X-8075 Bluetooth Module Manual
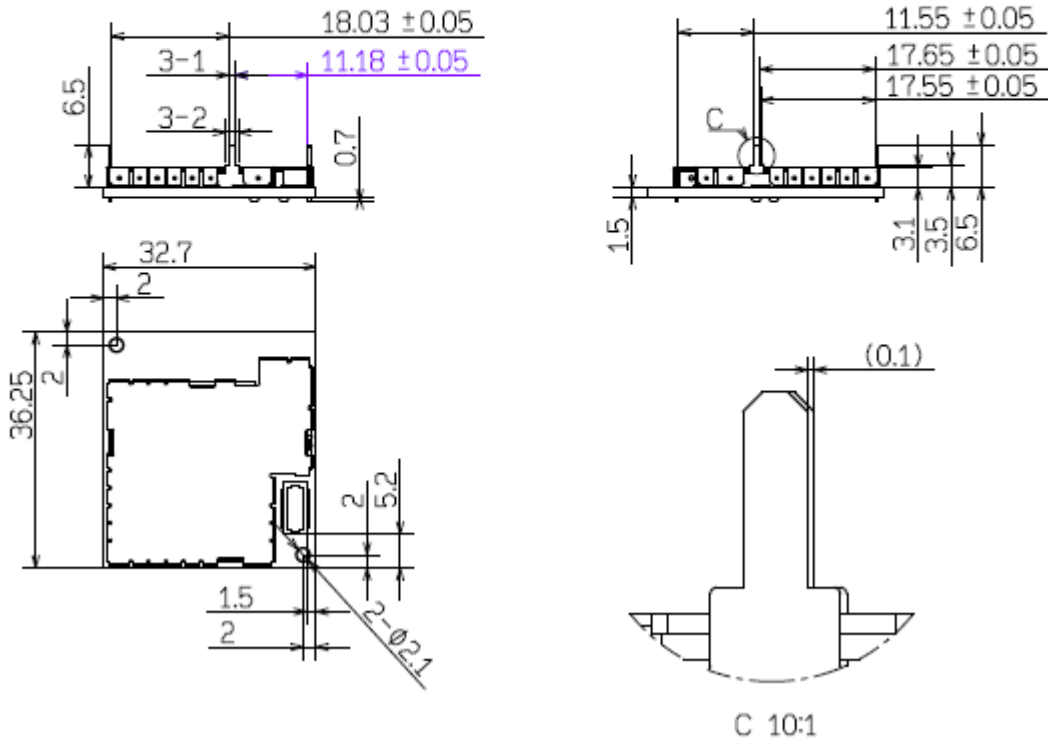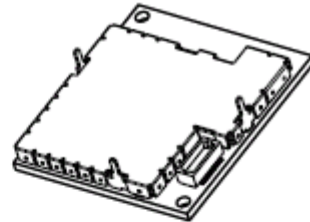
Version 1.0

1. Product Introduction

X-8075 is a fully integrated Bluetooth Module used as Car kit or in the Car Audio System or any systems requiring complete embedded Bluetooth connectivity solution. It's a high quality solution with low cost. It will work as a master or slave Bluetooth device, accepting the role switch request of remote device automatically.

X-8075 Shape

X-8075 Support Features:
Embedded Bluetooth 3.0 via EDR
Pairing and connection with multiple Bluetooth devices
Make calls, Terminate calls, Private mode, 3-way calling
Phone book and Call history synchronization
Audio Streaming
New message notification

2. Common Specification

Radio Chip:
CSR BC5MM
Power Supply Voltage:
The operating voltage range is D.C. 3.1V-3.6V.
Rated voltage is D.C.3.3V.
Ambient temperature:
The operating temperature range is $-40\sim+85\,^{\circ}$ C.
Rated temperature is $+25\,^{\circ}$ C.
Humidity:
The maximum relative humidity is 95 % (Ta=45 $^{\circ}$ C).
Rated relative humidity is 65%.
Antenna:
Built-in
Antenna gain:
The antenna gain value is -1dBi.

