_3
                                     SAME_4
                                     SAME_5
                                     ALL_FIPS
                  FTO_MODE :   Reserve
                  WF_MODE :   Reserve
                  IREC_MODE :   Reserve
                  UREC_MODE :   Folder Name
                  TDIS_MODE :   Session Name
                  CDIS_MODE :   Session Name

※When you send the channel index of 0xFFFFFFFF,
 scanner start to scan from top channel
※If temporary clock was set and go to discovery mode, scanner sends NG response.
※If temporary clock was set and go to wx alert mode, scanner sends NG response.
Radio → Controller
       (1)   JPM,OK[\r]

DTM   Get/Set Date and Time.

Controller → Radio
       (1)   DTM[\r]
       (2)   DTM,[DayLightSaving],[YYYY],[MM],[DD],[hh],[mm],[ss][\r]

Radio → Controller
       (1)   DTM,[DayLightSaving],[YYYY],[MM],[DD],[hh],[mm],[ss],[RTC Status][\r]
       (2)   DTM,OK[\r]

[RTC Status]:   0:RTC NG
                 1:RTC OK

LCR   Get/Set Location and range.

Controller → Radio
       (1)   LCR[\r]
       (2)   LCR,[LATITUDE],[LONGITUDE],[RANGE][\r]

Radio → Controller
       (1)   LCR,[LATITUDE],[LONGITUDE],[RANGE][\r]
       (2)   LCR,OK[\r]

           LATITUDE and LONGITUDE is degree format.

AST   Analize Start

See Analize Command Tab

APR   Analize Pauze/Resume

See Analize Command Tab

URC   User Record Control

Controller → Radio
       (1)   URC[\r]

(2)   URC,[STATUS][\r]

    Radio → Controller
        (1)   URC,[STATUS][\r]
        (2)   URC,OK[\r]
                   URC,ERR,[ERROR CODE][\r]

                   [ERROR CODE] :
                                0001: FILE ACCESS ERROR
                                0002: LOW BATTERY
                                0003: SESSION OVER LIMIT
                                0004: RTC LOST

                   [STATUS] : 0:Stop, 1:Start

MNU   Menu Mode

    Controller → Radio
        (1)   MNU,[MENU_ID],[INDEX][\r]

    Radio → Controller
        (1)   MNU,OK[\r]

MENU_ID	INDEX	Menu Position
TOP	-	Top (Main) Menu
MONITOR_LIST	-	Select Lists to Monitor menu
SCAN_SYSTEM	Syetm Index	System Menu
SCAN_DEPARTMENT	Department Index	Department Menu
SCAN_SITE	Site Index	Site Menu
SCAN_CHANNEL	Channel Index	Channel Menu
SRCH_RANGE	Custom Bank Index	Custom Search Bank Menu
SRCH_OPT	-	Search/Close Call Opt menu
CC	-	Close Call Menu
CC_BAND	-	Clsoe Call Band Menu
WX	-	WX Operation Menu
FTO_CHANNEL	FTO Channel Index	Tone out Channel Menu
SETTINGS	-	Settings Menu
BRDCST_SCREEN	-	Broadcast screen Menu

MSI   Menu Status Info

    Controller → Radio
        (1)   MSI[\r]

    Radio → Controller
        (1)   MSI,<XML>,[\r]
                   <?xml version="1.0" encoding="utf-8"?>[\r]
                   <MSI Name=" *Title* " Index="*xxxxxx* " >[\r]
                     :
                     :
                   </MSI>[\r]

    format is XML.
    See sheet MSI tab

MSV   Menu Set Value

Controller → Radio
(1)   MSV,[RSV],[VALUE][\r]

Radio → Controller
(1)   MSV,OK[\r]

VALUE   select type menu : selected item index
input type menu : inputted string

Note
Replace comma(,) to tab(\t), if value contain ,(comma).

MSB   Menu Structure Back

Controller → Radio
(1)   MSB,[RSV],[RET_LEVEL][\r]

Radio → Controller
(1)   MSB,OK[\r]

RET_LEVEL   "RETURN_PREVOUS_MODE"   exit menu mode
""   1 level back

GST   Get scanner status (for WF)

Controller → Radio
(1)   GST[\r]

Radio → Controller
(1)   GST,[DSP_FORM],[L1_CHAR],[L1_MODE],[L2_CHAR],[L2_MODE],
[L3_CHAR],[L3_MODE],····,[L20_CHAR],[L20_MODE],
[MUTE],[RSV],[RSV],
[WF_MODE],[FREQ],[MOD],[MF_POS],
[CF],[LOWER],[UPPER],[RSV],[FFT_SIZE][\r]

[WF_MODE] SCANNER MODE (0 : Normal Mode, 1 : Waterfall, 2 :Menu/Direct Entry)
(Normal Mode means SDS Link does not an effective mode. Ex scan mode, s
[FREQ]   Mark Frequency
[MOD]   Modulation
[MF_POS]   Marker position
[CF]   Center Frequency
[LOWER]   Lower Frequency
[UPPER]   Upper Frequency
[FFT_SIZE] FFT Area Size (0 :25%, 1:50%, 2:75%, 3:100%)

if Lx_CHAR or Lx_MODE is all ' '(0x20), it will be convertered "".
if Lx_CHAR has "," (comma), "," (comma) will be changed "\t".

PWF   Push Waterfall FFT Information

      Controller → Device
           (1)   PWF,[FFT_TYPE],[ON/OFF][\r]

      Device → Controller
           (1)   PWF,[DATA1],[DATA2],····,[DATA_n],[\r]

           [FFT_TYPE]
                   1 Dispalyed FFT (240)

GWF   GetWaterfall FFT Information

      Controller → Radio
           (1)   GWF,[TYPE],[ON/OFF][\r]

      Radio → Controller
           (1)   GWF,[DATA1],[DATA2],····,[DATA240],[\r]

           [FFT_TYPE]
                1 Dispalyed FFT (240)

Target Key Word		GLT 1st	GLT 2nd	NXT/PRV 1st	NXT/PRV 2nd	HLD 1st	HLD 2nd	AVD 1st	AVD 2nd
Favorites List	FL	[none]		---		---		---	
System	SYS	[Parent FL Index]		Sys Index	[none]	Sys Index	[none]	Sys Index	[none]
Department	DEPT	[Parent Sys Index]		Dept Index	[Parent Sys Index]	Dept Index	[Parent Sys Index]	Dept Index	[none]
Site	SITE	[Parent Sys Index]		Site Index	[none]	Site Index	[none]	Site Index	[none]
Conventional frequency	CFREQ	[Parent Dept Index]		Chan Index	[none]	Chan Index	[none]	Chan Index	[none]
TGID in ID Scan	TGID	[Parent Dept Index]		Chan Index	[none]	Chan Index	[none]	Chan Index	[none]
TGID in ID Search	STGID	---		TGID	[Site Index]	TGID	[Site Index]	--- (Use ATGID)	
Site frequency	SFREQ	[Parent Sit Index]		---		---		---	
Avoiding TGID in ID Search	ATGID	[Parent Sys Index]		---		---		TGID	Parent sys index
Search Avoiding frequency	AFREQ	[none]		---		---		[Frequency]	[none]
Close Call	CC	---		[none]	[none]	[none]	[none]	--- (Use AFREQ)	
WX	WX	[none]		WX Chan Index	[none]	WX Chan Index	[none]	---	
Tone-Out mode	FTO	[none]		FTO Chan Index	[none]	FTO Chan Index	[none]	---	
Search with scan frequency	SWS_FREQ	---		Frequency	[Parent Dept Index]	Frequency	[Parent Dept Index]	--- (Use AFREQ)	
CC Hits Channel	CCHIT	[Parent Dept Index]		CC Chan Index	[none]	CC Chan Index	[none]	CC Chan Index	[none]
Custom Search Bank	CS_BANK	[none]		---		---		---	
Custom Search frequency	CS_FREQ	---		Frequency	Parent Bank index	Frequency	Parent Bank index	--- (Use AFREQ)	
Quick Search frequency	QS_FREQ	---		Frequency	[none]	Frequency	[none]	--- (Use AFREQ)	
Repeater Find frequency	RPTR_FREQ	---		Frequency	[none]	Frequency	[none]	--- (You can't avoid Repeater Frequency)	
	IREC_FILE	[none]			[none]	File Index	[none]	--- (You can't avoid)	
	UREC_FOLDER	[none]		--- (You can't select folder)		--- (You can't select folder)		--- (You can't avoid)	
	UREC_FILE	Folder Index		File Index	[none]	File Index	[none]	--- (You can't avoid)	
	TRN_DISCOV	[none]		---		---		TGID	[none]
	CNV_DISCOV	[none]		---		---		Frequency	[none]
	~~BAND_SCOPE~~	~~---~~		~~Frequency~~	~~[none]~~	~~Frequency~~	~~[none]~~	~~---~~	

[none] means Parameter is none.
'---   means invarild command

Note 1   If you want ot avoid 406.0MHz in Quick Search mode,
"AVD,**AFREQ**,4060000,,1¥r"   is right.
"AVD,**QS_FREQ**,4060000,,1¥r"   is bad command.

