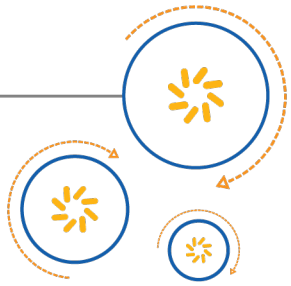
Qualcomm Technologies International, Ltd.



Audio Sink Application Custom AT Commands

User Guide

80-CT428-1 Rev. AE

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Revision history

Revision	Date	Description
1	MAY 2015	Initial release. Alternative document number CS-00330103-UG.
2	SEP 2016	Updated to conform to QTI standards; no technical content was changed in this document revision.
3	DEC 2017	Updates for ADK 6.0.
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AE	OCT 2017	Added to the Content Management System and DRN updated to use Agile number. N.o change to technical content

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1 Custom AT commands - overview

AT commands are used as part of the HFP specification to allow an HF device to exchange information with an AG device. The *Bluetooth HFP Specification* defines a list of standard AT commands that can be used to exchange information between two connected devices.

The HFP specification also allows for custom AT commands to be used to exchange non-standard HFP information. For example, custom AT commands can be used to indicate battery status updates over an HFP connection.

2 QTIL +MICTEST custom AT command

The +MICTEST custom AT command does not require any configuration as the source code to handle it is included in the default Audio Sink application project.

The `+MICTEST` custom AT command can be used for devices that support multiple microphones to individually test each microphone input.

NOTE An HFP connection with an ongoing active call must be present for this command to be actioned.

Command

The AG must send the `+MICTEST` command over the HFP connection to the HF device, the command requires no parameters.

Response

The HF must respond to the `+MICTEST` command over the HFP connection to the AG device, valid responses are:

- `AT+MICTEST=1`: If the command was issued successfully
- `AT+MICTEST=0`: If issuing the command failed

Example transactions

Figure 2-1 shows the message sequence for a successful `+MICTEST` command.

If while active audio is routed to the HF device the HF device receives a `+MICTEST` command and is able to switch the active microphone, it responds with `AT+MICTEST=1`.

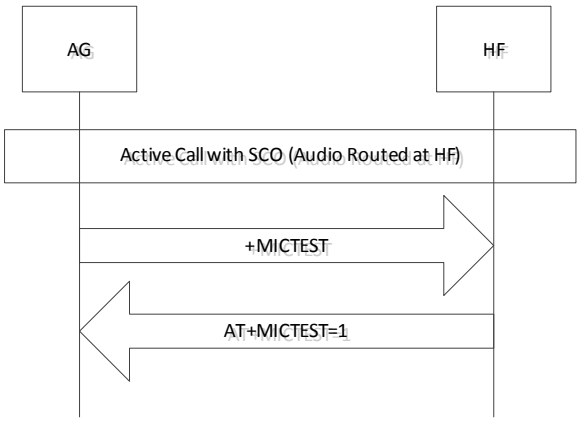

Figure 2-1 Successful +MICTEST transaction

Figure 2-2 shows the message sequence for an unsuccessful `+MICTEST` command.

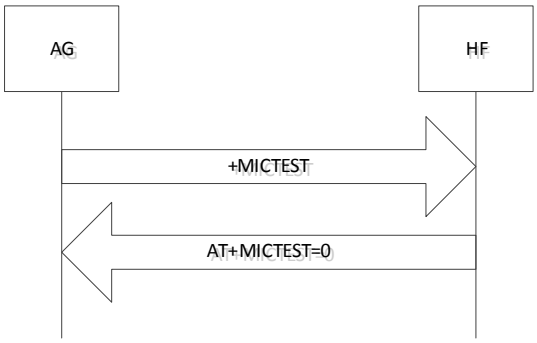

Figure 2-2 Unsuccessful +MICTEST transaction

NOTE The failure occurs because the HFP call audio is not routed to the HF device.

3 Implementation of custom AT commands

The custom AT commands feature is included as part of the Audio Sink application project. It allows the Audio Sink application to handle non-standard AT commands and provides:

- The ability to match unrecognized AT commands and formulate a response
- The ability to generate AT commands when internal events occur

3.1 Unrecognized AT commands

AT commands that are not successfully parsed by the HFP library (that is non-standard HFP commands) are passed to the Audio Sink application to be handled.

