



# AUDIOAGENT (AA) – IDC747

## UART COMMAND MANUAL

Ref: AAGENT-IDC7x7-V1992

Initial Release : Jan 2021

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## Version History

Version	Date	Comments
1.0	6/1/2021	Draft Version
1.01	9/4/2021	Minor Corrections / Typos
1.03	3/8/2021	Minor Changes
1.04	9/1/2022	Simplified and first release for 747
1.05	25/1/2022	Added BLE Central commands and Links to go back to tables – Note that BLE Central commands will be released as a firmware update on 15/3/2022
1.06	25/2/2022	Removed commands not supported (or not production validated yet) by V1992 to avoid confusion with firmware upgrades

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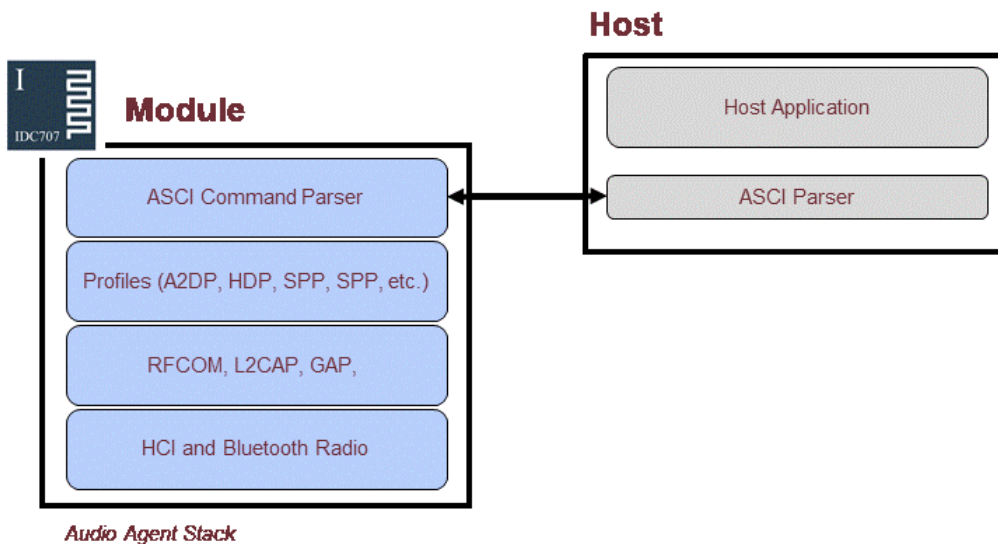
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# Introduction

AudioAgent is an embedded firmware running entirely on the IDC7x7 modules (ex: IDC747). It implements the Bluetooth protocol stack and many Bluetooth profiles as well. All software layers, including application software, Codecs such as aptX, AAC and aptX HD, aptX Adaptive run on the module in a protected user software execution environment.

The host system can interface to AudioAgent through one or more physical interfaces. The most common interfacing is done through the UART interface by using the ASCII commands that AudioAgent supports. With these ASCII commands, the host can access Bluetooth functionality without paying any attention to the complexity, which lies in the Bluetooth protocol stack. GPIO interface can be used for event monitoring and command execution. PCM, PDIF, I2S or Analog interfaces are available for audio. The available interfaces depend on the hardware used.

The user can write application code to the host processor to control AudioAgent using ASCII commands or GPIO events. In this way, it is easy to develop Bluetooth enabled applications. On the IDC7x7 modules, there is also DSP processor for Audio processing.



In the figure above, a Bluetooth module with AudioAgent firmware could be connected to a host system for example through the UART interface. The options are:

- 1) If the host system has a processor, software can be used to control AudioAgent by using ASCII based commands or GPIO events.
- 2) If there is no need to control AudioAgent or the host system does not need a processor, AudioAgent can be configured to be transparent and autonomous, in which case it only accepts Bluetooth connections or automatically opens them.
- 3) GPIO lines that IOT747 Bluetooth modules offer can also be used together with AudioAgent to achieve additional functionality, such as Connection Detection. Audio interfaces can be used to transmit audio over a Bluetooth link.

# Upgrading

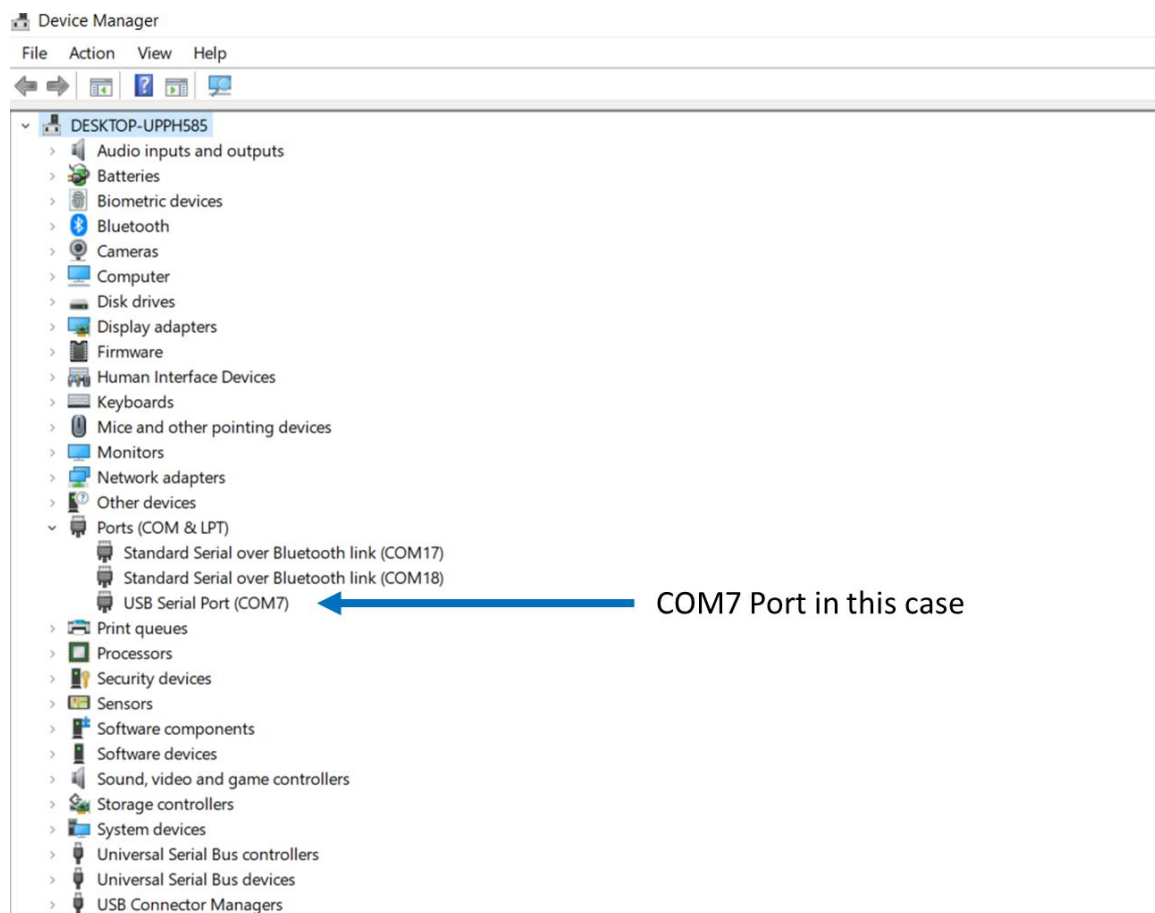
For those who are starting to design and using a IDC7x7 Diskit, we suggest upgrading the board to the latest version of AudioAgent. Please contact [info@iot747.com](mailto:info@iot747.com) or refer to [www.iot747.com](http://www.iot747.com) for upgrade tool and firmware upgrades.