Note 2   If App sends "HLD","NXT" or "PRV"in Repeater Find mod, the scanner cancels Repeater Find mod
and returns to previous mode(Custom Search/Quick Search/ Close Call)

Note 3   "Unkown" department in ID Search is virtual department. You can hold, next and previous "Unkown" department but can't avoid it.
"Unkown" department needs parent system index. Another department doesn't need parent system index. Both is OK that you set blank or system index for 2nd parameter.

GLT is command which PC get xx list form scanner.

Controller → Radio

(1)	GLT,FL	**F**avorites **L**ist
(2)	GLT,SYS,[fl_index]	**Sys**tem
(3)	GLT,DEPT,[system_index]	**Dep**art**m**ent
(4)	GLT,SITE,[system_index]	Site
(5)	GLT,CFREQ,[dept_index]	**C**onventional **Freq**uency
(6)	GLT,TGID,[dept_index]	**TGID**
(7)	GLT,SFREQ,[site_index]	**Si**te **Freq**uency
(8)	GLT,AFREQ	Search **A**voding **Freq**uencies
(9)	GLT,ATGID,[system_index]	Search **A**voiding **TGID**
(10)	GLT,FTO	**F**ire **T**one **O**ut
(11)	GLT,CS_BANK	**C**ustom **S**earch **Bank**
(12)	GLT,UREC	**U**ser **Rec**ord
(13)	GLT,IREC_FILE	**I**nner **Rec**ord **Fi**le
(14)	GLT,UREC_FILE,[folder_index]	**U**ser **Rec**ord **Fi**le
(15)	GLT,TRN_DISCOV	**Tr**unk **Discov**ery
(16)	GLT,CNV_DISCOV	**Conv**entional **Discov**ery

Radio → Controller

(1)	GLT	FL	Index	Name	Monitor	Q_Key	N_Tag				
(2)	GLT	SYS	Index	MyId	Name	Avoid	Type	Q_Key	N_Tag		
(3)	GLT	DEPT	Index	MyId	Name	Avoid	Q_Key				
(4)	GLT	SITE	Index	MyId	Name	Avoid	Q_Key				
(5)	GLT	CFREQ	Index	MyId	Name	Avoid	Freq	Mod	SAS	SAL	SvcType	N_Tag
(6)	GLT	TGID	Index	MyId	Name	Avoid	TGID	Audio Type	SvcType	N_Tag	
(7)	GLT	SFREQ	Index	Freq							
(8)	GLT	AFREQ	Freq	Avoid							
(9)	GLT	ATGID	TGID	Avoid	index	Name	DeptName	DeptIndex			
(10)	GLT	FTO	Index	Freq	Mod	Name	ToneA	ToneB			
(11)	GLT	CS_BANK	Index	Name	Lower	Upper	Mod	Step			
(12)	GLT	UREC	Index	Name				※Name = Folder Name			
(13)	GLT	IREC_FILE	Index	Name	Time			※Name = File Name			
(14)	GLT	UREC_FILE	Index	Name	Time			※Name = File Name			
(15)	GLT	TRN_DISCOV	Name	Delay	Logging	Duration	CompareDB	SystemName	SystemType	SiteName	TimeOutTimer	AutoStore	※Name = Session Name
(16)	GLT	CNV_DISCOV	Name	Lower	Upper	Mod	Step	Delay	Logginig	CompareDB	Duration	TimeOutTimer	AutoStore	※Name = Session Name

Short word means:
Q_Key : Quick Key
N_Tag : Number Tag
Freq : Frequency
Mod : Modulation
SAS : Sub Audio Setting (CTCSS/DCS/P25NAC/Color Code/RAN, Area)

Avoid
Off
T-Avoid

The Index is kind of handle. PC uses index to Hold and Avoid.
MyId is like RRDB ID.

format will be XML.

```
ex

GLT,FL¥r
GLT,<XML>,¥r
<?xml version="1.0" encoding="utf-8"?>¥r
<GLT>¥r
    <FL Index="0" Name="Favorites List 1" Monitor="On" Q_Key="1" N_Tag="None" />¥r
    <FL Index="1" Name="Favorites List 2" Monitor="On" Q_Key="2" N_Tag="2" />¥r
    <FL Index="2" Name="Favorites List 3" Monitor="Off" Q_Key="3" N_Tag="999" />¥r
</GLT>¥r
```
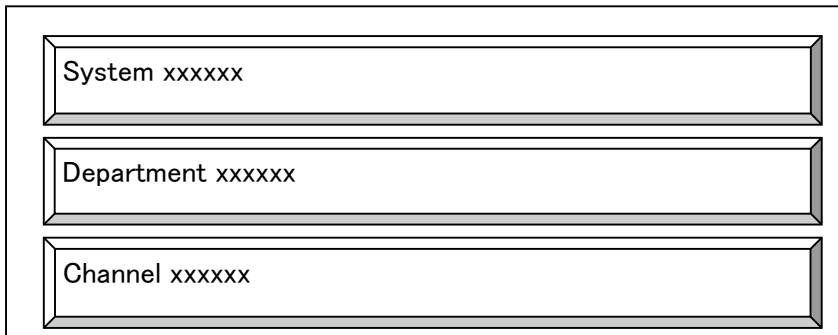
PC/Tablet App need scanner internal information to show.

If the scanner recvies GSI command, it will send scanner internal information.
Scaner internal information is like XML.

If the scanner receive PSI command, it outputs information periodically.
User can change interval by parameter.

```
[ Ex .scan mode ]
<?xml version="1.0" encoding="utf-8"?>
<ScannerInfo Mode="Trunk Scan Hold" V_Screen="trunk_scan">
      <MonitorList Name="Full Database" Index="4294967295" ListType="FullDb" Q_Key="None" N_Tag="None" DB_Counter="3" />
      <System Name="Calcasieu" Index="283" Avoid="Off" SystemType="Conventional" Q_Key="None" N_Tag="None" Hold="On" />
      <Department Name="Calcasieu Parish - Parish Fire &amp; Medical" Index="286" Avoid="Off" Q_Key="None" Hold="Off" />
      <ConvFrequency Name="DeQuincy Fire Department" Index="290" Avoid="Off" Freq=" 154.4150MHz"
            Mod="NFM" N_Tag="None" Hold="On" SvcType="Fire Dispatch" P_Ch="Off" SAS="All" SAD="None" LVL="0" IFX="Off" />
      <AGC A_AGC="Off" D_AGC="Off" />
      <DualWatch PRI="Off" CC="Off" WX="Off" />
      <Property
            VOL="0" SQL="9" Sig="0"
            WiFi="3" Att="Off" Rec="Off"
            KeyLock="Off" P25Status="None"
            Mute="Mute" Backlight="100"

            Rssi="0.377"
      />
      <ViewDescription>
            <InfoArea1 Text="F0:01234-6*789" />
            <InfoArea2 Text="S3:01234-6*---" />
            <PopupScreen Text="Quick Save?¥n"/>
      </ViewDescription>
```

```
┌─────────────────────────────────────────┐
│   ┌─────────────────────────────────┐    │
│   │ System xxxxxx                   │    │
│   └─────────────────────────────────┘    │
│   ┌─────────────────────────────────┐    │
│   │ Department xxxxxx               │    │
│   └─────────────────────────────────┘    │
│   ┌─────────────────────────────────┐    │
│   │ Channel xxxxxx                  │    │
│   └─────────────────────────────────┘    │
└─────────────────────────────────────────┘
```

see   PSI, GSI Elemen
       PSI, GSI Attribute
       Attribute (ViewDescription)

All mode Elements

ScannerInfo
Property
AGC
DispFormat
ViewDescription   (when the radio is wiewing override area)
ReplayDescription   (when the radio is in REPLAY mode)

ScannerInfo is the root node.