The unrecognized AT command is then matched against a list of configured custom AT commands and then:

- If the unrecognized AT command matches an entry in the custom AT commands list, a response (the next AT command in the custom AT commands list) is sent to the device.
- If no match is found, the unrecognized AT command is ignored.

3.2 Sending custom AT commands

The Audio Sink application is able to generate custom AT commands when Audio Sink application events are generated.

When an Audio Sink application event that is mapped to a custom AT command is generated, the custom AT command is sent to all connected HFP devices.

4 Configuration of custom AT commands

Custom AT commands can be configured using special character, special events and configuration data structure, which are described in:

- Special characters
- Special events
- Configuration data structure

Also see, Example of custom AT command configuration.

4.1 Special characters

Special characters can be used as placeholders for dynamic values to be inserted into the custom AT command sent to the AG. Special characters are not sent to the AG but are replaced by dynamic values indicating status information at the moment the command is sent to the AG.

Special characters can be used in:

- Event generated custom AT commands
- Responses to matched AT commands

Table 4-1 List of supported special characters

Special Character	Description
`0x0081`	Replaced by the battery level of the Headset scaled between 0 and 5
`0x0082`	Replaced by the battery level of the Headset scaled between 0 and 9

4.2 Special events

Table 4-2 lists the Audio Sink application events that have preprogrammed custom AT command behavior.

Table 4-2 Special audio sink application events for custom at commands

Audio Sink Application Event ID	Description
`EventSysGasGauge0`	Generates custom AT commands for all Gas Gauge events.
`EventSysChargerGasGauge0`	Generates custom AT commands for all charger Gas Gauge events.

4.2.1 Gas Gauge events

Gas Gauge events can be configured to indicate changes in battery level status when discharging.

If the Audio Sink application event `EventSysGasGauge0` is mapped against a custom AT command, that mapping is adopted for all Gas Gauge events, see Table 4-3.

Table 4-3 Adopted mapping of Gas Gauge events

Audio Sink Application Event ID	Custom AT Command Mapping	Adopted Custom AT Command Mapping
`EventSysGasGauge0`	`AT+BATTERY=0x82`	N/A
`EventSysGasGauge1`	Not mapped in custom AT commands map	Adopts custom AT command mapped to `EventSysGasGauge0` that is `AT+BATTERY=0x82`
`EventSysGasGauge2`	Not mapped in custom AT commands map	Adopts custom AT command mapped to `EventSysGasGauge0`that is `AT+BATTERY=0x82`
`EventSysGasGauge3`	Not mapped in custom AT commands map	Adopts custom AT command mapped to `EventSysGasGauge0` that is `AT+BATTERY=0x82`

4.2.2 Charger Gas Gauge events

Charger Gas Gauge events can be configured to indicate changes in battery level status when charging, refer to the *Audio Sink Application Configuration User Guide*.

If the Audio Sink application event `EventSysChargerGasGauge0` is mapped against a custom AT command, then that mapping is adopted for all Charger Gas Gauge events, see Table 4-4.

Table 4-4 Adopted mapping of Charger Gas Gauge events

Audio Sink Application Event ID	Custom AT Command Mapping	Adopted Custom AT Command Mapping
`EventSysChargerGasGauge0`	`AT+BATTERY=0x82`	N/A
`EventSysChargerGasGauge1`	Not mapped in custom AT commands map	Adopts custom AT command mapped to `EventSysChargerGasGauge0` that is `AT +BATTERY=0x82`
`EventSysChargerGasGauge2`	Not mapped in custom AT commands map	Adopts custom AT command mapped to `EventSysChargerGasGauge0`that is `AT +BATTERY=0x82`
`EventSysChargerGasGauge3`	Not mapped in custom AT commands map	Adopts custom AT command mapped to `EventSysChargerGasGauge0` that is `AT +BATTERY=0x82`

4.3 Configuration data structure

The custom AT command configuration data is held in the `sink_hfp_data_def.xm` configuration file locate in the **sink\module_configurations** folder.

This configuration data contains the custom AT command map and custom AT commands.