# Getting Started

To start using AudioAgent, you need:

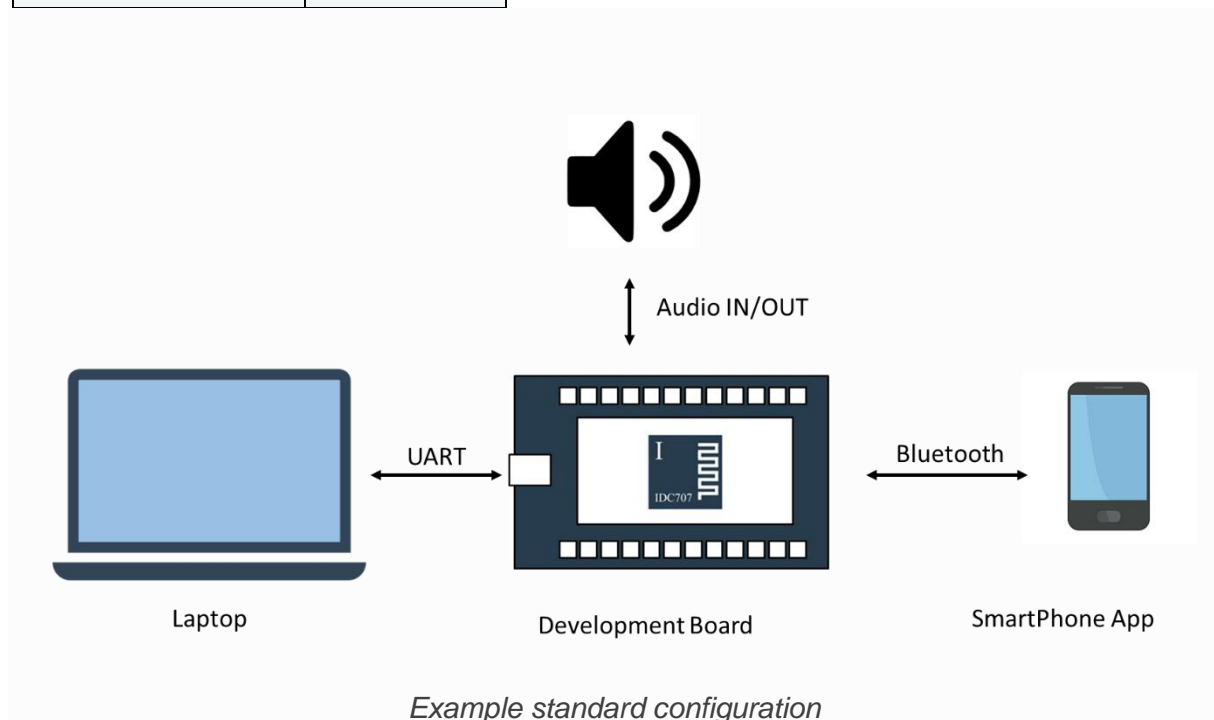
- A Development board (IDC747-DISKIT)
- A Computer running a serial terminal software such as [Hercules](#).

Connect the Computer (or Laptop) to the Development board using the USB cable. The Development board should enumerate as a COM port. You can see the COM number by going to Device Manager on a Windows Laptop.



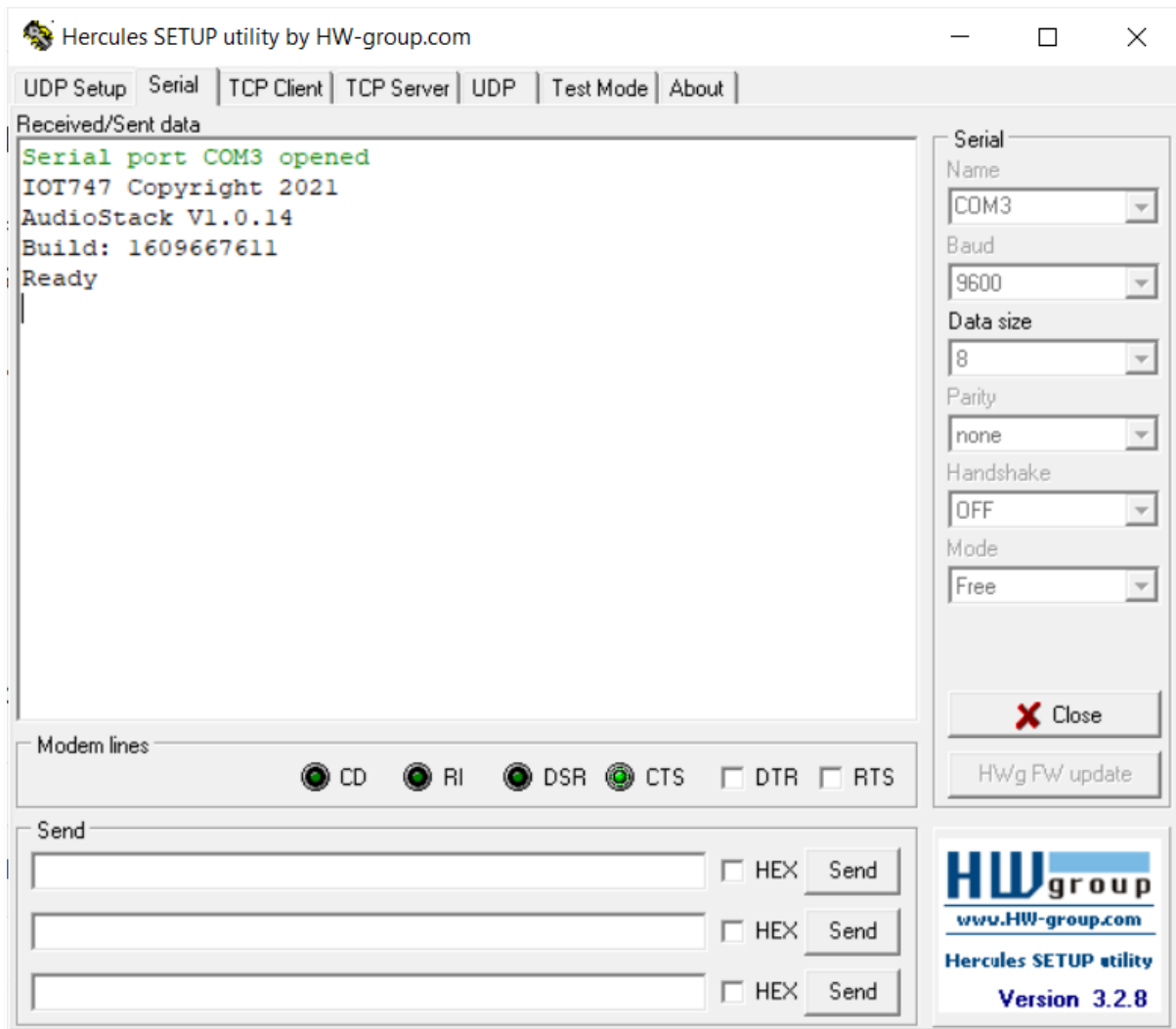
By default, AudioAgent uses the following UART settings:

Baud rate	9600 bps
Data bits	8
Stop bits	1
Parity bit	No Parity
HW Flow Control	Disabled



Once you have configured your serial terminal and opened the COM port, you should see a prompt appear on the screen of the terminal. If you see a prompt and a “Ready”, the module is ready to operate. Note that end of line character used by AudioAgent is a Carriage Return (‘\r’ or 0x0D).