Depend on mode elements

	Scan mode				Search				Signal		Temporary		discovery		Analyze			WF
	conventional_scan	trunk_scan	custom_with_scan	cchits_with_scan	custom_search	quick_search	close_call	cc_searching	tone_out	wx_alert	reverse_frequency	repeater_find	discovery_conventional	discovery_trunking	analyze_system_status	rf_power_plot	analyze	waterfall
MonitorList	O	O	O	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–
System	O	O	O	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Department	O	O	O	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Site	–	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ConvFrequency	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
TGID	–	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SiteFrequency	–	O		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
SrchFrequency	–	–	O	–	O	O	O	–	–	O	O	O	–	–	–	–	–	–
CcHitsChannel	–	–	–	O	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DualWatch	O	O	O	O	O	O	O	O	–	–	O	O	–	–	–	–	–	–
SearchRange	–	–	O	–	O	O	–	–	–	–	–	–	–	–	–	–	–	–
SearchBanks	–	–	–	–	O	–	–	–	–	–	–	–	–	–	–	–	–	–
CC_Bands	–	–	–	–	–	–	–	O	–	–	–	–	–	–	–	–	–	–
CC_Counters	–	–	–	–	–	–	–	O	–	–	–	–	–	–	–	–	–	–
ToneOutChannel	–	–	–	–	–	–	–	–	O	–	–	–	–	–	–	–	–	–
WxChannel	–	–	–	–	–	–	–	–	–	O	–	–	–	–	–	–	–	–
WxMode	–	–	–	–	–	–	–	–	–	O	–	–	–	–	–	–	–	–
ConventionalDiscovery	–	–	–	–	–	–	–	–	–	–	–	–	O	–	–	–	–	–
TrunkingDiscovery	–	–	–	–	–	–	–	–	–	–	–	–	–	O	–	–	–	–
SystemStatus	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O	–	–	–
Analyze	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O	–
WaterfallBand	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O
WaterfallSettings	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	O

Elements in ViewDescription

InfoArea1
InfoArea2
OverWrite
PopupScreen
PlainText

Elements in ReplayDescription

File
ReplayMode

ScannerInfo

Attribute Name	Value
Mode	
V_Screen	

→ (Mode points to)
```
Scan Mode
Scan Hold
Tone-Out
Custom Search
Custom Search Hold
Quick Search
Quick Search Hold
Service Scan
Service Scan Hold
Trunk Scan
Trunk Scan Hold
Close Call Only
Close Call
Menu tree
```

→ (V_Screen points to)
```
plain_text
conventional_scan
trunk_scan
custom_with_scan
cchits_with_scan
custom_search
quick_search
close_call
cc_searching
tone_out
wx_alert
discovery_conventional
discovery_trunking
reverse_frequency
repeater_find
direct_entry
menu_selection
menu_input
analyze_system_status
analyze
```

Property

Attribute Name	Value
F	Off/On
VOL	0–29 or 0–15
SQL	0–19 or 0–15
Sig	0–4
WiFi	Off / 0–3 / AP
Battery	0.0–3.3
Att	Off/On/G-Att
Rec	Off/On
KeyLock	Off/On
P25Status	None/Data/P25/DMR/CAP/CON/DT3/XPT /NX9/NX4/ND9/ND4/IDS/NXD
Mute	Unmute/Mute
A_Led	Off/Blue/Red/Magenta/Green/Cyan/Yellow/White
Dir	Up/Down
Rssi	0–

AGC

Attribute Name	Value
A_AGC	Off/On
D_AGC	Off/On

DualWatch

Attribute Name	Value
PRI	Off/DND/Priority
CC	Off/DND/Priority
WX	Off/Priority

MonitorList

Attribute Name	Value
Name	ASCII code , Max length 64
Index	0–
ListType	FullDb/FL/SWS
Q_Key	0–99/None
N_Tag	0–99/None
DB_Counter	0–65535, if counter overs 65535, counter will be 0.

System

Name	ASCII code , Max length 64
Index	0–
Avoid	Off/T-Avoid/Avoid
SystemType	
Q_Key	0–99/None
N_Tag	0–99/None
Hold	Off/On

→ (SystemType points to)
```
Conventional
Motorola
EDACS
LTR
P25 Trunk
P25 One Frequency
MotoTRBO Trunk
DMR One Frequency
NXDN Trunk
NXDN One Frequency
```

Department

Name	ASCII code , Max length 64
Index	0–
Avoid	Off/T-Avoid/Avoid
Q_Key	0–99/None
Hold	Off/On

Site

Name	ASCII code , Max length 64
Index	0-
Avoid	Off/T-Avoid/Avoid
Q_Key	0-99/None
Hold	Off/On
Mod	Auto/NFM/FM

ConvFrequency

Name	ASCII code , Max length 64
Index	0-
Avoid	Off/T-Avoid/Avoid
Freq	xxxx.xxxxMHz
Mod	Auto/AM/NFM/FM/WFM/FMB
N_Tag	0-999/None
Hold	Off/On
SvcType	See Sheet : "Service type"
P_Ch	Off/On
SAS	See Sheet : "Sub Audio"
SAL	Off/On
SAD	See Sheet : "Sub Audio"
RecSlot	Slot 1/2/None
LVL	-3/-2/-1/0/1/2/3
IFX	Off/On
TGID	TGID xxxx/None
U_Id	UID xxxx/None

TGID

Name	ASCII code , Max length 64
Index	0-
Avoid	Off/T-Avoid/Avoid
TGID	TGID:xxxx
SetSlot	Slot 1/2/Any
RecSlot	Slot 1/2/None
N_Tag	0-999/None
Hold	Off/On
SvcType	See Sheet : "Service type"
P_Ch	Off/On
LVL	-3/-2/-1/0/1/2/3

SiteFrequency

Freq	xxxx.xxxxMHz
SAS	See Sheet : "Sub Audio"
SAD	See Sheet : "Sub Audio"
IFX	Off/On

SearchBanks

Attribute Name	Value
Index	0-9
BankStatus	xxxxxxxxxx : 0=Off/ 1=On order=0123456789
Name	ASCII code , Max length 64
BankNo	0-9

CC_Bands

Attribute Name	Value
BandStatus	xxxxxxx : 0=Off/ 1=On order=0123456

SrchFrequency

Attribute Name	Value
Avoid	Off/T-Avoid/Avoid
Freq	xxxx.xxxxMHz
Mod	Auto/AM/NFM/FM/WFM/FMB

Hold	Off/On
SAD	See Sheet : "Sub Audio"
RecSlot	Slot 1/2/None
TGID	TGID xxxx/None
U_Id	UID xxxx/None
IFX	Off/On

CcHitsChannel

Attribute Name	Value
Name	ASCII code , Max length 64
Index	0–
Avoid	Off/T-Avoid/Avoid
CH_No	0–9
Freq	xxxx.xxxxMHz
Mod	Auto/AM/NFM/FM/WFM/FMB
Hold	Off/On
SAD	See Sheet : "Sub Audio"
LVL	-3/-2-/-1/0/1/2/3
IFX	Off/On

SearchRange

Lower	xxxx.xxxxMHz
Upper	xxxx.xxxxMHz
Mod	Auto/AM/NFM/FM/WFM/FMB
Step	

ToneOutChannel

Name	ASCII code , Max length 64
Index	1–
CH_No	0–31
Freq	xxxx.xxxxMHz
Mod	Auto/AM/NFM/FM/WFM/FMB
Hold	Off/On
LVL	-3/-2-/-1/0/1/2/3
IFX	Off/On
ToneA	xxxxHz
ToneB	xxxxHz

WxMode

Mode	"Monitor Weather" or "Weather Alert"
SAME	"Alert Only" or SAME group name

WxChannel

Name	ASCII code , Max length 64
Index	0–
CH_No	1–7
Freq	xxxx.xxxxMHz
Mod	FM
Hold	Off/On
LVL	-3/-2-/-1/0/1/2/3
IFX	Off/On