Table 4-5 Data structure of the custom AT commands PS Key

Words	Description
1 to16	Custom AT command map, see Custom AT command map.
17+	Custom AT commands, see Custom AT commands.

NOTE Custom AT command map gives an example of custom AT command configuration data.

4.3.1 Custom AT command map

The custom AT command map is used to send particular custom AT commands when Audio Sink application events are generated.

Table 4-6 Data format for custom AT command map entries

Configuration Item	Description
1	Audio Sink application event ID
2	Custom AT command index, see Custom AT commands

NOTE By default, the size of the custom AT command map is set to eight entries. Those that are not required must be padded with zeros.

4.3.2 Custom AT commands

Custom AT commands are stored as an array of ASCII character strings that can also contain special characters, see Implementation of custom AT commands. They are used to match and send custom AT commands.

Each ASCII character string defines a single AT command and must be delimited using using a `\r` or `\n` new line character followed by the NULL ASCII character `\0`. The index of the AT command is the position it occurs in the ASCII array. An example is provided in Example of custom AT command configuration.

NOTE (1) AT commands sent from the AG must start with `+`

(2) AT Commands sent from the HF must start with `AT+`

(3) While there is no limit to the number of entries that can be added to the array, the maximum data length of a single PS Key is limited.

(4) The combined length of the custom AT commands data must be defined in `CONFIG_LENGTHS`in the configuration data of the application.

5 Example of custom AT command configuration

An example of configuration data for the custom AT commands feature of the Audio Sink application how the example configuration data is interpreted and used by the Audio Sink application is described in:

- Configuration data
- Matching AT commands
- Sending custom AT commands

5.1 Configuration data

Figure 5-1 shows the example configuration for the mapping table, which is specified in the `sink_hfp_data_def.xml` configuration file locate in the **sink\module_configurations** directory.

Figure 5-1 Example configuration for the mapping table

```
<ConfigGroup
    Id="Event to AT Commands Mapping"
    ShortId="sink_hfp_event_at_command_table"
    Node="Array"

ConfigGroupPath="./[@ShortId='advanced_settings']/
[@ShortId='at_commands_key']/[@ShortId='event_to_at_command_mapping']" >
    <ConfigPatternArray
        Id="Event to AT Command Mapping Definition"
        ShortId="event_at_commands"
        Pattern="at_commands_events"
        MaxNumPatterns="10" >
        <PatternArrayRow Id="AT Event Row1" ShortId="at_event_row_1"
Node="Basic">
            <PatternArrayConfigItem ShortId="event" DefaultValue="SLC
Connected" />
            <PatternArrayConfigItem ShortId="at_cmd"
DefaultValue="0x0001" />
        </PatternArrayRow>
        <PatternArrayRow Id="AT Event Row2" ShortId="at_event_row_2"
Node="Basic">
```

```
            <PatternArrayConfigItem ShortId="event" DefaultValue="SLC
Connected" />
            <PatternArrayConfigItem ShortId="at_cmd"
DefaultValue="0x0003" />
        </PatternArrayRow>
        <PatternArrayRow Id="AT Event Row3" ShortId="at_event_row_3"
Node="Basic">
            <PatternArrayConfigItem ShortId="event" DefaultValue="Gas Gauge
0" />
            <PatternArrayConfigItem ShortId="at_cmd"
DefaultValue="0x0003" />
        </PatternArrayRow>
        <PatternArrayRow Id="AT Event Row4" ShortId="at_event_row_4"
Node="Basic">
            <PatternArrayConfigItem ShortId="event" DefaultValue="Gas Gauge
1" />
            <PatternArrayConfigItem ShortId="at_cmd"
DefaultValue="0x0004" />
        </PatternArrayRow>
        <PatternArrayRow Id="AT Event Row5" ShortId="at_event_row_5"
Node="Basic">
            <PatternArrayConfigItem ShortId="event" DefaultValue="Charger
Gas Gauge 0" />
            <PatternArrayConfigItem ShortId="at_cmd"
DefaultValue="0x0003" />
        </PatternArrayRow>
        <PatternArrayRow Id="AT Event Row6" ShortId="at_event_row_6"
Node="Basic">
            <PatternArrayConfigItem ShortId="event" DefaultValue="Charger
Gas Gauge 3" />
            <PatternArrayConfigItem ShortId="at_cmd"
DefaultValue="0x0005" />
        </PatternArrayRow>
    </ConfigPatternArray>
</ConfigGroup>
```

Figure 5-2 shows example configuration for the AT commands, which is specified in the `sink_hfp_data_def.xml` configuration file that is located in the **sink\module_configurations** directory.