3. Hardware Integration
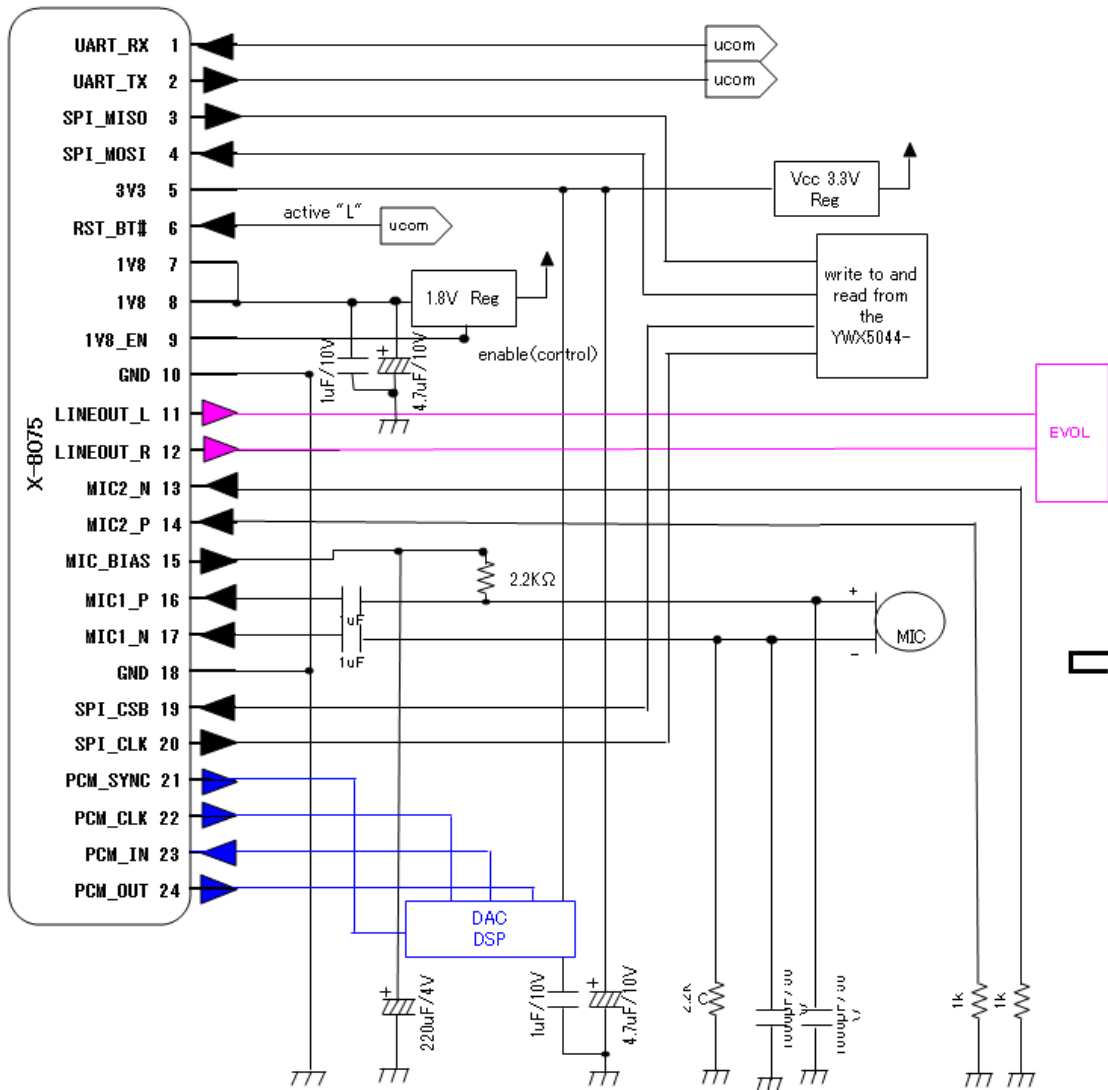
X-8075 Pin-out diagram

No.	symbol	explain	Description
1	UART_RX		UART DATA OUTPUT
2	UART_TX		UART DATA INPUT
3	SPI_MISO		SPI data output
4	SPI_MOSI		SPI data input
5	3V3		power Vcc 3.3V
6	RST_BT#		Reset if low.Input debounced so must be low for >5ms to cause a reset
7	1V8		power 1.8V
8	1V8		power 1.8V
9	1V8_EN		1V8 power supply enable signal --active high
10	GND		GND
11	LINEOUT_L		analog audio output

12	LINEOUT_R		analog audio output
13	MIC2_N		Microphone2 minus input
14	MIC2_P		Microphone2 plus input
15	MIC_BIAS		Microphone bias
16	MIC1_P		Microphone1 plus input
17	MIC1_N		Microphone1 minus input
18	GND		GND
19	SPI_CBS		Chip select for serial peripheral interface(SPI),active low
20	SPI_CLK		SPI clock
21	PCM_SYNC		synchronous data sync
22	PCM_CLK		synchronous data clock
23	PCM_IN		synchronous data input
24	PCM_OUT		synchronous data output

X-8075 Pin-out Description

4. Software Interface Reference

The default device name is X-8075_B203 after module start. User can change it to any other friendly name by using the relative interface command. X-8075 can send or receive data from remote Bluetooth device.

Software Configuration:

Setting	Value
Baud Rate	115200bps(pre-configurable)
Data bit	8 data bits, list significant bit transmit first
Parity	Even Parity
Stop bit	1 stop bit
HW Flow Control	Optional

Interface Example:

Name: BT_GEN_FID_SET_SCANMODE_REQ

functionality:			
Set Bluetooth inquiry scan and page scan parameter			
param 1:			
type:	u8	**name:**	discover_mode
meaning:	discoverable mode		
range:	0x00~0x03		
0x00: no scan enable(default)			
0x01: Enable inquiry scan Page scan disabled			
0x02: Enable page scan inquiry scan disabled			
0x03: page and inquiry enable			

The interface command name is BT_GEN_FID_SET_SCANMODE_REQ. There is one paramer named discover_mode with four valid values and below is the description of all values.User can configure ScanMode of X-8075 by sending this

interface. When Host Controller initiates a REQ, BT Module should always send a corresponding CFM to specify operation result and optional additional information.
Example:

BT_GEN_FID_SET_SCANMODE_REQ<discover_mode=0x03>

BT_GEN_FID_SET_SCANMODE_CFM<status=0x00>

Set discover_mode as 0x03, then other Bluetooth device can find X-8075 and initiate to pairing with X-8075.