ConventionalDiscovery

Lower	xxxx.xxxxMHz
Upper	xxxx.xxxxMHz
Mod	Auto/AM/NFM/FM/WFM/FMB
Step	
Freq	xxxx.xxxxMHz
SAD	See Sheet : "Sub Audio"
RecSlot	Slot 1/2/None
PastTime	
HitCount	
TGID	TGID xxxx/None
U_Id	UID xxxx/None
IFX	Off/On

TrunkingDiscovery
      SystemName   ASCII code , Max length 64
      SiteName   ASCII code , Max length 64
      TGID
      TgidName
      SAD   See Sheet : "Sub Audio"
      RecSlot   Slot 1/2/None
      PastTime
      HitCount
      U_Id   UID xxxx/None

SystemStatus
      SystemName   ASCII code , Max length 64
      SiteName   ASCII code , Max length 64
      Signal   0–100
      Quality   0–100
      Activity   0–100
      SystemID   0–0x1FFFF
      SystemSubID   0–99
      SiteID   0–4095
      WacnID   0–0xFFFFF
      NAC   0–0xFFF
      Color   0–15
      RAN   0–63
      Area   0–1
      Att   Off/G-Att
      Freqs   0–16
      P25Status   None/Data/P25/DMR/CAP/CON/DT3/XPT
                           /NX9/NX4/ND9/ND4/IDS/NXD

RfPowerPlot
      Frequency   xxxx.xxxxMHz
      Modulation   Auto/AM/NFM/FM/WFM/FMB
      SampleRate   100ms/200ms/400ms/800ms
      Att   Off/G-Att
      B01   0 – 100
      B02   0 – 100
      B03   0 – 100
      B04   0 – 100
      B05   0 – 100
      B06   0 – 100
      B07   0 – 100
      B08   0 – 100
      B09   0 – 100
      B10   0 – 100
      B11   0 – 100
      B12   0 – 100
      B13   0 – 100
      B14   0 – 100
      B15   0 – 100
      B16   0 – 100
      B17   0 – 100
      B18   0 – 100
      B19   0 – 100
      B20   0 – 100
      B21   0 – 100
      B22   0 – 100
      B23   0 – 100
      B24   0 – 100
      B25   0 – 100
      B26   0 – 100
      B27   0 – 100
      B28   0 – 100
      B29   0 – 100
      B30   0 – 100
      B31   0 – 100

```
        B32             0 – 100
        B33             0 – 100
        B34             0 – 100

    Analyze
        Msg1            ASCII code , Max length 64
        Msg2            ASCII code , Max length 64
        SystemName      ASCII code , Max length 64
        SiteName        ASCII code , Max length 64
        Att             Off/G-Att
※Used by following mode
    LCN Finder
    Current Activity
    LCN Monitor
    Activity Log




WaterfallBand
        Lower           xxxx.xxxxMHz
        Center          xxxx.xxxxMHz
        Upper           xxxx.xxxxMHz
        Mod             Auto/AM/NFM/FM/WFM/FMB
        Step            5kHz/6.25kHz/7.5kHz/833kHz/10kHz/12.5kHz/
                        15kHz/20kHz/25kHz/50kHz/100kHz
        Span            360kHz/720kHz/1.44MHz/2.88MHz/
                        5.76MHz/8.64MHz/17.28MHz/
        Limit           0/1


WaterfallSettings
        MF              xxxx.xxxxMHz
        Gain            Auto/0/1/···/15
```

Info Area and Override>>

Scanner has special view area on main screen.
Info Area 1 and Info Area 2 are diplayed Quick keys status in scan mode or Banks status in custum search mode.

Over Write Area is displayed error message or scanning message on channel name area.

```
<ViewDescription>
    <InfoArea1 Text="F0:01234-6*789" />
    <InfoArea2 Text="S3:01234-6*---" />
    <OverWrite Text="No thing to scan">
</ViewDescription>
```


Info Area 1

Info Area 2

Fx:0123456789
Sx:0123456789

Fx:0123456789
Sx:0123456789

channel name

channel name

BCD536HP image

BCD436HP image

Over Write Area
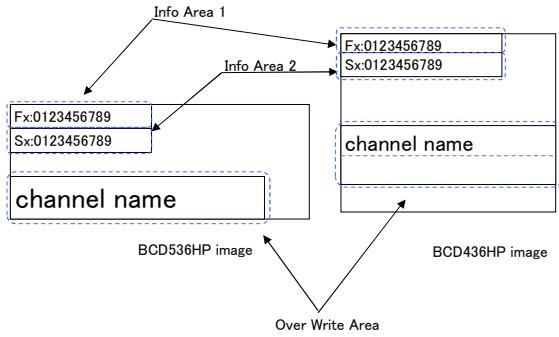
Popup Screen>>

Scanner has popup screen. It shows temporary view for 1-2 seconds.
The popup screen is shown on main screen.

It is like toaster in Android OS.

```
<ViewDescription>
    <PopupScreen Text="Global ATT¥nOn"/>
</ViewDescription>
```

Global ATT
On
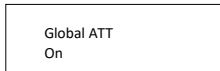
Popup screen has a few buttons.
This popup screen is not cleared automatically.
Scanner waits pressed button by user.

It is like Dialog box.

```
<ViewDescription>
    <PopupScreen Text="USB Cable Detected&#xD;
        Select USB mode&#xD;&#xD;Mass Storage=&quot;E&quot; / Serial Port=&quot;.&quot;">
        <Button Text="&quot;E&quot; (Yes)" KeyCode="E" />
        <Button Text="&quot;.&quot; (No)" KeyCode="." />
    </PopupScreen>
```


USB Cable Detected
Select USB mode
Mass Storage="E" / Serial Port="."

'E' (Yes)   '.' (No)

Syst

Depa

Chan
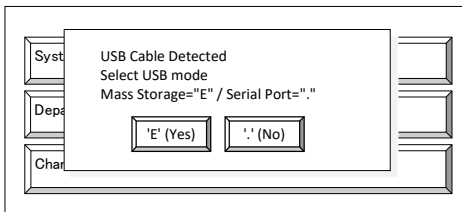
In this case Popup screen has 2 buttons.

If 'E' (Yes) button is pressed, App shoud send "KEY,E,P".
E is KeyCode.

PlainText view>>

Plain Text view is kind of view mode in main screen.

```
ex.
<ViewDescription>
    <PlainText Text="Copyright 2014"/>
    <PlainText Text="Uniden America Corp."/>
    <PlainText Text="All Rights Reserved."/>
    <PlainText Text=""/>
</ViewDescription>
```

≪ ReplayDescription ≫

```
<ReplayDescription>
 <File Index="2" />
 <ReplayMode Mode="USER_REC" />
</ReplayDescription>
```

Basic Rule for Response scanner information

MyId

The system, department, site and channel on Full Database have MyId.
The system, department, site and channel copied form full database have MyId.
But system, department, site and channel which user created don't have MyId.

MyId relates RadioReference ID.

ID is shown xxId=xx.

e.x.
  CountyId=5
  AgencyId=15

ID list

HPDB ID	description	RRDB ID
CountyId	Conventional System（County）	ctid
AgencyId	Conventional System（Agency）	aid
TrunkId	Trunked System	sid
CGroupId	Conventional Department	scid
CFreqId	Conventional Frequncy	fid
SiteId	Trunked Site	siteId
TGroupId	Trunked Department	tgCid
Tid	Trunked Channel	tgId

Note :
  Search with Scan doesn't have MyId.

Index

The index will be used, when you hold or avoid system, department and channel.
It is decided when data is downloaded to RAM. It is invalid if DB_Counter differs.