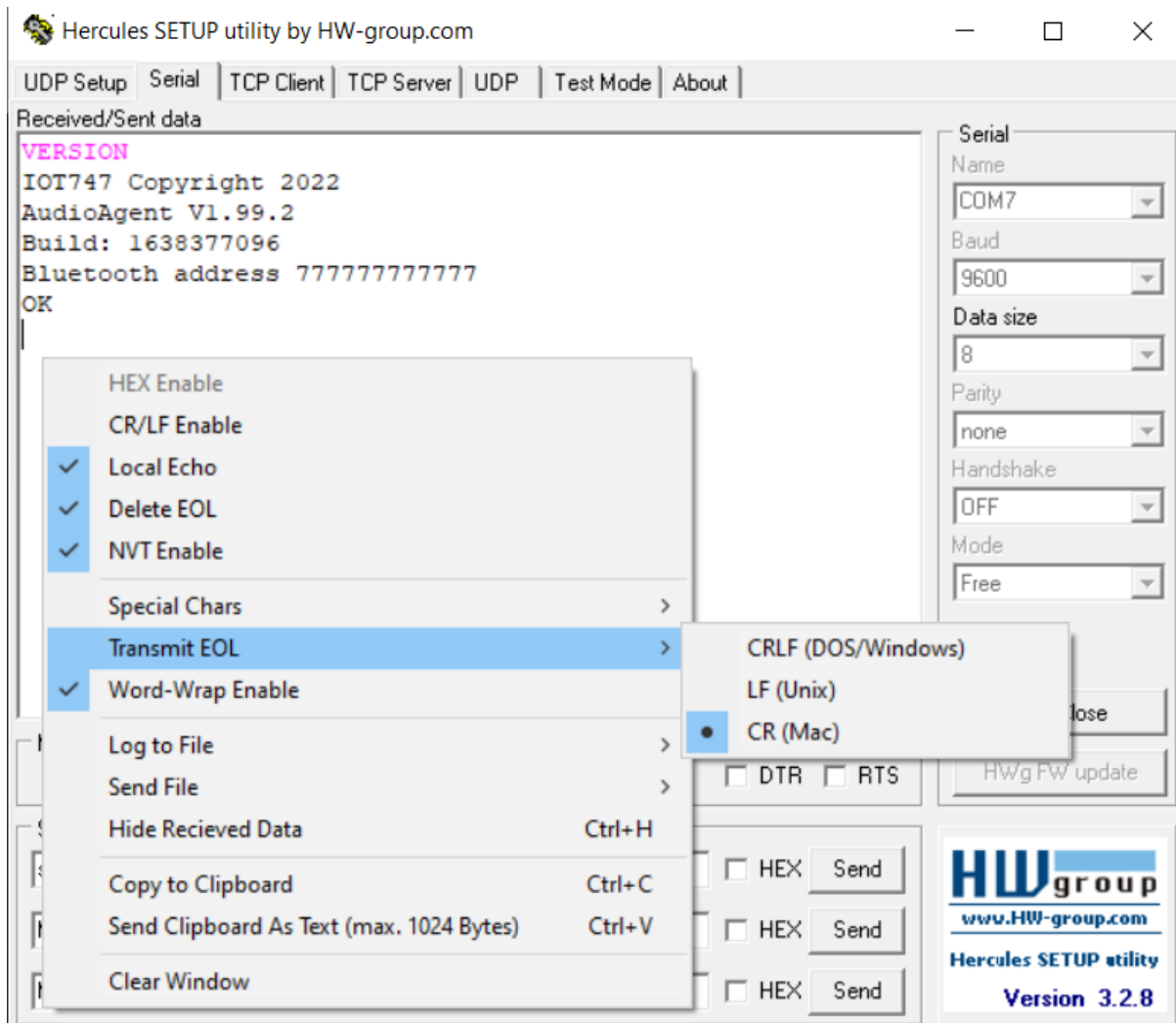
### *AudioAgent initial prompt*

If you do not see the prompt and “Ready” appear, please check that:

- The module is powered ON and receiving power
- The UART settings on your serial terminal are the same as above
- You have opened the right COM port

### Default behaviour

When AudioAgent boots with factory default settings, it is discoverable. Any Bluetooth enabled phone or other Bluetooth device can see it when scanning (discovering) other Bluetooth devices. AudioAgent will appear as ‘AA-XXXXXX’ where XXXXXX represent the last six hexadecimal digits of the device’s Bluetooth address.



*AudioAgent UART Settings on Hercules*

# First Commands

A few basic AudioAgent use cases are below to get you started. More details and explanation are later in the manual.

The RESET command resets the module. The response will be the prompt at power ON

```
RESET
IOT747 Copyright 2022
AudioAgent V1.99.1
Build: 1640941125
Bluetooth address 245DFC010203
Ready
PAIR_PENDING
```

The STATUS command gives the status of the module and whether it is connected to a device or not.

```
STATUS
STATE CONNECTABLE DISCOVERABLE ADVERTISING
OK
```

The HELP command lists the commands available by the module. Please note that some commands are only available for certain modules. Below is just an example and you might not have all these commands available on your module.

```
HELP
ADVERTISING
AT
AVRCP_META_DATA
BATTERY_STATUS
CLOSE
...
UNPAIR
VERSION
VOLUME
WRITE
OK
```

The CONFIG command displays the configuration settings of the module. Please note that some configurations are only available for certain modules. Below is an example and you might not have all the configurations below on your module.

```
CONFIG
AUDIO=0
AUDIO_ANALOG=44100 15 10 ON OFF
AUDIO_DIGITAL=0 44100 64 100A00
AUTOCNN=0
...
BATT_CONFIG=OFF 145 4250 1500 150
IOT_SMART_UUIDS=68E3 28F0 89F7 D93C
UART_CONFIG=9600 OFF 0
OK
```

The RESTORE command resets and restores the module to factory configuration settings.

#### RESTORE

IOT747 Copyright 2021

AudioAgent V1.0.16

Build: 1626985247

Ready

# General Operation

In most cases, AudioAgent will be ready to receive commands over the UART interface.

- 1) **Commands:** The host can send commands over the UART. AudioAgent will answer with a Notification. Please see the [Command](#) section for the list of commands that AudioAgent supports.
- 2) **Notifications:** When a command was issued or when there is activity over the Bluetooth Link (such as a Bluetooth connection, disconnection, etc.), AudioAgent will send a Notification over the UART. The Notifications are to notify the host of the activity or respond to the command. Please see the [Notification](#) section for the list of Notifications that can be received over UART.
- 3) **Configurations:** AudioAgent comes with Configuration parameters that affect the behaviour of the module given different circumstances or to enable/disable certain features. Please see the [Configuration](#) section for the list of the Configurations that AudioAgent supports.

# Link ID Management

Since AudioAgent allows to connect multiple profiles to multiple devices, it needs to identify particular profiles/links for some commands. This is done by Links. A Link ID is an 8-bit hexadecimal value 0xAB. In most cases, the first digit identifies a device and the second digit refers to a profile as described in the tables below.

Device field values

Device A	Description
0	Reserved values
1	Device 1
2	Device 2
3	Device 3

Profile field values

Profile (B)	Description
0	Advanced Audio Distribution Profile (A2DP)
1	Audio/Video Remote Control Profile (AVRCP)
2	Hands-Free Profile (AGHFP), audio gateway
3	Hands-Free Profile (HFP), hand-free device
4	Bluetooth Low Energy (BLE)

Example:

In the example below, we have connected a mobile phone to the module. We send the command STATUS and we receive a response over UART. It is connected to 1 Device with three profiles LINK10, LINK11 and LINK13. These are A2DP, AVRCP and HFP profiles.

## STATUS

```
STATE CONNECTED IDLE
LINK 10 CONNECTED A2DP 3CCD36230455 SBC SNK 44100
LINK 11 CONNECTED AVRCP 3CCD36230455 STOPPED
LINK 13 CONNECTED HFP 3CCD36230455 NB
OK
```

Please note that the Bluetooth Low Energy (LINK 14 or LINK 24) is considered a different device. So if you have one mobile phone connected over Bluetooth Low Energy and Classic Bluetooth (For example A2DP, AVRCP and HFP like the example above), it will appear as LINK10,11,13 and LINK 24 (for Bluetooth Low Energy).

# AudioAgent Commands

AudioAgent can be used and controlled from the host system by sending ASCII commands through the UART interface of the module.

This section explains the AudioAgent commands and their syntax. Some simple use cases and tips are also given.

The generic syntax for commands is:

COMMAND <parameter\_1> <parameter\_2> ... <parameter\_n>\r

with a space between each parameter and a Carriage Return ('r' or 0x0D) at the end of each command. The different commands to control the Bluetooth link are listed in alphabetical order below. Mandatory parameters are listed in “( )” optional parameters are listed in “[ ]”.

The maximum length for a command is 150 characters, if a command larger than this is provided, AudioAgent will return an error.

Please note that:

- The parser is case sensitive so the commands are in capital letters
- Commands must end with a Carriage Return ('\r' or 0x0D)
- AudioAgent prints OK to indicate that the command has been executed

[Table1](#) below lists all the available commands and a general description of each command.

[Table2](#) describes each command in details with examples.

**Table 1: List of Commands**

Command	General Description
<a href="#"><u>ADVERTISING</u></a>	Starts/Stops Advertising (BLE)
<a href="#"><u>CALL</u></a>	Manages Voice Call
<a href="#"><u>CLOSE</u></a>	Connection Close Request
<a href="#"><u>CONFIG</u></a>	Shows Configuration registers
<a href="#"><u>DISCOVERABLE</u></a>	Starts/Stops Pairing Mode (Classic Bluetooth).
<a href="#"><u>HELP</u></a>	Shows List of Commands (LC)
<a href="#"><u>GET</u></a>	Shows the value of a config parameter
<a href="#"><u>LIST</u></a>	Shows List of Paired Devices (LPD)
<a href="#"><u>MUSIC</u></a>	Controls the Music Stream
<a href="#"><u>OPEN</u></a>	Connection Open Request
<a href="#"><u>PAIR</u></a>	Pair Request
<a href="#"><u>POWER</u></a>	Power ON/OFF module
<a href="#"><u>RESET</u></a>	Resets module
<a href="#"><u>RESTORE</u></a>	Restores Default Configuration parameters
<a href="#"><u>SEND</u></a>	Sends Data
<a href="#"><u>SET</u></a>	Sets configuration parameter.
<a href="#"><u>STATUS</u></a>	Returns the Bluetooth state of the device
<a href="#"><u>UNPAIR</u></a>	Removes Devices from Pairing List (LPD)
<a href="#"><u>VOLUME</u></a>	Controls Volume
<a href="#"><u>VERSION</u></a>	Shows Firmware Version
<a href="#"><u>WRITE</u></a>	Store Configurations.in Permanent Memory