Figure 5-2 Example configuration for the AT commands

```
<ConfigGroup
        Id="HFP AT Commands Data"
        ShortId="sink_hfp_at_commands"
        Node="Array"
        ConfigGroupPath="./[@ShortId='advanced_settings']/
[@ShortId='at_commands_key']/[@ShortId='command_data']">
```

```
        <ConfigPatternArray
            Id="AT command raw data"
            ShortId="at_commands"
            Pattern="at_command_data"
            MaxNumPatterns="60" >
            <PatternArrayRow Id="AT Data Row1" ShortId="at_data_row_1"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x2b43" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row2" ShortId="at_data_row_2"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5352" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row3" ShortId="at_data_row_3"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5645" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row4" ShortId="at_data_row_4"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5253" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row5" ShortId="at_data_row_5"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x494f" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row6" ShortId="at_data_row_6"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4e0d" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row7" ShortId="at_data_row_7"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x0041" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row8" ShortId="at_data_row_8"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x542b" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row9" ShortId="at_data_row_9"
Node="Basic">
```

```
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4353" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row10" ShortId="at_data_row_10"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5256" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row11" ShortId="at_data_row_11"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4552" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row12" ShortId="at_data_row_12"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5349" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row13" ShortId="at_data_row_13"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4f4e" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row14" ShortId="at_data_row_14"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x3d41" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row15" ShortId="at_data_row_15"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x444b" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row16" ShortId="at_data_row_16"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x330d" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row17" ShortId="at_data_row_17"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x002b" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row18" ShortId="at_data_row_18"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4353" />
```

```
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row19" ShortId="at_data_row_19"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5242" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row20" ShortId="at_data_row_20"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4154" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row21" ShortId="at_data_row_21"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5445" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row22" ShortId="at_data_row_22"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5259" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row23" ShortId="at_data_row_23"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x0d00" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row24" ShortId="at_data_row_24"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4154" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row25" ShortId="at_data_row_25"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x2b43" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row26" ShortId="at_data_row_26"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5352" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row27" ShortId="at_data_row_27"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4241" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row28" ShortId="at_data_row_28"
```

```
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5454" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row29" ShortId="at_data_row_29"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4552" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row30" ShortId="at_data_row_30"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x593d" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row31" ShortId="at_data_row_31"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x820d" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row32" ShortId="at_data_row_32"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x0041" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row33" ShortId="at_data_row_33"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x542b" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row34" ShortId="at_data_row_34"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4353" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row35" ShortId="at_data_row_35"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5242" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row36" ShortId="at_data_row_36"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4154" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row37" ShortId="at_data_row_37"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
```

```
DefaultValue="0x5445" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row38" ShortId="at_data_row_38"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5259" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row39" ShortId="at_data_row_39"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x3d4c" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row40" ShortId="at_data_row_40"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4f57" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row41" ShortId="at_data_row_41"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x0d00" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row42" ShortId="at_data_row_42"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4154" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row43" ShortId="at_data_row_43"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x2b43" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row44" ShortId="at_data_row_44"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5352" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row45" ShortId="at_data_row_45"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4241" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row46" ShortId="at_data_row_46"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x5454" />
            </PatternArrayRow>
```

```
            <PatternArrayRow Id="AT Data Row47" ShortId="at_data_row_47"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4552" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row48" ShortId="at_data_row_48"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x593d" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row49" ShortId="at_data_row_49"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4655" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row50" ShortId="at_data_row_50"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x4c4c" />
            </PatternArrayRow>
            <PatternArrayRow Id="AT Data Row51" ShortId="at_data_row_51"
Node="Basic">
                <PatternArrayConfigItem ShortId="data"
DefaultValue="0x0d00" />
            </PatternArrayRow>
        </ConfigPatternArray>
    </ConfigGroup>
```

5.1.1 Command map

The example configuration data defined in Configuration data contains an example custom AT command map, which is described in Table 5-1.