Name

ASCII code (20h-7eh)
Max Length 64 characters

AST   Analize Start

■ Current Activity

Controller → Radio
AST,CURRENT_ACTIVITY,[Site Index]¥r

Radio → Controller
format will be XML.
Data is sent in 200ms interval

C-Ch

No	LCN	Frequency	SystemID	SiteID	TGID Type

V-Ch

No	LCN	Frequency	TGID	Unit ID	MOD	TGID Type

Parameter
LCN   :   LCN(decimal)
Freq   :   Frequency
TGID   :   Talk Group ID(decimal)
Unit ID   :   Unit ID(decimal)
MOD   :   Mode
                      Analog
                      Digital
                      Encrypted
TgidType   :   Talk Group ID type
                      Control Channel
                      Encrypted
                      Patch
                      Unknown
                      TGID
                      I-CALL
SystemID   :   System ID(hex)
SiteID   :   Site ID(decimal)

XML example
AST,<XML>,¥r
<?xml version="1.0" encoding="utf-8"?>¥r
<AST>¥r
      <CurrentActivity LCN="1" Freq="851.0125" SystemID="0001h" SiteID="0" TgidType="Control Channel" />¥r
      <CurrentActivity LCN="2" Freq="851.0375" TGID="16" UnitID="32" MOD="Analog" TgidType="TGID" />¥r
      <CurrentActivity LCN="3" Freq="851.0625" TGID="64" UnitID="128" MOD="Analog" TgidType="TGID" />¥r
               :
               :
      <CurrentActivity LCN="32" Freq="851.6125" TGID="256" UnitID="512" MOD="Analog" Tgidype="TGID" />¥r
</AST>¥r

※Before sending AST command, please go to Scan Mode to load the hpdb data

■ LCN Monitor

Controller → Radio
AST,LCN_MONITOR,[Site Index]¥r

Radio → Controller
format will be XML.
Data is sent in 1s interval

No	LCN	Frequency	Status

Parameter
LCN   :   LCN(decimal)
Freq   :   Frequency
ReceiveStaus   :   1 or 0

XML example

AST,<XML>,¥r
<?xml version="1.0" encoding="utf-8"?>¥r
<AST>¥r
      <LcnMonitor LCN="1" Freq = "851.0125" ReceiveStaus="1" />¥r
      <LcnMonitor LCN="2" Freq = "851.0250" ReceiveStaus="0" />¥r
      <LcnMonitor LCN="3" Freq = "851.0375" ReceiveStaus="0" />¥r
      <LcnMonitor LCN="4" Freq = "851.0500" ReceiveStaus="0" />¥r
      <LcnMonitor LCN="5" Freq = "851.0625" ReceiveStaus="0" />¥r
      :
      :
      <LcnMonitor LCN="32" Freq = "851.4000" ReceiveStaus="0" />¥r
</AST>¥r

※Before sending AST command, please go to Scan Mode to load the hpdb data

■ Activity Log

※If temporary clock was set and go to activity log mode, scanner sends NG response.

Controller → Radio

AST,ACTIVITY_LOG,[Site Index]¥r

Radio → Controller

AST,ACTIVITY_LOG,[Time],[Data],[Message],[Description]

Parameter

Time	:	MM/DD/YYYY hh:mm:ss
Data	:	Received raw data (depends on system type)
Message	:	Message type (Depends on system type)
Description1-5	:	Message description (depends on system type). Number of description is depends on message type.

【Motorola】

Data
"<cmd>/<prv>/<id>"
cmd : command field 0-1023(decimal)
prv : private bit 0 or 1
id : id field 0-65535(decimal)

Message	Description1	Description2	Description3	Description4	Description5
System ID	Sid:				
Site ID	Site:				
Talkgroup Voice Channel Grant	Tid:	Uid:	Lcn:	Sts:	Mod:
Talkgroup Voice Channel Grant Update	Tid:		Lcn:	Sts:	
I-Call Voice Channel Grant Update	Uid:		Lcn:		
Individual Call	Uid:	Uid:	Lcn:		
Patch/MultiSelect Voice Channel Grant	Pid:	Uid:	Lcn:	Sts:	Mod:
Patch/Multiselect Voice Channel Grant Update	Pid:		Lcn:	Sts:	
Patch List	Pid:	Mid			
Patch Cancel	Pid:				
Control					
First OSW					
Receive Error					

Description

Sid	:	System ID(hex)
Site	:	Site ID(decimal)
Tid	:	Talk Group ID(decimal)
Uid	:	Unit ID(decimal)
Pid	:	Patch ID(decimal)
Mid	:	Patch Member ID (decimal)
Lcn	:	LCN(decimal)
Sts	:	Status bit
		Normal Talkgroup
		All Talkgroup
		Emergency
		Talkgroup Patch
		Emergency Patch
		Emergency Multi-Group
		Multi-Select
		DES Encryption Talkgroup
		DES All Talkgroup
		DES Emergency
		DES Talkgroup Patch
		DES Emergency Patch
		DES Emergency Multi-Group
		Multi-Select DES TG
Mod	:	Modulation
		Analog
		Digital

【P25 Standard】

Data
"<opecode>/<data>"
opecode opecode 1byte:00-FF(hex)
data TSBK 12bytes:000000000000000000000000-FFFFFFFFFFFFFFFFFFFFFFFF(hex)

Message	Description1	Description2	Description3	Description4	Description5
Group Voice Channel Grant	Lcn:	Gad:	Sad:		
Group Voice Channel Grant Explicit	LcnT:	Gad:	Sad:	LcnR:	
Group Voice Channel Grant Update	Lcn:	Gad:	Lcn:	Gad:	
Group Voice Channel Grant Update Explicit	LcnT:	LcnR:	Gad:		
Unit To Unit Voice Channel Grant	Lcn:	Tad:	Sad:		
Unit To Unit Voice Channel Grant Extended	LcnT:	Tad:	Sad:	LcnR:	
Unit To Unit Answer Request	Tad:	Src:			
Unit To Unit Answer Request Extended	Tad:	Src:			
Unit To Unit Voice Channel Grant Update	Lcn:	Tad:	Sad:		
Unit To Unit Voice Channel Grant Update Extended	LcnT:	Tad:	Sad:	LcnR:	
Telephone Voice Channel Grant					
Telephone Interconnect Answer Request					

Message	Description1	Description2	Description3	Description4	Description5
Identifier Update for X2TDMA					
Individual Data Channel Grant					
Group Data Channel Grant					
Group Data Channel Announcement					
Group Data Channel Announcement Explicit					
SNDCP Data Channel Grant					
SNDCP Data Page Request					
SNDCP Data Channel Announcement Explicit					
Status Update					
Status Query					
Message Update					
Radio Unit Monitor Command					
Call Alert					
Acknowledge Response FNE					
Queued Response					
Extended Function Command					
Deny Response					
Group Affiliation Response					
Secondary Control Channel Broadcast Explicit					
Group Affiliation Query					
Location Registration Response					
Unit Registration Response					
Unit Registration Command					
Authentication Command					
De-Registration Acknowledge					
Identifier Update for TDMA	Iden:	Type:	Tofs:	Csp:	Bfrq:
Identifier Update for VHF/UHF Bands					
Time and Date Announcement	Iden:	Bw:	Tofs:	Csp:	Bfrq:
Roaming Address Command					
Roaming Address Update					
System Service Broadcast					
Secondary Control Channel Broadcast					
RFSS Status Broadcast	Sid:	Sub:	Site:	Lcn:	
RFSS Status Broadcast Extended	Sid:	Sub:	Site:	LcnT:	LcnR:
Network Status Broadcast	Wacn:	Sid:	Lcn:		
Network Status Broadcast Extended	Wacn:	Sid:	LcnT:	LcnR:	
Adjacent Status Broadcast					
Identifier Update for non-VHF/UHF Bands	Iden:	Bw:	Tofs:	Csp:	Bfrq:
Protection Parameter Broadcast					
Protection Parameter Update					
Receive Error					

Description

Lcn	:	LCN(decimal)
LcnT	:	Transmit channel LCN(decimal)
LcnR	:	Receive channel LCN(decimal)
Gad	:	Group Address(decimal)
Sad	:	Source Address(decimal)
Tad	:	Target Address(decimal)
Src	:	Source ID(decimal)
Iden	:	Identifier(decimal)
Bw	:	Band Width(decimal)
Tofs	:	Transmit Offset(decimal)
Csp	:	Channel Spacing(decimal)
Bfrq	:	Base Frequency(decimal)
Sid	:	System ID(hex)
Sub	:	RF Sub-system ID(decimal)
Site	:	Site ID(decimal)
Wacn	:	WACN ID(hex)
Type	:	Channel Type(decimal)

【EDACS】

Data
"<data>"
data   message data   28bits:0000000-FFFFFFF(hex)