Table 2: Detailed Description and Example of Commands

Command	Description
ADVERTISING	Starts/Stops Advertising (BLE) <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Starts/Stops BLE Advertising</p> <p><b>Syntax:</b> ADVERTISING &lt;action&gt;</p> <p><b>Response:</b> OK</p> <p><b>Parameter(s):</b>            &lt;action&gt;:</p> <ul style="list-style-type: none"> <li>• ON – Enable Advertising</li> <li>• OFF-Disable Advertising</li> </ul> <p><b>Example(s):</b>            ADVERTISING ON            OK            ADVERTISING OFF            OK</p>	
CALL	Manages Voice Call
<p><b>Description:</b> Manages Voice Call</p> <p><b>Syntax:</b> CALL &lt;link_id&gt; &lt;action&gt;</p> <p><b>Response:</b> OK.</p> <p><b>Parameter(s):</b>            &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>• 8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>• ALL (will disconnect all connections)</li> </ul> <p>&lt;action&gt;:</p> <ul style="list-style-type: none"> <li>• ANSWER – Accept Incoming call</li> <li>• REJECT – Reject Incoming call</li> <li>• END – Terminate Call</li> </ul> <p><b>Example(s):</b>            CALL INCOMING 13            CALL 13 ANSWER            OK            CALL_ACTIVE 13            SCO_OPEN 13            CALL 13 END            OK            SCO_CLOSE 13            CALL_END 13</p>	

Command	Description	
CLOSE	Connection Close Request	<a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Sends a connection close request to a link (specific profile for a specific device)</p> <p><b>Syntax:</b> CLOSE &lt;link_id&gt; OR ALL</p> <p><b>Response:</b> OK followed by a CLOSE_OK for every successful disconnection.</p> <p>Parameter(s):</p> <p>&lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>ALL (will disconnect all connections)</li> </ul> <p><b>Example(s):</b></p> <pre> STATUS STATE CONNECTABLE OFF LINK 10 CONNECTED A2DP 3CCD36230455 LINK 11 CONNECTED AVRCP 3CCD36230455 LINK 24 CONNECTED BLE 675DDBA8F833 OK CLOSE 24 OK CLOSE_OK 24 BLE STATUS STATE CONNECTABLE ADVERTISING LINK 10 CONNECTED A2DP 3CCD36230455 LINK 11 CONNECTED AVRCP 3CCD36230455 OK </pre>		
CONFIG	Shows Configuration registers	<a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Shows all configuration registers</p> <p><b>Syntax:</b> CONFIG</p> <p><b>Response:</b> &lt;config_name&gt;=&lt;config_value&gt;</p> <pre> .... OK </pre> <p><b>Example(s):</b></p> <pre> CONFIG LOCAL_ADDR=245DFC010209 NAME=AA-010209 OK </pre> <p>Note: This is an example. Latest version of AudioAgent might have more configuration parameters. See the <a href="#">Configuration</a> section for all configuration parameters available.</p>		
DISCOVERABLE	Starts/Stops Pairing Mode	<a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Starts/Stops Bluetooth Pairing Mode (Classic Bluetooth)</p>		

Command	Description	
<p><b>Syntax:</b> DISCOVERABLE &lt;action&gt;</p> <p><b>Response:</b> OK</p> <p>Parameter(s): &lt;action&gt;:</p> <ul style="list-style-type: none"><li>• ON – Enable Pairing</li><li>• OFF - Disable Pairing</li></ul>		
HELP	Shows List of Commands (LC)	<a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Shows all commands available</p> <p><b>Syntax:</b> HELP</p> <p><b>Response:</b> &lt;command&gt; ... OK</p> <p><b>Example(s):</b> HELP ADVERTISING AT CLOSE CONFIG DISCOVERABLE HELP GET LIST MUSIC NAME OPEN PAIR POWER RESET RESTORE SET SEND STATUS UNPAIR VERSION VOLUME WRITE</p> <p>Note: This is an example. Latest version of AudioAgent might have more or less commands. See the Command section for all commands available.</p>		
GET	Shows the value of a config parameter	<a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Shows the value of a specific config parameter</p>		

Command	Description
<p><b>Syntax:</b> GET &lt;config_name&gt;</p> <p><b>Response:</b> &lt;config_name&gt;=&lt;config_value&gt; OK</p> <p>Parameter(s): &lt;config_name&gt;:</p> <ul style="list-style-type: none"> <li>• ASCII string (<a href="#">See Configuration</a>)</li> <li>• ALL (will disconnect all connections)</li> </ul> <p><b>Example(s):</b>  GET NAME  NAME=AA-010209  GET LOCAL_ADDR  LOCAL_ADDR=245DFC010209</p>	
LIST	Shows List of Paired Devices (LPD) <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Shows List of Paired Devices (LPD)</p> <p><b>Syntax:</b> LIST</p> <p><b>Response:</b> LIST &lt;bt_addr&gt; [profile_1] ... [profile_n] ... OK</p> <p><b>Note:</b> The profile listed are the profiles supported by the Paired devices</p> <p><b>Example(s):</b>  LIST  LIST 3CCD36230455 HFP A2DP AVRCP  LIST 887598BA1A7D HFP A2DP AVRCP  OK</p>	
MUSIC	Controls the Music Stream <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Controls the Bluetooth Music Stream</p> <p><b>Syntax:</b> MUSIC &lt;link_id&gt; &lt;action&gt;</p> <p><b>Response:</b> OK</p> <p>Notes: The Response can be followed by a notification if the music state changed (ex: A2DP_STREAM_START 10, AVRCP_PLAY 11)</p> <p>Parameter(s): &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>• 8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>• Must be a &lt;link_id&gt; for an A2DP or AVRCP profile (ex: 10, 20)</li> </ul>	

Command	Description
<p>&lt;action&gt;:</p> <ul style="list-style-type: none"> <li>PLAY</li> <li>PAUSE</li> <li>STOP</li> <li>FORWARD</li> <li>BACKWARD</li> <li>FF_PRESS</li> <li>FF_RELEASE</li> <li>REW_PRESS</li> <li>REW_RELEASE</li> </ul> <p><b>Example(s):</b>  MUSIC 10 PLAY  OK  A2DP_STREAM_START 10  AVRCP_PLAY 11  MUSIC 10 PAUSE  OK  AVRCP_PAUSE 11  A2DP_STREAM_SUSPEND 10  MUSIC 11 PLAY  OK  AVRCP_PLAY 11  A2DP_STREAM_START 10  MUSIC 11 PAUSE  OK  AVRCP_PAUSE 11  A2DP_STREAM_SUSPEND 10</p>	
OPEN	Connection Open Request <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Sends a connection open request to a link (specific profile for a specific device)</p> <p><b>Syntax:</b> OPEN &lt;bt_addr&gt; &lt;profile&gt;</p> <p><b>Note:</b> The OPEN request will succeed only if the device with bt_addr is connectable and previously paired (i.e. in the list of Paired Devices (LPD)). If the device is not in the pairing list, the module will attempt to Pair and the device should be in Discoverable (or Pairing) mode. Also, sometimes, if you initiate an A2DP connection request, the remote device will automatically initiate an AVRCP connection request. So you will end up with both A2DP and AVRCP connections.</p> <p>Response: PENDING (OPEN_OK notification or OPEN_ERROR notification)</p> <p>Parameter(s):  &lt;bd_addr&gt;: Bluetooth Address of the device to connect to</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul> <p><b>Example(s):</b>  LIST  LIST 887598BA1A7D HFP A2DP AVRCP  LIST 3CCD36230455 HFP A2DP AVRCP</p>	

Command	Description
OK OPEN 3CCD36230455 AVRCP PENDING OPEN_OK 11 AVRCP STATUS STATE CONNECTABLE ADVERTISING LINK 11 CONNECTED AVRCP 3CCD36230455 OK	
PAIR	Pair Request <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Sends a pair request to a specific device (or Bluetooth Address).</p> <p><b>Syntax:</b> PAIR &lt;bd_addr&gt;</p> <p><b>Response:</b> PAIR PENDING (PAIR_OK notification or PAIR_ERROR notification)</p> <p>Parameter(s):            &lt;bd_addr&gt;: Bluetooth Address of the device to connect to</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul> <p><b>Example(s):</b>            PAIR 3CCD36230455            PENDING            PAIR_OK 3CCD36230455            LIST            LIST 3CCD36230455 HFP A2DP AVRCP            OK</p>	
POWER	Power ON/OFF module <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Powers ON/OFF Bluetooth Module.</p> <p><b>Syntax:</b> POWER &lt;action&gt;</p> <p>Response: OK</p> <p>Parameter(s):            &lt;action &gt;:</p> <ul style="list-style-type: none"> <li>ON or OFF</li> </ul> <p><b>Example(s):</b>            POWER OFF            OK            STATUS            STATE OFF OFF            OK            POWER ON            OK            STATUS            STATE CONNECTABLE ADVERTISING            OK</p>	