Interface Listing

No.	Interface
1	BT_GEN_FID_RESET_REQ
2	BT_GEN_FID_INQUIRY_REQ
3	BT_GEN_FID_SET_SCANMODE_REQ
4	BT_GEN_FID_SET_SEC_MODE_REQ
5	BT_GEN_FID_GET_REMOTE_NAME_REQ
6	BT_GEN_FID_SET_LOCAL_NAME_REQ
7	BT_GEN_FID_READ_LOCAL_NAME_REQ
8	BT_GEN_FID_PAIRING_DEVICE_REQ
9	BT_GEN_FID_DEL_PAIR_DEV_REQ
10	BT_GEN_FID_GET_PAIR_DEV_LIST_REQ
11	BT_GEN_FID_SERVICE_CON_REQ
12	BT_GEN_FID_SERVICE_DISCON_REQ
13	BT_GEN_FID_GET_LINK_QUALITY_REQ
14	BT_GEN_FID_SEARCH_ATTRIBUTE_REQ
15	BT_GEN_FID_TEST_MODE_REQ
16	BT_GEN_FID_ENTER_DFU_REQ
17	BT_HFP_FID_AUDIO_TRANSFER_REQ
18	BT_HFP_FID_DIAL_REQ
19	BT_HFP_FID_LAST_DIAL_REQ
20	BT_HFP_FID_MEM_DIAL_REQ
21	BT_HFP_FID_CALL_PROCESS_REQ
22	BT_HFP_FID_TERMINATE_CALL_REQ
23	BT_HFP_FID_GET_CURRENT_CALL_LIST_REQ
24	BT_HFP_FID_VOICE_RECOGNIZE_REQ
25	BT_HFP_FID_DTMF_CODE_REQ
26	BT_HFP_FID_CALL_HOLD_REQ
27	BT_HFP_FID_SUBSCRIBER_NUM_REQ
28	BT_HFP_FID_NETWORK_OPERATOR_REQ
29	BT_AVP_FID_MEDIA_START_REQ
30	BT_AVP_FID_MEDIA_PAUSE_REQ
31	BT_AVP_FID_GET_PLAY_STATUS_REQ
32	BT_AVP_FID_GET_ELEMENT_ATTRIBUTES_REQ
33	BT_PBDL_FID_CONFIGURE_REQ
34	BT_PBDL_FID_SYNC_PB_REQ
35	BT_PBDL_FID_SYNC_ABORT_REQ
36	BT_PBDL_FID_GET_PB_BY_INDEX_REQ
37	BT_PBDL_FID_SEARCH_PB_BY_NUMBER_REQ
38	BT_PBDL_FID_SEARCH_PB_BY_KEY_REQ

System Error Status

Value	Error Status
0x00	APP_EVTRES_SUCCESS
0x01	APP_EVTRES_FAIL
0x02	APP_EVTRES_UNKNOWN_OPCODE
0x03	APP_EVTRES_ILLEGAL_PARAM
0x04	APP_EVTRES_OPERATION_FAIL
0x05	APP_EVTRES_SYSTEM_BUSY
0x06	APP_EVTRES_ILLEGAL_OPERATION
0x07	APP_EVTRES_ILLEGAL_STATE
0x08	APP_EVTRES_ILLEGAL_FORMAT
0x09	APP_EVTRES_PAGE_TIMEOUT
0x0A	APP_EVTRES_ABNORMAL
0x0B	APP_EVTRES_ABORTED
0x0C	APP_EVTRES_SDP_ERROR
0x0D	APP_EVTRES_AUTHENTICATION_FAIL
0x0E	APP_EVTRES_OPERATION_TIMEOUT
0x0F	APP_EVTRES_NO_CORRESPONDING_IND

1. Reset Software

Name:	BT_GEN_FID_RESET_REQ

functionality:
Software reset of the Bluetooth Module.

2, Inquiry Remote Device

Name:	BT_GEN_FID_INQUIRY_REQ

functionality:			
Inquiry Bluetooth device(s) nearby. The detail device information should be report to host application by the indication of BT_GEN_FID_INQ_RESULT_IND.			
param 1:			
type:	u8	**name:**	mode
meaning:	The mode of inquiry Bluetooth device(s)		
range:	0x00~0x01		
0x00: General inquiry 0x01: Limited inquiry			
param 2:			
type:	u24	**name:**	filter
meaning:	Bitwise class of device to be filtered		
range:	0x000000~0xFFFFFF		
.			
param 3:			
type:	u8	**name:**	duration

meaning:	The maximum amount of time used for inquiring in 1.28 second		
range:	0x02~0x30		
param 4:			
type:	u8	**name:**	num
meaning:	The maximum number of response from the inquiry		
range:	0x01~0x20		

3. San Mode configure

Name:	BT_GEN_FID_SET_SCANMODE_REQ

functionality:	
Set Bluetooth inquiry scan and page scan parameter	
param 1:	
type:	u8
meaning:	discoverable mode
range:	0x00~0x03
0x00: no scan enable(default)	
0x01: Enable inquiry scan Page scan disabled	
0x02: Enable page scan inquiry scan disabled	
0x03: page and inquiry enable	