Table 5-1 Example custom AT command map

Entry	Configuration Data	Audio Sink Application Event	AT Command Index
1	4715 0001	EventSysSLCConnected	0x0001
2	4715 0003	EventSysSLCConnected	0x0003
3	470d 0003	EventSysGasGauge0	0x0003
4	470e 0003	EventSysGasGauge1	0x0004
5	4711 0003	EventSysChargerGasGauge0	0x0003
6	4714 0005	EventSysChargerGasGauge3	0x0005

NOTE Multiple mappings for a single Audio Sink application event allow multiple custom AT commands to be sent for a single Audio Sink application event.

5.1.2 Custom AT commands

The example configuration data in Configuration data contains multiple custom AT commands. These are described in Table 5-2.

Table 5-2 Example custom AT commands

Index	Configuration Data	AT Command String	AT Command Index
1	4715 0001	EventSysSLCConnected	0x0001
2	4715 0003	EventSysSLCConnected	0x0003
3	470d 0003	EventSysGasGauge0	0x0003
4	470e 0003	EventSysGasGauge1	0x0004
5	4711 0003	EventSysChargerGasGauge0	0x0003
6	4714 0005	EventSysChargerGasGauge3	0x0005

NOTE Multiple mappings for a single Audio Sink application event allow multiple custom AT commands to be sent for a single Audio Sink application event.

5.2 Matching AT commands

The example configuration data shown in Configuration data contains entries that are used to match custom AT commands received by the Audio Sink application. +CSRVERSION example, +CSRBATTERY example, SLC connection, Gas Gauge events, and Charger Gas Gauge events give examples of these custom AT commands and show the resulting message sequences.

5.2.1 +CSRVERSION example

When the connected AG sends the `+CSRVERSION` AT command to the Audio Sink application, the Audio Sink application matches it with the AT command at index 0, see Table 5-2. The next indexed AT command (`AT+CSRVERSION=ADK3` at index 1) is used as the response.

Figure 5-3 shows the message sequence for this custom AT command.

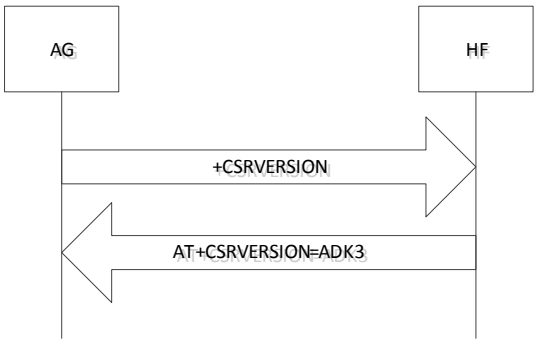

Figure 5-3 Example transaction for +CSRVERSION command

5.2.2 +CSRBATTERY example

When the connected AG sends the `+CSRBATTERY` AT command to the Audio Sink application, the Audio Sink application matches it with the custom AT command at index 2, see Table 5-2. The next indexed custom AT command (`AT+CSRBATTERY=0x82` at index 3) is used as the response. This response contains the special character `0x82` which is replaced with a value indicating the current battery level of the device.

Figure 5-4 shows the message sequence for this command when the battery is fully charged.

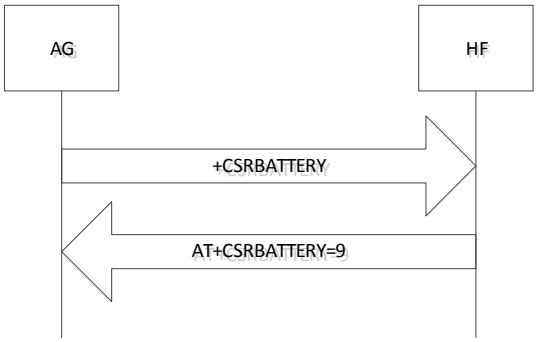

Figure 5-4 Example transaction for +CSRBATTERY command

5.3 Sending custom AT commands

The example configuration data outlined in Configuration data can be used to send custom AT commands when Audio Sink application events are generated. Sections +CSRVERSION example, +CSRBATTERY example, SLC connection, Gas Gauge events, and Charger Gas Gauge events describe the use cases within the example configuration where custom AT commands are sent to one or more connect AGs as a result of an Audio Sink application event being generated.