Command	Description
RESET	Resets module <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Resets module</p> <p><b>Syntax:</b> RESET</p> <p><b>Response:</b> Reset followed by boot-up Prompt</p> <p><b>Notes:</b> A RESET will close all Bluetooth connection and any configuration parameters that were not saved with the WRITE command will be lost.</p> <p><b>Example(s):</b></p> <pre>RESET IOT747 Copyright 2022 AudioAgent V1.99.2 Build: 1638377096 Bluetooth address 245DFC010209 Ready</pre>	
RESTORE	Restores Default Config parameters <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Resets module and Restores default configuration parameters.</p> <p><b>Syntax:</b> RESTORE</p> <p><b>Response:</b> Reset followed by boot-up Prompt</p> <p><b>Notes:</b> A RESTORE will delete all current configuration parameters and restore factory setting. For example, the Bluetooth device name will be restored to AA-XXXXXX where XXXXXX are the last hex values of the Bluetooth Address. A RESTORE command will not erase the List of Paired Devices (LPD). the command UNPAIR needs to be used for that.</p> <p><b>Example(s):</b></p> <pre>RESTORE IOT747 Copyright 2022 AudioAgent V1.99.2 Build: 1638377096 Bluetooth address 245DFC010209 Ready GET NAME NAME=AA-010209</pre>	
SCAN	Scans for BLE Device <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Searches for BLE Devices in the area</p> <p><b>Syntax:</b> SCAN &lt;time&gt; [&lt;format&gt;]</p> <p><b>Response:</b></p> <pre>PENDING SCAN &lt;bd_addr&gt; &lt;type&gt; &lt;name&gt;&lt;flags&gt;&lt;rssi&gt; Or SCAN_RAW &lt;bd_addr&gt;&lt;type&gt;&lt;rssi&gt;&lt;size&gt;&lt;data&gt; ... SCAN_OK</pre>	

Command	Description
	<p><b>Notes:</b> SCAN is only used for BLE. For Classic, you should use INQUIRY command. When using SCAN, the same device might appear several times. The response will be SCAN or SCAN_RAW depending on the format.</p> <p><b>Parameter(s):</b></p> <p>&lt;timeout&gt;: Scan duration in seconds</p> <ul style="list-style-type: none"> <li>Range: 0-255</li> <li>0-No timeout (will only stop with a RESET or another SCAN command)</li> </ul> <p>&lt;format&gt;:</p> <ul style="list-style-type: none"> <li>ON-SCAN_RAW format</li> <li>OFF-(Default) SCAN notifications</li> </ul> <p>&lt;bd_addr&gt;: Bluetooth Address of the device to remove form the pairing list</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul> <p>&lt;type&gt;: Address type</p> <ul style="list-style-type: none"> <li>0-Public</li> <li>1-Private</li> </ul> <p>&lt;name&gt;: Device Name</p> <ul style="list-style-type: none"> <li>ASCII value between &lt;&gt;. Example &lt;AA-1234&gt; or &lt;UNKNOWN&gt; if not reported</li> </ul> <p>&lt;flag&gt;: Advertising flags as define in Bluetooth Specs</p> <ul style="list-style-type: none"> <li>Hex value</li> </ul> <p>&lt;rssI&gt;: Signal strength in dBm</p> <ul style="list-style-type: none"> <li>ASCII string (ex: -58dBm)</li> </ul> <p><b>Example(s):</b> TBD</p>
SEND	<p>Sends Data</p> <p><a href="#">Back to Table1: List of Commands</a></p>
	<p><b>Description:</b> Sends Data (characters) to the BLE Link.</p> <p><b>Syntax:</b> SEND &lt;link_id&gt; &lt;string&gt; Response: OK</p> <p><b>Notes:</b> SEND can be used to send any Data to another BLE device. For example, it can be used with an iOS and Android App to send data back and forth with the module. Please refer to IOT747 Scanner Sample Apps on Google Play or Apple Store.</p> <p><b>Parameter(s):</b></p> <p>&lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Must be a &lt;link_id&gt; for a BLE profile (ex: 14, 22)</li> </ul> <p>&lt;string&gt;:</p> <ul style="list-style-type: none"> <li>String of characters (max: 80 bytes)</li> </ul> <p><b>Example(s):</b> STATUS STATE CONNECTABLE OFF LINK 14 CONNECTED BLE 6E1358D7188B OK</p>



Command	Description
SEND 14 Hello OK	
SET	Sets configuration parameter <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Sets the value of a specific config parameter</p> <p><b>Syntax:</b> SET &lt;config_name&gt;</p> <p><b>Response:</b> OK</p> <p><b>Notes:</b> This sets the configuration parameter in RAM. To avoid it being deleted at the next RESET, you should use the WRITE command to store in in Flash.</p> <p>Parameter(s): &lt;config_name&gt;:</p> <ul style="list-style-type: none"> <li>• ASCII string (<a href="#">See Configuration</a>)</li> </ul> <p><b>Example(s):</b> GET NAME NAME=AA-010203 OK SET NAME=SPKR2 OK GET NAME NAME=SPKR2 OK WRITE OK</p>	
STATUS	Returns the State of the device <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Shows Bluetooth State and lists module active connections</p> <p><b>Syntax:</b> STATUS</p> <p><b>Response:</b> STATE CONNECTABLE [&lt;state&gt;] DISCOVERABLE [&lt;state&gt;] ADVERTISING [&lt;state&gt;] LINK &lt;link_id&gt; &lt;profile&gt; &lt;bd_addr&gt; &lt;profile_info&gt; ... OK</p> <p>&lt;state&gt;:</p> <ul style="list-style-type: none"> <li>• ON-Connectable, Discoverable or Advertising</li> <li>• OFF- Not Connectable, Discoverable or Advertising</li> </ul> <p>&lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>• 8-bit hex value (<a href="#">See Link ID Management</a>)</li> </ul> <p>&lt;profile&gt;:</p> <ul style="list-style-type: none"> <li>• A2DP, AVRCP, AGHFP, HFP, BLE</li> </ul> <p>&lt;bd_addr&gt;: Bluetooth Address of the device to remove form the pairing list</p> <ul style="list-style-type: none"> <li>• 12 hex value (e: 245DFC010209)</li> </ul> <p>&lt;profile_info&gt;: Information about the profile</p>	

Command	Description
	<ul style="list-style-type: none"> <li>For A2DP: &lt;streaming&gt; &lt;codec&gt; &lt;role&gt; &lt;sample rate&gt;</li> <li>&lt;streaming&gt;: SUSPENDED, STREAMING</li> <li>&lt;codec&gt;: SBC, AAC, APTX, APTX-HD, APTX-LL</li> <li>&lt;role&gt;: SNK (A2DP Sink), SRC (A2DP Source)</li> <li>&lt;sample_rat&gt;: Sampling rate in Hz</li> <li>For AVRCP &lt;status&gt;</li> <li>&lt;status&gt;: STOPPED, PLAYING, PAUSED</li> <li>For BLE &lt;mtu&gt;</li> <li>&lt;mtu&gt; - Size in bytes of MTU negotiated</li> <li>For HFP &lt;call_state&gt; &lt;codec&gt;</li> <li>&lt;call_state&gt;: IDLE, OUTGOING, INCOMING, ACTIVE</li> <li>&lt;codec&gt; NB (Narrow Band), WB (Wide Band)</li> </ul> <p><b>Example(s):</b></p> <p><b>STATUS</b></p> <pre>STATE CONNECTABLE[ON] DISCOVERABLE[IDLE] ADVERTISING[OFF] LINK 10 CONNECTED A2DP 3CCD36230455 AAC SNK 44100 LINK 11 CONNECTED AVRCP 3CCD36230455 PAUSED LINK 24 CONNECTED BLE 7E33C0AB936D 80 OK OK</pre>
UNPAIR	Deletes Device from Pairing List <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Deletes device from Pairing list</p> <p><b>Syntax:</b> UNPAIR [bd_addr]</p> <p><b>Notes:</b> UNPAIR without any parameters deletes the complete List of Paired Devices (LPD). If you UNPAIR from the module but not from the other device (ex: phone). You won't be able to Repair with that device. You have to remove the module (or forget on iOS) from the other device also.</p> <p><b>Response:</b> OK</p> <p>Parameter(s):</p> <p>&lt;bd_addr&gt;: Bluetooth Address of the device to remove form the pairing list</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul> <p><b>Example(s):</b></p> <p><b>LIST</b></p> <pre>LIST 3CCD36230455 HFP A2DP AVRCP LIST 887598BA1A7D HFP A2DP AVRCP OK UNPAIR 3CCD36230455 OK LIST LIST 887598BA1A7D HFP A2DP AVRCP OK</pre>	
VOLUME	Controls Volume <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Sets or Gets the current volume from the Link_ID.</p> <p><b>Syntax:</b> VOLUME [&lt;link_id&gt;] [&lt;value&gt;]</p>	