4. Security Mode configure

Name:	BT_GEN_FID_SET_SEC_MODE_REQ		

functionality:			
Configure the security mode of local Bluetooth device			
param 1:			
type:	u8	**name:**	mode
meaning:	The Bluetooth security mode		
range:	0x01~0x04		
0x01: non secure 0x02: service level enforced security			
0x03: link level enforced security 0x04: service level enhanced security(SSP, default)			
param 2:			
type:	u8	**name:**	sec
meaning:	The Bluetooth encryption mode		
range:	0x00~0x02		
0x00: Encryption off 0x01: Point to point encryption			
0x02: Point to point and broadcast encryption (default)			

5. Get Remote device name

Name: BT_GEN_FID_GET_REMOTE_NAME_REQ

functionality:			
Retrieve User-Friendly name of remote Bluetooth device			
param 1:			
type:	bdaddr	**name:**	remote
meaning:	the Bluetooth device address of remote		
range:	N/A		

6. Set BT module name

Name: BT_GEN_FID_SET_LOCAL_NAME_REQ

functionality:			
Set the User-Friendly name for local Bluetooth device			
param 1:			
type:	u16	**name:**	len
meaning:	The length of User-Friendly name		
range:	0x01~0x1F		
param 2:			
type:	str	**name:**	name
meaning:	The User-Friendly name encoded in UTF-8		
range:	N/A		

7. Read BT Module name

Name: BT_GEN_FID_READ_LOCAL_NAME_REQ

functionality:
Issue this command to read local device friendly name. the result will be returned by the confirmation of BT_GEN_FID_READ_LOCAL_NAME_CFM.
remark:
N/A

8. Pairing with Remote device

Name: BT_GEN_FID_PAIRING_DEVICE_REQ

functionality:
Issue this command to authentication with remote device, when this command is issued local will init a authentication process with remote device.
NOTE: This command can not be sent when there is a service connection between local and remote device.

param 1:			
type:	bdaddr	**name:**	remote
meaning:	The Bluetooth device address of remote		
range:	N/A		

9. Delete paired Remote device

Name: BT_GEN_FID_DEL_PAIR_DEV_REQ

functionality:			
Delete the paired device information according its device id.			
param 1:			
type:	u8	**name:**	pairId
meaning:	The paired device id.		
range:	0x00~0x02		

10. Get paired device list

Name: BT_GEN_FID_GET_PAIR_DEV_LIST_REQ

functionality:
Get all paired device list.

11. Initiate Service connection

Name: BT_GEN_FID_SERVICE_CON_REQ

functionality:			
Setup a Bluetooth profile level connection			
param 1:			
type:	bdaddr	**name:**	remote
meaning:	The Bluetooth device address to be connected		
range:	N/A		
param 2:			
type:	u8	**name:**	service
meaning:	The service to be connected		
range:	0x00~0x02, 0x04~0x05		
0x00: SPP 0x01: HFP 0x02: AVP 0x04:OPPS 0x05:PBAP			
param 3:			
type:	u8	**name:**	extend
meaning:	The extended info the target service		
range:	0x00~0xFF		
As for SPP service, it is the instance id; As for other services, it is reserved and should be always zero.			

12. Release Service connection

Name: BT_GEN_FID_SERVICE_DISCON_REQ

functionality:			
Release an existing profile level connection			
param 1:			
type:	u8	**name:**	service
meaning:	The service to be released		
range:	0x00~0x02, 0x05		
0x00: SPP 0x01: HFP 0x02: AVP 0x05: PBAP			
param 2:			
type:	u8	**name:**	extend
meaning:	The extended info.		
range:	0x00~0x01 (default is 0)		
As for SPP service, it is the instance id; As for AVP, it's the device id.			