5.3.1 SLC connection

The example configuration data in Configuration data contains two entries in the custom AT commands map for the Audio Sink application `EventSysSLCConnected` event. Both mapped custom AT commands are sent to one or more connected AGs when an `EventSysSLCConnected` event is generated.

Figure 5-5 shows multiple custom AT commands being sent as a result of the Audio Sink application event being generated when the battery is fully charged.

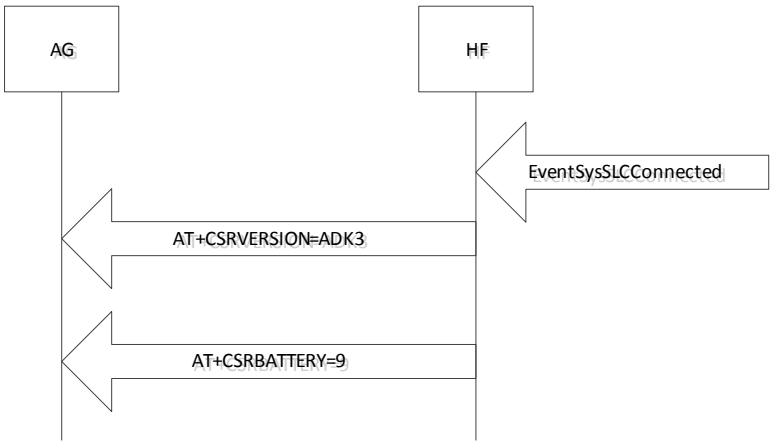

Figure 5-5 Example transaction when EventSysSLCConnected is generated

5.3.2 Gas Gauge events

The example configuration data contains mappings for Gas Gauge events. As described in Gas Gauge events, the special Audio Sink application event `EventSysGasGauge0` has been mapped to the custom AT command `AT+CSRBATTERY=0x82`. This means that any Gas Gauge event generated causes this custom AT command to be sent to one or more connected AGs.

shows an example case where the battery is draining and Gas Gauge events are generated causing custom AT commands to be sent to one or more connected AGs.

NOTE (1) Notice that the value of the battery level decreases as the special character in the custom AT command string is replaced by the current battery level when the Gas Gauge events are generated.

(2) `EventGasGauge1` has been mapped to custom AT command `AT+CSRBATTERY=LOW`, which results in two custom AT commands being sent when this event is generated.