Message	Description1	Description2	Description3	Description4	Description5
Site ID	Site:		Lcn:		
Talkgroup Voice Channel Grant	Tid:	Uid:	Lcn:	Sts:	
Talkgroup Voice Channel Grant Update	Tid:		Lcn:	Sts:	
I-Call Voice Channel Grant Update	Uid:		Lcn:	Sts:	
Patch Voice Channel Grant	Pid:	Uid:	Lcn:	Sts:	
Patch Voice Channel Grant Update	Pid:		Lcn:	Sts:	
Patch List	Pid:	Mid:			
First OSW					
Receive Error					

Description

Site	:	Site ID(decimal)
Tid	:	Talk Group ID(decimal 1-2047: AFS, decimal 2048-65535: Decimal)
Uid	:	Unit ID(decimal)
Pid	:	Patch ID(decimal)
Mid	:	Patch Member ID (decimal)
Lcn	:	LCN(decimal)
Sts	:	Status bit

Normal Talkgroup
Talkgroup Patch
Emergency
Emergency Patch
Digital Talkgroup
Digital Patch
Digital Emergency
Digital Emergency Patch
I-Call
Digital I-Call

【LTR】

Data		
"<data>"		
data	<area_code>/<goto>/<home>/<id>/<free>	
area code	Area Code	0 or 1
goto	Goto Repeater	0-31(decimal)
home	Home Repeater	0-31(decimal)
id	Id Field	0-255(decimal)
free	Free Repeater	0-31(decimal)

Message	Description1	Description2	Description3	Description4	Description5
Repeater Idle	Tid:	Rpt:	Goto:	Free:	
Talkgroup Voice Channel Grant Update	Tid:	Rpt:	Goto:	Free:	
Turn-off Code	Tid:	Rpt:	Goto:	Free:	

Tid : Talk Group ID (Area-Home-Id)
Rpt : Transmitting Repeater
Goto : Goto Repeater
Free : Free Repeater

【DMR/MotoTRBO】

Data		
"<opcode>/<fid>/<id>/<ch>/<slot>/<prv>/<emergency>"		
opcode	Full/Short Link Control Opcode	00-3F (Hex)
	Control Signal Block Opcode	00-3F (Hex)
fid	Feature ID	00(DMR), 06(Connect Plus), 10(Capacity Plus) (Hex)
id	TGID	0-16777215 (Decimal)
ch	LCN	0-4095 (Decimal)
slot	TDMA Slot	1 or 2 or 15(None) (Decimal)
prv	Privacy	0 or 1
emergency	Emergency	0 or 1

Message	Description1	Description2	Description3	Description4	Description5
Talkgroup Voice Channel Grant	Tid:	Uid:	Color Code:	Lcn:	Slot:
Talkgroup Voice Channel Link Control	Tid:	Uid:	Color Code:	Lcn:	Slot:
Unit to Unit Voice Channel Grant	Uid Src:	Uid Dst:	Color Code:	Lcn:	Slot:
Unit to Unit Voice Channel Link Control	Uid Src:	Uid Dst:	Color Code:	Lcn:	Slot:
Broadcast Talkgroup Voice Channel Grant	Tid:	Uid:	Color Code:	Lcn:	Slot:
Capacity Plus Voice Channel Grant	Tid:	Uid:	Color Code:	Lcn:	Slot:
Capacity Plus Update	Sid:	Site:	Color Code:	Lcn:	Slot:
Capacity Plus Site ID	Sid:	Site:	Color Code:	Lcn:	Slot:
Linked Capacity Plus Site ID	Sid:	Site:	Color Code:	Lcn:	Slot:
Connect Plus Voice Channel Grant	Tid:	Uid:	Color Code:	Lcn:	Slot:
Connect Plus Update					
Connect Plus Network ID	Sid:	Site:	Color Code:	Lcn:	Slot:
DMR Network ID	Sid:	Site:	Color Code:	Lcn:	Slot:
Idle					

Description

Sid : Network ID (Hex)
Site : Site ID (Decimal)
Tid : Talk Group ID (Decimal)
Uid : Unit ID (Decimal)
Uid Src : Source Unit ID (Decimal)
Uid Dst : Destination Unit ID (Decimal)
Color Code : Color Code (Decimal)
Lcn : LCN (Decimal)
Slot : TDMA Slot (Decimal)

※Before sending AST command, please go to Scan Mode to load the hpdb data

【NXDN】

Data		
"<call type>/<home ch>/<id>/<ch>/<prv>/<emergency>"		
call type	Call Type	0-7 (Decimal)
home ch	Home Channel	0-31 (IDAS only, Decimal)
id	TGID	NEXEDGE: 0-65535, IDAS: 0-2047 (Decimal)
ch	LCN	0-1023 (Decimal)
prv	Privacy	0 or 1
emergency	Emergency	0 or 1

Message	Description1	Description2	Description3	Description4	Description5
Replying to requesting communication	Tid:	Uid:	Area Code:	Home Ch:	
	Uid Src:	Uid Dst:	Area Code:	Home Ch:	
Performing voice communication	Tid:	Uid:	RAN: or Area Code:		
	Uid Src:	Uid Dst:	RAN: or Area Code:		
Sending Encryption init vector					
Assignment of traffic channel to VC	Tid:	Uid:	RAN: or Area Code:	LCN: or Home Ch:	
	Uid Src:	Uid Dst:	RAN: or Area Code:	LCN: or Home Ch:	
Existence of assigned traffic channel to VC	Tid:	Uid:	RAN: or Area Code:	LCN: or Home Ch:	
	Uid Src:	Uid Dst:	RAN: or Area Code:	LCN: or Home Ch:	
Transmission released					
Idle					
Disconnecting					
Site configuration information	Sys:	Site:	RAN:	Cch LCN: or DFA	
Service information which site provides	Sys:	Site:	RAN:		
Information of site's control channel	Sys:	Site:	RAN:	Cch LCN: or DFA	
IDAS go to Repeater	Tid:	Uid:	Area Code:	Go to Repeater:	
	Uid Src:	Uid Dst:	Area Code:	Go to Repeater:	

Description

Sys	:	System ID (Decimal)
Site	:	Site ID (Decimal)
Tid	:	Talk Group ID (Decimal)
Uid	:	Unit ID (Decimal)
Uid Src	:	Individual Call Source Unit ID (Decimal)
Uid Dst	:	Individual Call Destination Unit ID (Decimal)
RAN	:	NEXEDGE RAN (Decimal)
Area Code	:	IDAS Area Code (Decimal)
LCN	:	NEXEDGE LCN (Decimal)
Go to Repeater	:	IDAS Repeater Channel (Decimal)
Home Ch	:	IDAS Home Channel (Decimal)
Cch LCN	:	NEXEDGE Control Channel (Decimal)
DFA	:	NEXEDGE Direct Frequency Assignment

※Before sending AST command, please go to Scan Mode to load the hpdb data

■ LCN Finder

Controller → Radio

AST,LCN_FINDER,[Site Index]¥r

Radio → Controller

format will be XML.
Data is sent in 500ms interval

Parameter

Freq   :   Frequency
AccuracyStatus   :   Accuracy Level (Total 30 status)
                      0 :   Unknown
                      1 :   Level 1
                      2 :   Level 2
                      3 :   Level 3
                      4 :   Level 4
                      5 :   Found
                      6 :   Disable

Condition   :   Searching
                      All Lcn Found

XML example

AST,<XML>,¥r
<?xml version="1.0" encoding="utf-8"?>¥r
<AST>¥r
    <LcnFinder Freq="851.0125" AccuracyStatus="566666666666666666666666666666">
    <LcnFinder Freq="851.0375" AccuracyStatus="610000000000000000000000000000">
    <LcnFinder Freq="851.0625" AccuracyStatus="603000000000000000000000000000">

    <LcnFinder Freq="851.6125" AccuracyStatus="600000000000000000000000000000">
    <LcnFinder Condition="Searching"/>
</AST>¥r

※Before sending AST command, please go to Scan Mode to load the hpdb data

■ Band Scope

Data is sent in 10ms interval
Controller → Radio
AST,BAND_SCOPE,[Center frequency],[Span],[Step],[Modulation]¥r

[Center frequency]
    250000 – 1300000
[Span]
    200   8000

Removed in SDS100

```
        400        10000
        600        20000
        800        40000
        1000       60000
        2000       80000
        4000       100000
        6000       200000
```
[Step]
```
        500        1500
        625        2000
        750        2500
        833        5000
        1000       10000
```
[Modulation]
        Auto
        AM
        NFM
        FM
        WFM
        FMB

Radio → Controller
The data is output every time the frequency is changed
AST,BAND_SCOPE,[Frequency],[RSSI_LEVEL]¥r

Parameter
Frequency   :   Frequency
Status   :   RSSI Level (0 – 100)

■ **Raw Data Output**

Controller → Radio
AST,RAW_DATA_OUTPUT,[Frequency],[Modulation],[Filter],[Global Attenuator]¥r

[Frequency]
        250000 – 13000000
[Modulation]
        Auto
        AM
        NFM
        FM
        WFM
        FMB
[Filter]
        1=On
        0=Off
[Global Attenuator]
        1=On
        0=Off

Removed in SDS100

Radio → Controller
Discriminator A/D sampling raw data (10 bit signed data) will be output by the radio.
10 bit data will be divided into High byte and Low byte, see data format in next table.