Command	Description
<p><b>Response:</b> OK</p> <p><b>Notes:</b> VOLUME without parameters will return the current volume of all active Links. VOLUME &lt;link_id&gt;. Without a value will return the Volume of that Link. VOLUME with a value sets the Volume value. When a value is set for volume, it will be rounded to fit in the steps (steps of 16 in the case of A2DP).</p> <p>Parameter(s):</p> <p>&lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Must be a &lt;link_id&gt; for a BLE profile (ex: 14, 22)</li> </ul> <p>&lt;value&gt;:</p> <ul style="list-style-type: none"> <li>UP (Volume will increase by 16)</li> <li>DOWN (Volume will decrease by 16)</li> <li>Hex value between 0 and 127 in steps of 16</li> </ul> <p><b>Example(s):</b></p> <pre>VOLUME 10 A2DP 60 OK VOLUME 10 UP OK ABS_VOL 11 104 VOLUME 10 A2DP 68 OK VOLUME 10 6 OK ABS_VOL 11 8</pre>	
VERSION	Shows Firmware Version <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Gives information on firmware VERSION</p> <p><b>Syntax:</b> VERSION</p> <p><b>Response:</b> IOT747 Copyright xxxx AudioAgent Vx.xx.xx Build: xxxxxxxxx Bluetooth address &lt;bd_addr&gt;</p> <p><b>Example(s):</b></p> <pre>VERSION IOT747 Copyright 2022 AudioAgent V1.99.2 Build: 1638377096 Bluetooth address 245DFC010203 OK</pre>	
WRITE	Store Configurations in Flash <a href="#">Back to Table1: List of Commands</a>
<p><b>Description:</b> Saves all configuration values from RAM to Flash (Persistent Memory)</p> <p><b>Notes:</b> Please refer to the <a href="#">Configurations</a> section</p>	

Command	Description
	<p><b>Syntax:</b> WRITE</p> <p><b>Response:</b> OK</p> <p><b>Example(s):</b>  WRITE  OK</p>

# AudioAgent Configuration

The user can configure general parameters for the module. These parameters are stored in the RAM memory. If required, the parameters can be stored to Flash memory. When the module reboots, it will boot with the parameters that are saved to Flash memory.

There are 4 main commands to configure parameters. The commands to modify configuration parameters are described below. The generic syntax for the configuration parameters are:

SET CONFIGURATION=<parameter\_1> <parameter\_2> ... <parameter\_n>\r

with a space between each parameter and a Carriage Return ('r' or 0x0D) at the end of the SET command for example. Mandatory parameters are listed in "( )" optional parameters are listed in "[ ]".

## General Configuration Commands

Command	Description
<a href="#">CONFIG</a>	Shows all configuration registers.
<a href="#">GET</a>	Reads the value of a config parameter.
<a href="#">RESTORE</a>	Restore the Configuration parameters to factory settings
<a href="#">SET</a>	Sets a new value to a configuration parameter.
<a href="#">WRITE</a>	Store configurations.in Flash (Permanent Memory).

Note: If the module boots up with the VOLUME-UP button pushed (PIO\_3 HIGH on the IDC747 module), the factory default configurations are reset. This allows reverting to a known and working configuration state if severe problems are encountered.

Note that once modified, many configuration parameters will not take effect before a reboot: They need to be stored to Flash before rebooting with the WRITE command.

[Table3](#) below lists all the available commands and a general description of each command.

[Table4](#) describes each configuration parameter in details with examples.

**Table 3: List of Configuration Parameters**

Configuration Parameter	General Description
<a href="#">AUDIO</a>	Selects the Audio interface
<a href="#">AUDIO_DIGITAL</a>	Digital Audio Interface Settings
<a href="#">AUTOCONN</a>	Auto-Connection Feature
<a href="#">BT_STATE_CONFIG</a>	Bluetooth State at Boot-Up
<a href="#">LOCAL_ADDR</a>	Bluetooth Address of Device (Read Only)
<a href="#">NAME</a>	Bluetooth Name of Device
<a href="#">NAME_SHORT</a>	Bluetooth Low Energy Name of Device
<a href="#">PROFILES</a>	Bluetooth Profiles Enabled
<a href="#">UART_CONFIG</a>	UART Interface Settings

Table 4: Detailed Description of Configurations

Configuration	Description
AUDIO	Selects the Audio Interface
<p><b>Description:</b> Selects which Audio Interface to use (Analog or Digital)</p> <p><b>Syntax:</b> AUDIO=&lt;input&gt; [&lt;output&gt;]</p> <p><b>Note(s):</b> If the optional parameter is not used, the output is the same as the input. Please refer to the module schematics to locate the Audio digital output Pins</p> <p>Default: AUDIO=0 0</p> <p>Parameter(s):</p> <p>&lt;input&gt;: (Audio Input Interface)</p> <ul style="list-style-type: none"> <li>• 0-Analog</li> <li>• 1-Digital</li> </ul> <p>&lt;output&gt;: (Audio Input Interface)</p> <ul style="list-style-type: none"> <li>• 0-Analog</li> <li>• 1-Digital</li> </ul> <p><b>Reboot:</b> Not Required</p>	
AUDIO_DIGITAL	Digital Audio Interface Settings
<p><b>Description:</b> Configure the Digital Audio Interface Settings</p> <p><b>Syntax:</b> AUDIO_DIGITAL=&lt;format&gt;&lt;rate&gt;&lt;param1&gt;param2&gt;[param3]</p> <p><b>Note(s):</b></p> <p>-This parameter is only taken in consideration if <a href="#">AUDIO=1</a> (a Digital Interface is selected)</p> <p><b>Default:</b> AUDIO_DIGITAL=0 44100 64 011001</p> <p>Parameter(s):</p> <p>&lt;format&gt;: (Digital format)</p> <ul style="list-style-type: none"> <li>• 0-I2S</li> </ul> <p>&lt;rate&gt;: (Digital sampling rate in Hertz -Samples/Second)</p> <ul style="list-style-type: none"> <li>• 44100 or 48000</li> </ul> <p>&lt;format&gt;: (Digital format)</p> <ul style="list-style-type: none"> <li>• 0-I2S</li> </ul> <p>&lt;rate&gt;: (Digital sampling rate in Hertz -Samples/Second)</p> <ul style="list-style-type: none"> <li>• 44100 or 48000</li> </ul> <p>&lt;param1&gt;: (rate parameter – depends on Digital format)</p> <ul style="list-style-type: none"> <li>• For I2S: Bit Clock (BCLK) scaling factor – 64, 128 or 256</li> </ul>	

Configuration	Description												
<p>&lt;param2&gt;: (settings – depends on Digital format) - Four-byte (8 Hex) value</p> <ul style="list-style-type: none"><li>• For I2S:</li></ul> <table><tr><th>Bit Position</th><th>Description</th><th>Valid Values</th></tr><tr><td>First Byte</td><td>Master or Slave</td><td>00 or 01</td></tr><tr><td>Second Byte</td><td>Bits Per Sample in Hex</td><td>10, 14 or 18</td></tr><tr><td>Third Byte</td><td>Left Justify Bit Delay</td><td>0 or 1</td></tr></table> <p><b>Reboot:</b> Not Required</p>		Bit Position	Description	Valid Values	First Byte	Master or Slave	00 or 01	Second Byte	Bits Per Sample in Hex	10, 14 or 18	Third Byte	Left Justify Bit Delay	0 or 1
Bit Position	Description	Valid Values											
First Byte	Master or Slave	00 or 01											
Second Byte	Bits Per Sample in Hex	10, 14 or 18											
Third Byte	Left Justify Bit Delay	0 or 1											
AUTOCONN	Auto-Connection Feature												
<p><b>Description:</b> Enables/Disables the Auto-Connection at Boot-Up</p> <p><b>Syntax:</b> AUTOCONN=&lt;type&gt; [&lt;max_rec&gt;] [&lt;remote_addr&gt;]</p> <p><b>Note(s):</b> If type=1, the module will try to reconnect to all devices on the PDL starting by the last one that was Paired (most recent device paired). Also, as it tries to re-connect, it will not be Discoverable/Connectable to by other devices. So if you boot the module with AUTOCONN enabled, you might not be able to connect to it for the time while it tries to Autoconnect (even if you have already paired with it).</p> <p><b>Default:</b> AUTOCONN=0 3 000000000000</p> <p>Parameter(s):</p> <p>&lt;type&gt;: (Auto-Connection Feature)</p> <ul style="list-style-type: none"><li>• 0—OFF. Auto-connection disabled.</li><li>• 1—Auto-connect to all devices in the Paired Device List (PDL)</li><li>• 2—Auto-connect to specific remote address</li></ul> <p>&lt;max_rec&gt; (Max number of attempts it will try to connect with each device in the PDL)</p> <ul style="list-style-type: none"><li>• Decimal value – 0 to 7</li></ul> <p>&lt;remote_addr&gt; (Specific remote Bluetooth address it will reconnect to)</p> <ul style="list-style-type: none"><li>• 12 hex value (e: 245DFC010209)</li></ul> <p><b>Reboot:</b> Required – Needs to be saved with WRITE command before RESET to take place next boot-up</p>													
BLE_CONFIG	BLE configuration												
<p><b>Description:</b> Sets Default Bluetooth Low Energy configuration</p> <p><b>Syntax:</b> BLE_CONFIG=&lt;connectable &gt; &lt;auto&gt; &lt;mtu&gt; &lt;private&gt;</p> <p><b>Default:</b> BLE_CONFIG =0 OFF 80 ON</p> <p><b>Parameter(s):</b></p> <p>&lt;connectable&gt;: (Allows other devies to connect)</p> <ul style="list-style-type: none"><li>• 1—ON (Default) connectable</li></ul>													