13. Get Link quality with Remote device

Name: BT_GEN_FID_GET_LINK_QUALITY_REQ

functionality:			
Retrieve link quality of current link			
param 1:			
type:	bdaddr	**name:**	remote
meaning:	The Bluetooth device address of remote		
range:	N/A		

14. Get Attribute of Remote device

Name: BT_GEN_FID_SEARCH_ATTRIBUTE_REQ

functionality:			
Search the attributes for services that supported by Remote device			
param 1:			
type:	bdaddr	**name:**	remote
meaning:	The Bluetooth device address of remote		
range:	N/A		
param 2:			
type:	u8	**name:**	timeout
meaning:	The timeout of service search in seconds		
range:	0x05~0x3C		

15. Enter Test Mode

Name: BT_GEN_FID_TEST_MODE_REQ

functionality:
Enable local device under test mode
remark:
Request to place the local module into Device Under Test mode. The module automatically becomes discoverable, connectable and security is disabled before entering DUT mode. It is intended that this command be used when connecting the module to a Bluetooth Tester (e.g. Rhode & Schwartz CMU200). To return to normal operation, the module should be reset. This message contains no parameters.

16. Enter DFU Mode

Name: BT_GEN_FID_ENTER_DFU_REQ

functionality:
Make the BT Module to enter Device Firmware Upgrade mode
remark:
As soon as this message is processed, Bluetooth module will be rebooted automatically and ready for firmware maintenance procedures. There is no parameter for this message.

17. Audio transfer

Name: BT_HFP_FID_AUDIO_TRANSFER_REQ

functionality:			
By sending this command host can transfer SCO audio out between BT module and remote connected AG device.			
param 1:			
type:	u8	**name:**	dir
meaning:	Which side should output the SCO audio		
range:	0x00~0x01		
0x00 - BT module side 0x01 - AG side			

18. Place an outgoing call by number

Name: BT_HFP_FID_DIAL_REQ

functionality:
Send a dial request to the remote AG device.
Note that the num parameter is limited to 32 bytes in length.
param 1:

type:	u16	name:	len
meaning:	The length of the dialing number.		
range:	0x0000~0x0020		
param 2:			
type:	str	name:	num
meaning:	Dialing call number		
range:	N/A		

19. Place an outgoing call to last number

Name: BT_HFP_FID_LAST_DIAL_REQ

functionality:
Send a last dial request to the remote device.

20. Memory dial

Name: BT_HFP_FID_MEM_DIAL_REQ

functionality:			
Send a memory dial request to the remote device.			
param 1:			
type:	u16	name:	len
meaning:	The length of the dialling number.		
range:	0x0000~0x0020		
NA			
param 2:			
type:	str	name:	num
meaning:	Dialling call number		
range:	N/A		

21. Accept/Reject incoming call

Name: BT_HFP_FID_CALL_PROCESS_REQ

functionality:			
This command is used to accept/reject incoming calls.			
param 1:			
type:	u8	name:	action
meaning:	The action for the incoming call		
range:	0x00~0x01		
0x00　reject the incoming call　　　0x01 - accept the incoming call			

22. End ongoing call

Name: BT_HFP_FID_TERMINATE_CALL_REQ

functionality:
Issue this command to terminate the ongoing call of the remote connected device.

23. Get current call information

Name: BT_HFP_FID_GET_CURRENT_CALL_LIST_REQ

functionality:
Issue this command to get current call detail information of connected remote device.

24. Voice Recognition

Name: BT_HFP_FID_VOICE_RECOGNIZE_REQ

functionality:			
Issue this command BT Module can activate/deactivate voice recognize in Remote device.			
param 1:			
type:	u8	**name:**	operation
meaning:	Enable/disable the function of voice recognize function.		
range:	0x00~0x01		
0x00 deactivate (default) 0x01 activate			

25. Transmit DTMF code

Name: BT_HFP_FID_DTMF_CODE_REQ

functionality:			
Transmit a DTMF code to the remote device. DTMF codes other than those specified below will be rejected as per the Bluetooth specification.			
param 1:			
type:	u8	**name:**	code
meaning:	DTMF code		
range:	0x30 - 0x39, 'A' - 'D', '#', '*'		
0x00 means no error, other values please refer to corresponding spec.			