*Data Format

	b7	b6	b5	b4	b3	b2	b1	b0
H	1	0	0	bit9	bit8	bit7	bit6	bit5
L	0	0	0	bit4	bit3	bit2	bit1	bit0

※ Interface of raw data output mode is the only USB port.
    If you want to use the other remote command, please send after pause command.

■ **System Status**

Controller → Radio
AST,SYSTEM_STATUS,[site_index]¥r

Radio → Controller
AST,OK¥r

■ **Rf Power Plot**

Controller → Radio
AST,RF_POWER_PLOT,[Frequency],[Modulation],[Sampling Rate]¥r

[Frequency]
        250000 – 13000000
[Modulation]
        Auto
        AM
        NFM
        FM
        WFM

Removed in SDS100

```
            FMB
         [Sampling Rate]
            100
            200
            400
            800

      Radio → Controller
         AST,OK¥r
```

APR   **Analize Pauze/Resume**

Controller → Radio
      APR,[Analize Mode]¥r

Parameter
Analize Mode :   SYSTEM_STATUS
                    RF_POWER_PLOT
                    CURRENT_ACTIVITY
                    LCN_MONITOR
                    ACTIVITY_LOG
                    RAW_DATA_OUTPUT

Radio → Controller
      APR,OK¥r

MSI

Attribute Name	Value
Name	Menu title
Index	Menu index
MenuType	TypeSelect/TypeInput/TypeLocation/TypeError
Value	Current set value
Selected	

MenuItem

Attribute Name	Value
Name	Item name
Index	Item index
Value	Menu item current value

MenuInput

Attribute Name	Value
MaxLength	1-64
EnableKeys	Characters which user can input.
AddedInformation	String

MenuLocation

Attribute Name	Value
MaxLength	1-
EnableKeys	Characters which user can input.
IsLatitude	″1″=Lan/ ″0″= Lon

MenuErrorMsg

Attribute Name	Value
Text	Error Message
ScanButton	″1″=Enable / ″0″=Disable

Service Type

id	Service Type Name
PST1	Multi-Dispatch
PST2	Law Dispatch
PST3	Fire Dispatch
PST4	EMS Dispatch
PST5	non
PST6	Multi-Tac
PST7	Law Tac
PST8	Fire-Tac
PST9	EMS-Tac
PST10	non
PST11	Interop
PST12	Hospital
PST13	Ham
PST14	Public Works
PST15	Aircraft
PST16	Federal
PST17	Business
PST18	non
PST19	non
PST20	Railroad
PST21	Other
PST22	Multi-Talk
PST23	Law Talk
PST24	Fire-Talk
PST25	EMS-Talk
PST26	Transportation
PST27	non
PST28	non
PST29	Emergency Ops
PST30	Military
PST31	Media
PST32	Schools
PST33	Security
PST34	Utilities
PST35	non
PST36	non
PST37	Corrections

Custom Service Type

id	Service Type Name
ST1	Custom 1
ST2	Custom 2
ST3	Custom 3
ST4	Custom 4
ST5	Custom 5
ST6	Custom 6
ST7	Custom 7
ST8	Custom 8
ST9	Racing Officials
ST10	Racing Teams

Key code	BCD536HP	SDS100	Note
M	MENU	Menu	Menu Key
F	(Rotary nob)	Func	F Key
L	AVOID	AVOID	Avoid Key
1	1	1	1 Key
2	2	2	2 Key
3	3	3	3 Key
4	4	4	4 Key
5	5	5	5 Key
6	6	6	6 Key
7	7	7	7 Key
8	8	8	8 Key
9	9	9	9 Key
0	0	0	0 Key
.	. NO	. NO	Dot key
E	E yes	E yes	Enter Key
>	(Rotary nob)	(Rotary nob)	Rotary Right
<	(Rotary nob)	(Rotary nob)	Rotary Left
^	(Rotary nob)	(Rotary nob)	Rotary nob push
V	VOL	Backlight	Volume nob push
Q	SQ	*(none)*	Squelch nob push
Y	REPLAY	REPLAY	Replay Key
A	SOFT 1	SOFT 1	BCD436HP : System
B	SOFT 2	SOFT 2	BCD436HP : Dept
C	SOFT 3	SOFT 3	BCD436HP : Channel
Z	ZIP	Zip	Zip Key
T	SREV	*(none)*	Service Type Key
R	RANG	RANG	Range Key

SAS (Sub Audio Settings)

	All	All	Analog (CTCSS/DCS) Tone Search	NAC Search	Digital (P25 NAC/ColorCode/RAN/Area)
0x0000			CTCSS 67.0Hz	NAC 000h	
			CTCSS 69.3Hz	NAC 001h	
			CTCSS 71.9Hz	NAC 002h	
			CTCSS 74.4Hz	NAC 003h	
			CTCSS 77.0Hz	NAC 004h	
			CTCSS 79.7Hz	NAC 005h	
			CTCSS 82.5Hz	NAC 006h	
			CTCSS 85.4Hz	NAC 007h	
			CTCSS 88.5Hz	NAC 008h	
			CTCSS 91.5Hz	NAC 009h	
			CTCSS 94.8Hz	NAC 00Ah	
			CTCSS 97.4Hz	NAC 00Bh	
			CTCSS 100.0Hz	NAC 00Ch	
			CTCSS 103.5Hz	NAC 00Dh	
			CTCSS 107.2Hz	NAC 00Eh	
			CTCSS 110.9Hz	NAC 00Fh	
			CTCSS 114.8Hz	NAC 010h	
			CTCSS 118.8Hz	NAC 011h	
0x0012			CTCSS 123.0Hz	NAC 012h	
:			CTCSS 127.3Hz	:	
:			CTCSS 131.8Hz	:	
:			CTCSS 136.5Hz	:	

SAD (Sub Audio Detected)

	All	None	Analog (CTCSS/DCS) None	Digital (P25 NAC/ColorCode/RAN/Area) None
			CTCSS 67.0Hz	NAC 000h
			CTCSS 69.3Hz	NAC 001h
			CTCSS 71.9Hz	NAC 002h
			CTCSS 74.4Hz	NAC 003h
			CTCSS 77.0Hz	NAC 004h
			CTCSS 79.7Hz	NAC 005h
			CTCSS 82.5Hz	NAC 006h
			CTCSS 85.4Hz	NAC 007h
			CTCSS 88.5Hz	NAC 008h
			CTCSS 91.5Hz	NAC 009h
			CTCSS 94.8Hz	NAC 00Ah
			CTCSS 97.4Hz	NAC 00Bh
			CTCSS 100.0Hz	NAC 00Ch
			CTCSS 103.5Hz	NAC 00Dh
			CTCSS 107.2Hz	NAC 00Eh
			CTCSS 110.9Hz	NAC 00Fh
			CTCSS 114.8Hz	NAC 010h
			CTCSS 118.8Hz	NAC 011h
			CTCSS 123.0Hz	NAC 012h
			CTCSS 127.3Hz	:
			CTCSS 131.8Hz	:
			CTCSS 136.5Hz	:

0x0fff			CTCSS 141.3Hz	NAC FFFh					CTCSS 141.3Hz	NAC FFFh
0x1000			CTCSS 146.2Hz	Color Code 0					CTCSS 146.2Hz	Color Code 0
			CTCSS 151.4Hz	Color Code 1					CTCSS 151.4Hz	Color Code 1
			CTCSS 156.7Hz	Color Code 2					CTCSS 156.7Hz	Color Code 2
			CTCSS 159.8Hz	Color Code 3					CTCSS 159.8Hz	Color Code 3
			CTCSS 162.2Hz	Color Code 4					CTCSS 162.2Hz	Color Code 4
			CTCSS 165.5Hz	Color Code 5					CTCSS 165.5Hz	Color Code 5
			CTCSS 167.9Hz	Color Code 6					CTCSS 167.9Hz	Color Code 6
			CTCSS 171.3Hz	Color Code 7					CTCSS 171.3Hz	Color Code 7
			CTCSS 173.8Hz	Color Code 8					CTCSS 173.8Hz	Color Code 8
			CTCSS 177.3Hz	Color Code 9					CTCSS 177.3Hz	Color Code 9
			CTCSS 179.9Hz	Color Code 10					CTCSS 179.9Hz	Color Code 10
			CTCSS 183.5Hz	Color Code 11					CTCSS 183.5Hz	Color Code 11
			CTCSS 186.2Hz	Color Code 12					CTCSS 186.2Hz	Color Code 12
			CTCSS 189.9Hz	Color Code 13					CTCSS 189.9Hz	Color Code 13
			CTCSS 192.8Hz	Color Code 14					CTCSS 192.8Hz	Color Code 14
0x100f			CTCSS 196.6Hz	Color Code 15					CTCSS 196.6Hz	Color Code 15
:			CTCSS 199.5Hz	:					CTCSS 199.5Hz	:
:			CTCSS 203.5Hz	:					CTCSS 203.5Hz	:
:			CTCSS 206.5Hz	:					CTCSS 206.5Hz	:
0x2000			CTCSS 210.7Hz	RAN 0					CTCSS 210.7Hz	RAN 0
			CTCSS 218.1Hz	RAN 1					CTCSS 218.1Hz	RAN 1
			CTCSS 225.7Hz	RAN 2					CTCSS 225.7Hz	RAN 2
			CTCSS 229.1Hz	RAN 3					CTCSS 229.1Hz	RAN 3
			CTCSS 233.6Hz	RAN 4					CTCSS 233.6Hz	RAN 4
			CTCSS 241.8Hz	RAN 5					CTCSS 241.8Hz	RAN 5
			CTCSS 250.3Hz	RAN 6					CTCSS 250.3Hz	RAN 6
			CTCSS 254.1Hz	RAN 7					CTCSS 254.1Hz	RAN 7
			DCS 006	RAN 8					DCS 006	RAN 8
			DCS 007	RAN 9					DCS 007	RAN 9
			DCS 015	RAN 10					DCS 015	RAN 10
			DCS 017	RAN 11					DCS 017	RAN 11
			DCS 021	RAN 12					DCS 021	RAN 12
			DCS 023	RAN 13					DCS 023	RAN 13
			DCS 025	RAN 14					DCS 025	RAN 14
			DCS 026	RAN 15					DCS 026	RAN 15
			DCS 031	RAN 16					DCS 031	RAN 16
			DCS 032	RAN 17					DCS 032	RAN 17
			DCS 036	RAN 18					DCS 036	RAN 18
			DCS 043	RAN 19					DCS 043	RAN 19
			DCS 047	RAN 20					DCS 047	RAN 20
			DCS 050	RAN 21					DCS 050	RAN 21
			DCS 051	RAN 22					DCS 051	RAN 22
			DCS 053	RAN 23					DCS 053	RAN 23
			DCS 054	RAN 24					DCS 054	RAN 24
			DCS 065	RAN 25					DCS 065	RAN 25
			DCS 071	RAN 26					DCS 071	RAN 26
			DCS 072	RAN 27					DCS 072	RAN 27
			DCS 073	RAN 28					DCS 073	RAN 28
			DCS 074	RAN 29					DCS 074	RAN 29
			DCS 114	RAN 30					DCS 114	RAN 30
			DCS 115	RAN 31					DCS 115	RAN 31
			DCS 116	RAN 32					DCS 116	RAN 32
			DCS 122	RAN 33					DCS 122	RAN 33
			DCS 125	RAN 34					DCS 125	RAN 34
			DCS 131	RAN 35					DCS 131	RAN 35
			DCS 132	RAN 36					DCS 132	RAN 36
			DCS 134	RAN 37					DCS 134	RAN 37
			DCS 141	RAN 38					DCS 141	RAN 38
			DCS 143	RAN 39					DCS 143	RAN 39
			DCS 145	RAN 40					DCS 145	RAN 40
			DCS 152	RAN 41					DCS 152	RAN 41
			DCS 155	RAN 42					DCS 155	RAN 42
			DCS 156	RAN 43					DCS 156	RAN 43
			DCS 162	RAN 44					DCS 162	RAN 44
			DCS 165	RAN 45					DCS 165	RAN 45
			DCS 172	RAN 46					DCS 172	RAN 46
			DCS 174	RAN 47					DCS 174	RAN 47
			DCS 205	RAN 48					DCS 205	RAN 48
			DCS 212	RAN 49					DCS 212	RAN 49
			DCS 214	RAN 50					DCS 214	RAN 50
			DCS 223	RAN 51					DCS 223	RAN 51
			DCS 225	RAN 52					DCS 225	RAN 52
			DCS 226	RAN 53					DCS 226	RAN 53
			DCS 243	RAN 54					DCS 243	RAN 54
			DCS 244	RAN 55					DCS 244	RAN 55
			DCS 245	RAN 56					DCS 245	RAN 56
			DCS 246	RAN 57					DCS 246	RAN 57
			DCS 251	RAN 58					DCS 251	RAN 58
			DCS 252	RAN 59					DCS 252	RAN 59
			DCS 255	RAN 60					DCS 255	RAN 60
			DCS 261	RAN 61					DCS 261	RAN 61
			DCS 263	RAN 62					DCS 263	RAN 62

0x203f			DCS 265	RAN 63					DCS 265	RAN 63
:			DCS 266	:					DCS 266	:
:			DCS 271	:					DCS 271	:
:			DCS 274	:					DCS 274	:
0x3000			DCS 306	Area 0					DCS 306	Area 0
0x3001			DCS 311	Area 1					DCS 311	Area 1
			DCS 315						DCS 315	
			DCS 325						DCS 325	
			DCS 331						DCS 331	
			DCS 332						DCS 332	
			DCS 343						DCS 343	
			DCS 346						DCS 346	
			DCS 351						DCS 351	
			DCS 356						DCS 356	
			DCS 364						DCS 364	
			DCS 365						DCS 365	
			DCS 371						DCS 371	
			DCS 411						DCS 411	
			DCS 412						DCS 412	
			DCS 413						DCS 413	
			DCS 423						DCS 423	
			DCS 431						DCS 431	
			DCS 432						DCS 432	
			DCS 445						DCS 445	
			DCS 446						DCS 446	
			DCS 452						DCS 452	
			DCS 454						DCS 454	
			DCS 455						DCS 455	
			DCS 462						DCS 462	
			DCS 464						DCS 464	
			DCS 465						DCS 465	
			DCS 466						DCS 466	
			DCS 503						DCS 503	
			DCS 506						DCS 506	
			DCS 516						DCS 516	
			DCS 523						DCS 523	
			DCS 526						DCS 526	
			DCS 532						DCS 532	
			DCS 546						DCS 546	
			DCS 565						DCS 565	
			DCS 606						DCS 606	
			DCS 612						DCS 612	
			DCS 624						DCS 624	
			DCS 627						DCS 627	
			DCS 631						DCS 631	
			DCS 632						DCS 632	
			DCS 654						DCS 654	
			DCS 662						DCS 662	
			DCS 664						DCS 664	
			DCS 703						DCS 703	
			DCS 712						DCS 712	
			DCS 723						DCS 723	
			DCS 731						DCS 731	
			DCS 732						DCS 732	
			DCS 734						DCS 734	
			DCS 743						DCS 743	
			DCS 754						DCS 754	