Configuration	Description
<ul style="list-style-type: none"> <li>0—OFF. Not connectable</li> </ul> <p>&lt;auto&gt;: (Enables Auto_Advertising)</p> <ul style="list-style-type: none"> <li>0—OFF. Disabled</li> <li>1—Generates a random address at boot-up</li> </ul> <p>&lt;mtu&gt;: (Maximum unit size in bytes used for GATT exchanges)</p> <ul style="list-style-type: none"> <li>Range: 23-158</li> <li>STATUS will give the negotiated mtu over the link</li> </ul> <p>&lt;private&gt;: (Enables BLE private address)</p> <ul style="list-style-type: none"> <li>ON-(Default)-Enabled</li> <li>OFF-Disabled</li> </ul>	
BT_STATE_CONFIG	Bluetooth State at Boot-Up
<p><b>Description:</b> Sets Default Bluetooth state at boot-up and after Connection/Disconnection</p> <p><b>Syntax:</b> BT_STATE_CONFIG=&lt;connectable&gt; &lt;discoverable&gt; &lt;advertising&gt;</p> <p><b>Note(s):</b> Being connectable/discoverable and advertising takes Radio bandwidth and power. So if there are multiple connection and advertising/discoverable are ON, the Audio channel might be affected.</p> <p><b>Default:</b> BT_STATE_CONFIG=2 2 2</p> <p><b>Parameter(s):</b></p> <p>&lt;connectable&gt;: (Allows other devices to connect)</p> <ul style="list-style-type: none"> <li>0—OFF. Not connectable at boot-up</li> <li>1—Always connectable</li> <li>2—Connectable at boot-up</li> </ul> <p>&lt;discoverable&gt;: (Allows other device to pair)</p> <ul style="list-style-type: none"> <li>0—OFF. Not discoverable at boot-up</li> <li>1—Always discoverable</li> <li>2—Discoverable at boot-up</li> </ul> <p>&lt;advertising&gt;: (Advertising Bluetooth low Energy)</p> <ul style="list-style-type: none"> <li>0—OFF. Not advertising at boot-up</li> <li>1—Always Advertising</li> <li>2—Advertising at boot-up</li> </ul> <p><b>Reboot:</b> Required – Needs to be saved with WRITE command before RESET to take place next boot-up</p>	
LOCAL_ADDR	Bluetooth Address of Device (Read Only)
<p><b>Description:</b> Local Device Bluetooth Address</p> <p><b>Syntax:</b> LOCAL_ADDR=&lt;bd_addr&gt;</p> <p><b>Note(s):</b> The Bluetooth Address is Unique for each module and is a read only parameter. The host cannot change it.</p>	

Configuration	Description
<p><b>Default:</b> Not Applicable. On some modules, the Bluetooth Address is printed on a label that is placed on the module under the heading MAC-ID along with other module inform such as Build number.</p> <p>Parameter(s):</p> <p>&lt;bd_addr&gt; (Local Bluetooth address)</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul>	
NAME	Shows List of Paired Devices (LPD)
<p><b>Description:</b> Bluetooth Friendly Name of Device</p> <p><b>Syntax:</b> NAME=&lt;name&gt;</p> <p><b>Default:</b> AA-XXXXXX (Where XXXXXX are the last digits of <a href="#">LOCAL_ADDR</a>).</p> <p>Parameter(s):</p> <p>&lt;namer&gt; (Device Bluetooth Friendly Name)</p> <ul style="list-style-type: none"> <li>String of characters. Max: 16 characters.</li> </ul> <p><b>Reboot:</b> Required</p>	
NAME_SHORT	Bluetooth Low Energy Name of Device
<p><b>Description:</b> Bluetooth Low Energy Short Friendly Name of Device</p> <p><b>Syntax:</b> NAME_SHORT=&lt;name_short&gt;</p> <p><b>Default:</b> LE-AA-XXXXXX (Where XXXXXX are the last digits of <a href="#">LOCAL_ADDR</a>).</p> <p>Parameter(s):</p> <p>&lt;name_short&gt; (Device Bluetooth Low Energy Short Friendly Name)</p> <ul style="list-style-type: none"> <li>String of characters. Max: 16 characters.</li> </ul> <p><b>Reboot:</b> Required</p>	
PROFILES	Bluetooth Profiles Enabled
<p><b>Description:</b> Bluetooth Profiles Enabled</p> <p><b>Syntax:</b> PROFILES=&lt;hfp&gt;&lt;aghfp&gt;&lt;a2dp_snk&gt;&lt;a2dp_src&gt;&lt;avrcp&gt;&lt;ble&gt;</p> <p><b>Default:</b> PROFILES=1 0 1 0 1 1</p> <p>Parameter(s):</p> <p>&lt;hfp&gt; Max number of HFP Profiles allowed to be connected simultaneously</p> <ul style="list-style-type: none"> <li>0 or 1</li> </ul> <p>&lt;aghfp&gt; Max number of HFP-AG Profiles allowed to be connected simultaneously</p> <ul style="list-style-type: none"> <li>0</li> </ul> <p>&lt;a2dp_snk&gt; Max number of A2DP SINK Profiles allowed to be connected simultaneously</p> <ul style="list-style-type: none"> <li>0 or 1</li> </ul>	

Configuration	Description
	<p>&lt;a2dp_src&gt; Max number of A2DP SOURCE HFP Profiles allowed to be connected simultaneously</p> <ul style="list-style-type: none"> <li>• 0 or 1</li> </ul> <p>&lt;avrcp&gt; Max number of AVRCP Profiles allowed to be connected simultaneously</p> <ul style="list-style-type: none"> <li>• 0 or 1</li> </ul> <p>&lt;ble&gt; Max number of BLE connections simultaneously</p> <ul style="list-style-type: none"> <li>• 0 or 1</li> </ul> <p><b>Reboot:</b> Required</p>
UART_CONFIG	UART Interface Settings
	<p><b>Description:</b> UART Interface Settings</p> <p><b>Syntax:</b> UART_CONFIG=&lt;baudrate&gt;&lt;flow_ctrl&gt;&lt;parity&gt;</p> <p><b>Default:</b> UART_CONFIG=9600 OFF 0</p> <p>Parameter(s):</p> <p>&lt;baudrate &gt; (UART Baud rate)</p> <ul style="list-style-type: none"> <li>• 9600,19200,38400,57600,115200,230400,460800,961200</li> </ul> <p>&lt;flow_ctrl &gt; (Hardware Flow Control)</p> <ul style="list-style-type: none"> <li>• OFF-Disabled</li> <li>• ON-Enabled</li> </ul> <p>&lt;parity &gt; (UART parity)</p> <ul style="list-style-type: none"> <li>• 0-None</li> <li>• 1-Odd parity</li> <li>• 2-Even</li> </ul> <p><b>Reboot:</b> Required for Flow Control</p>

# AudioAgent Notifications

AudioAgent sends Notifications over the UART to notify the Host of events happening in the Bluetooth Link.

The generic syntax for Notifications are:

<event> [<link\_id>] <parameters>

with a space between each parameter and a Carriage Return ('r' or 0x0D) at the end.S

Note: AudioAgent sends Responses to Commands over the UART as well. These are described for each Command in the Command section. We list here the Notifications that are not solicited.