26. 3-way call control

Name: BT_HFP_FID_CALL_HOLD_REQ

functionality:			
Issue this command to send call held command to connected remote device.			
param 1:			
type:	u8	**name:**	action
meaning:	The action of call hold command		
range:	0x00 - 0x04		

0x00	Release all hold call and reject the waiting calls
0x01	Release active call and accept the waiting calls
0x02	Put active call on hold and accept other waiting/hold calls
0x03	Adds a held call to the conversation
0x04	Connects the two calls and disconnects the subscriber from both calls

param 2:			
type:	u8	**name:**	index
meaning:	The index of the speciated call		
range:	0x00 - 0x02		

[action = 0x01]

0x00 Release all active calls   0x01- 0x02 Release the speciated call

[action = 0x02]

0x00 Put all active calls on hold   0x01-0x02 Put all call on hold except the speciated call.

27. Subscribe number

Name: BT_HFP_FID_SUBSCRIBER_NUM_REQ

functionality:
Issue this command to query AG subscriber number, if subscriber is available then AG will return subscriber number by using the indication of subscriber number event, if multiple subscriber numbers are available then AG will return the result by many use the event of subscriber number indication.

28. Get network operator of Remote device

Name: BT_HFP_FID_NETWORK_OPERATOR_REQ

functionality:
Issue this command to get the network operator of remote device. This command not has any parameters.

29. Start Audio Streaming

Name: BT_AVP_FID_MEDIA_START_REQ

functionality:			
Send a request to start A2DP audio streaming.			
param 1:			
type:	u8	**name:**	device_id
meaning:	The current used device id		
range:	0x00~0x01		

30. Pause Audio Streaming

Name: BT_AVP_FID_MEDIA_PAUSE_REQ

functionality:

Suspend an ongoing A2DP audio streaming.			
param 1:			
type:	u8	**name:**	device_id
meaning:	The current used device id		
range:	0x00~0x01		

31. Get current Audio Streaming status
Name: BT_AVP_FID_GET_PLAY_STATUS_REQ

functionality:			
This command is used to request the status of the currently playing media at the TG.			
param 1:			
type:	u8	**name:**	device_id
meaning:	The current used device id		
range:	0x00~0x01		

32. Get current media information
Name: BT_AVP_FID_GET_ELEMENT_ATTRIBUTES_REQ

functionality:			
This command is used to request the attributes of the element specified in the parameter.			
param 1:			
type:	u8	**name:**	device_id
meaning:	The current used device id		
range:	0x00~0x01		
param 2:			
type:	u8	**name:**	attributes
meaning:	The attributes to be retrieved by setting attribute ID bit mask.		
range:	0x00 – 0x7F		
Bit0 - Title of the media Bit1 - Name of the artist			
Bit2 - Name of the album Bit3 - Number of the media			
Bit4 - Total number of the media Bit5 - Genre			
Bit6 - Playing time in millisecond Bit7 - Reserved			
Get the attribute content by set the bit mask to 1, or 0 not. None mask set means get all attributes.			