[Table5](#) below lists all the possible notifications

[Table6](#) describes each notification in details.

**Table 5: List of Notifications**

Notification	General Description
<a href="#"><u>A2DP_STREAM_START</u></a>	A2DP Audio Stream Opened
<a href="#"><u>A2DP_STREAM_SUSPEND</u></a>	A2DP Audio Stream Suspended
<a href="#"><u>ABS_VOL</u></a>	AVCP Absolute Volume Change
<a href="#"><u>AVRCP_BACKWARD</u></a>	AVRCP Backward
<a href="#"><u>AVRCP_FORWARD</u></a>	AVRCP Forward
<a href="#"><u>AVRCP_PAUSE</u></a>	AVRCP Pause
<a href="#"><u>AVRCP_PLAY</u></a>	AVRCP Play
<a href="#"><u>AVRCP_STOP</u></a>	AVRCP STOP
<a href="#"><u>CLOSE_OK</u></a>	Close Connection Success
<a href="#"><u>ERROR</u></a>	Error
<a href="#"><u>OPEN_OK</u></a>	Open Connection Success
<a href="#"><u>PAIR_ERROR</u></a>	Pairing Error
<a href="#"><u>PAIR_OK</u></a>	Pairing Successful
<a href="#"><u>PAIR_PENDING</u></a>	Pairing in Progress
<a href="#"><u>RECV</u></a>	Received Data Over the BLE Link

**Table6: Detailed Description of Notifications**

Notification	General Description
A2DP_STREAM_START	A2DP Audio Stream Opened
<p><b>Description:</b> A2DP Audio Stream opened. This notification appears when the remote (or local) device has requested the state of the A2DP to change.</p> <p><b>Syntax:</b> A2DP_STREAM_START &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an A2DP profile (ex: 10, 20)</li> </ul>	
A2DP_STREAM_SUSPEND	A2DP Audio Stream Suspended
<p><b>Description:</b> A2DP Audio Stream suspended. This notification appears when the remote (or local) device has requested the state of the A2DP to change.</p> <p><b>Syntax:</b> A2DP_STREAM_SUSPEND &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an A2DP profile (ex: 10, 20)</li> </ul>	
ABS_VOL	AVRCP Absolute Volume Change
<p><b>Description:</b> The current Absolute Volume has been changed. This notification appears when the remote (or local) device has requested a volume change.</p> <p><b>Syntax:</b> ABS_VOL &lt;link_id&gt; &lt;volume&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul> <p>&lt;volume&gt;: (Absolute Volume)</p> <ul style="list-style-type: none"> <li>Decimal value between 0 and 127</li> </ul>	
AVRCP_BACKWARD	AVRCP Backward
<p><b>Description:</b> AVRCP Backward has been received from the remote device</p> <p><b>Syntax:</b> AVRCP_BACKWARDS &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> </ul>	

Notification	General Description
<ul style="list-style-type: none"> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul>	
AVRCP_FORWARD	AVRCP Forward
<p><b>Description:</b> AVRCP Forward has been received from the remote device</p> <p><b>Syntax:</b> AVRCP_FORWARD &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul>	
AVRCP_PAUSE	AVRCP Pause
<p><b>Description:</b> AVRCP Pause has been received from the remote device</p> <p><b>Syntax:</b> AVRCP_PAUSE &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul>	
AVRCP_PLAY	AVRCP Play
<p><b>Description:</b> AVRCP Play has been received from the remote device</p> <p><b>Syntax:</b> AVRCP_PLAY &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul>	
AVRCP_STOP	AVRCP STOP
<p><b>Description:</b> AVRCP Stop has been received from the remote device</p> <p><b>Syntax:</b> AVRCP_STOP &lt;link_id&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul>	
CLOSE_OK	Close Connection Success
<p><b>Description:</b> The connection of on the Link has been closed</p>	

Notification	General Description
<p><b>Syntax:</b> CLOSE_OK &lt;link_id&gt; &lt;profile&gt;</p> <p>Parameter(s):</p> <p>&lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul> <p>&lt;profile&gt;:</p> <ul style="list-style-type: none"> <li>A2DP, AVRCP, AGHFP, HFP, BLE</li> </ul>	
ERROR	Error
<p><b>Description:</b> An error has happened</p> <p><b>Syntax:</b> ERROR &lt;error_code&gt;</p> <p>Parameter(s):</p> <p>&lt;error_code&gt;:</p> <ul style="list-style-type: none"> <li>Refer to Error Codes Section</li> </ul>	
OPEN_OK	Open Connection Success
<p><b>Description:</b> The connection of on the Link has been closed</p> <p><b>Syntax:</b> OPEN_OK &lt;link_id&gt; &lt;profile&gt;&lt;bd_addr&gt;</p> <p>Parameter(s):</p> <p>&lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul> <p>&lt;profile&gt;:</p> <ul style="list-style-type: none"> <li>A2DP, AVRCP, AGHFP, HFP, BLE</li> </ul> <p>&lt;bd_addr&gt; (Local Bluetooth address)</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul>	
PAIR_ERROR	Pairing Error
<p><b>Description:</b> The Pairing with remote device has failed</p> <p><b>Syntax:</b> PAIR_ERROR &lt;bd_addr&gt;</p> <p>Parameter(s):</p> <p>&lt;bd_addr&gt; (Local Bluetooth address)</p> <ul style="list-style-type: none"> <li>12 hex value (e: 245DFC010209)</li> </ul>	
PAIR_OK	Pairing Successful



Notification	General Description
<p><b>Description:</b> The Pairing with remote device has succeeded</p> <p><b>Syntax:</b> PAIR_OK &lt;bd_addr&gt;  Parameter(s):  &lt;bd_addr&gt; (Local Bluetooth address)  12 hex value (e: 245DFC010209)</p>	
PAIR_PENDING	Pairing in Progress
<p><b>Description:</b> The Pairing process with remote device has started</p> <p><b>Syntax:</b> PAIR_PENDING  Parameter(s): None</p>	
RECV	Received Data Over the BLE Link
<p><b>Description:</b> Data has been received on the BLE Link</p> <p><b>Syntax:</b> RECV &lt;link_id&gt; &lt;size&gt;&lt;data&gt;  Parameter(s):  &lt;link_id&gt;:</p> <ul style="list-style-type: none"> <li>• 8-bit hex value (<a href="#">See Link ID Management</a>)</li> <li>• Will be a &lt;link_id&gt; from an AVRCP profile (ex: 11, 21)</li> </ul> <p>&lt;size&gt;: (Number of characters received)</p> <ul style="list-style-type: none"> <li>• Integer number</li> </ul> <p>&lt;data&gt;: (Received Data)</p> <ul style="list-style-type: none"> <li>• ASCII String</li> </ul>	

# Communication with Apps

The module can communicate with an Android and iOS App using Bluetooth Low Energy. The module exposes many services and characteristics used for different purposes (Device firmware upgrade, etc.). For simple Data Communications, the following Service is used.

AudioAgent Smart Service

UUID: 0xbc2f4cc6aaef43519034d66268e328f0

Characteristics (Write/Notify)

UUID: 0x06d1e5e779ad4a718faa373789f7d93c

For testing and demo purposes, Sample Apps are available for download on the Apple Store and Google Play.

For integration, Source code for the AppStore and GooglePlay Applications is available. Please refer to <https://www.iot747.com/software/> for the latest.

# Error codes

Error code	Description
0x0003	Unknown error

## Command Errors

Error code	Description
0x0011	Command not allowed with the current configuration
0x0012	Command not found
0x0013	Wrong parameter
0x0014	Wrong number of parameters
0x0015	Command not allowed in the current state
0x0016	Device already connected
0x0017	Device not connected
0x0018	Command is too long
0x0019	Name not found
0x001A	Configuration not found

## Warnings

Error code	Description
0x0100	Fail to read battery voltage
0x1003	Fail to configure cap sense
0x1004	Fail to register/unregister device
0x1005	BLE request failed
0xFF01	License key is missing
0xFF02	License key is invalid

## Critical Errors

Error code	Description
0xF00X	Critical error
0xF004	Wrong config

## Terms and definitions

Abbreviation	Description
A2DP	Advanced Audio Distribution Profile
AG	Audio Gateway
AVRCP	Audio/Video Remote Control Profile
BLE	Bluetooth Low Energy
cVc	Clear Voice Capture
DFU	Device Firmware Upgrade
HF	Hands-Free Unit
HFP	Hand-Free Profile
HID	Human Interface Device Profile
MAP	Message Access Profile
Multipoint	When more than one device is connected
PBAP	Phone Book Access Profile
PDL	Paired Device List
SPP	Serial Port Profile
TWS	True Wireless Speaker
WBS	Wide Band Speech