33. Phonebook synchronization configure
Name: BT_PBDL_FID_CONFIGURE_REQ

functionality:

This message used to configure PBDL service before used it. Host must use this interface to register the wanted service, the service priority and other parameters etc.

param 1:			
type:	u8	**name:**	srv_ priority
meaning:	Set the priority of the available service to pull phonebook.		
range:	0~1		
0 – Priority to use AT+PBDL (default)　　　1- Priority to use PBAPC			

param 2:			
type:	u8	**name:**	register_srv
meaning:	The service registered to use PBDL.		
range:	0x00 ~ 0xFF (default is 0x00)		
bit1: HFP_HF　　bit4: OPP_SERVER　　bit5: PBAP_PCE　　bit0 and others reserved.			

param 3:			
type:	u8	**name:**	vcard_type
meaning:	Wanted VCARD version.		
range:	0x00, 0x01, 0x02 (default is 0x00)		
0x00 – Vcard 2.1　　　0x01 – Vcard 3.0　　　0x02 – Vcard Default			

param 4:			
type:	u8	**name:**	charset_type
meaning:	Wanted char set type.		
range:	0x00~0x0A		
0x00: GSM (default)　　0x01: ASCII　　0x02: UTF-8　　　0x03: HEX 0x04: IRA　　0x05:UCS2　　0x0006:PCCP437　　0x0007:PCDN 0x0008:8859-1　　0x0009:UCS-2　　0x000A:UTF8			

34. Phonebook synchronization

Name:　　　BT_PBDL_FID_SYNC_PB_REQ

functionality:			
This message used to sync phonebook from remote phone. Firmware will use the available service as its priority setting by the last configure interface.			

param 1:			
type:	u8	**name:**	devId
meaning:	The request device id.		
range:	0x00~0x02		

param 2:			
type:	u8	**name:**	pbType
meaning:	The request phonebook type		
range:	0x00~0x01		
0x00: Phonebook(SIM, ME) (default)　　0x01:CallHistory(DC, MC, RC)			

35. Abort Phonebook synchronization

Name: BT_PBDL_FID_SYNC_ABORT_REQ

functionality:
This message used to abort the PBDL sync operation.

36. Get phonebook information after synchronization

Name: BT_PBDL_FID_GET_PB_BY_INDEX_REQ

functionality:			
This message used to get the earlier sync phonebook record stored on local flash by its number.			
param 1:			
type:	u8	**name:**	devId
meaning:	The request device id.		
range:	0x00~0x02		
param 2:			
type:	u16	**name:**	index
meaning:	The index of the record.		
range:	0x0000~0x03E8		

37. Search phonebook by number after synchronization

Name: BT_PBDL_FID_SEARCH_PB_BY_NUMBER_REQ

functionality:			
This message used to search the phonebook record by number.			
param 1:			
type:	u8	**name:**	devId
meaning:	The request device id.		
range:	0x00~0x02		
param 2:			
type:	u16	**name:**	numberLen
meaning:	The got number length		
range:	0x0000~0x001F		
param 3:			
type:	str	**name:**	number
meaning:	The number string.		
range:	N/A		

38. Search phonebook by key word after synchronization

Name: BT_PBDL_FID_SEARCH_PB_BY_KEY_REQ

functionality:			
This message used to search the phonebook record by its key word of name.			
param 1:			
type:	u8	**name:**	devId
meaning:	The request device id.		
range:	0x00~0x02		
param 2:			
type:	u24	**name:**	key
meaning:	3 bytes UTF-8 Unicode encoding code.		
range:	N/A		
E.g: A : 0x000041			

Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: Reorient or relocate the receiving antenna; Increase the separation between the equipment and receiver; Connect the equipment into an outlet on a circuit different from that to which the receiver is connected; Consult the dealer or an experienced radio/TV technician for help.

In accordance with FCC Part 15C and RSS-210, this module is listed as a Modular Transmitter device.

1 Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

2 The antenna of this transmitter must not be co-located or operating in conjunction with any other antenna or transmitters within a host device, except in accordance with FCC multitransmitter product procedures.

FCC Label Instructions

The outside of final products that contains this module device must display a label referring to the enclosed module. This exterior label can use wording such as the following: "Contains Transmitter Module FCC ID: [AJDK071]" or "Contains FCC ID: [AJDK071]." Any similar wording that expresses the same meaning may be used.

If the product is to be sold in Canada, then this exterior label should use wording such as the following: "Contains Transmitter Module IC: [775E-K071]"

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.