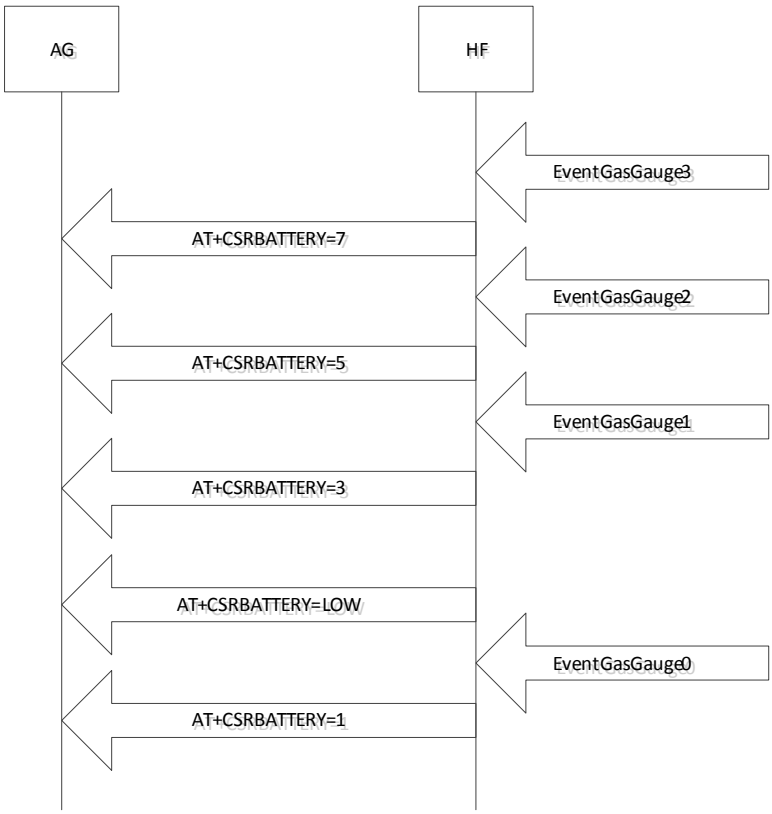

Figure 5-6 Example transaction when gas gauge events are generated

5.3.3 Charger Gas Gauge events

The example configuration data contains mappings for Charger Gas Gauge events. As described in Charger Gas Gauge events, the special Audio Sink application event `EventSysChargerGasGauge0` has been mapped to the custom AT command `AT+CSRBATTERY=0x82`. This means that any generated Charger Gas Gauge events cause this custom AT command to be sent to one or more connected AGs.

Figure 5-7 shows an example case where the battery is charging and Charger Gas Gauge events are generated causing custom AT commands to be sent to one or more connected AGs.

NOTE (1) Notice that the value of the battery level increasing as the special character in the custom AT command string is replaced by the current battery level when the Charger Gas Gauge events are generated.

(2) `EventChargerGasGauge3` has been mapped to custom AT command `AT+CSRBATTERY=FULL`, which results in two custom AT commands being sent when this event is generated.

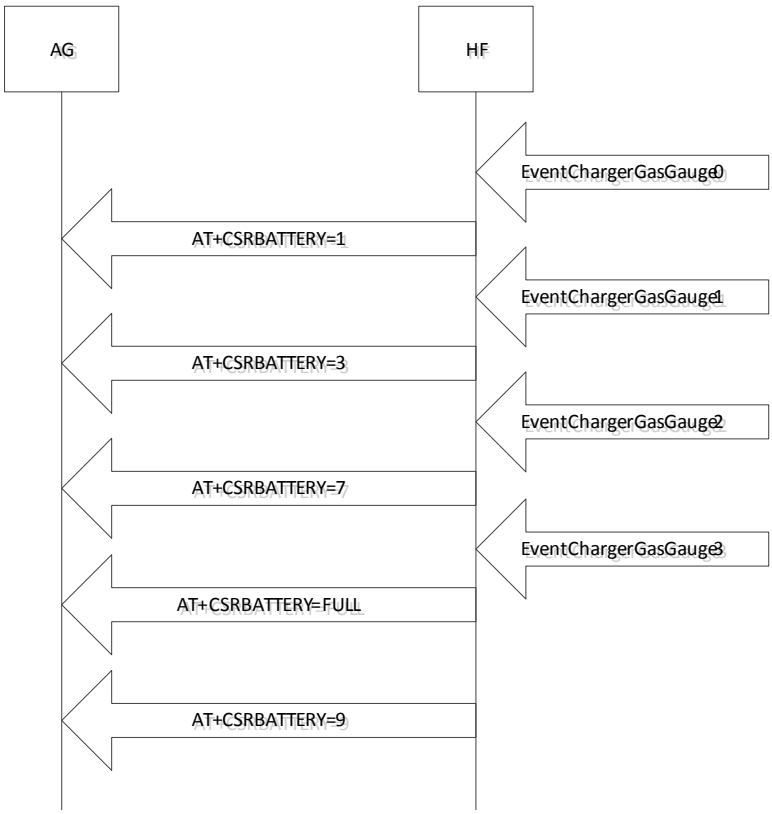

Figure 5-7 Example transaction when charger gas gauge events are generated

Document references

Document	Reference
Audio Sink Application User Guide	80-CT439-1/CS-00236868-UG
The Hands-Free Profile (HFP) 1.6 Specification	www.bluetooth.org

Terms and definitions

Term	Definition
ADK	Audio Development Kit
AG	Audio Gateway role as defined in the HFP specification
ASCII	American Standard Code for Information Interchange
AT	ATtention (command prefix)
Bluetooth	Set of technologies providing audio and data transfer over short-range radio connections
HF	Hands Free device role as defined in the HFP specification
HFP	Hands Free Profile
IC	Integrated Circuit
PS Key	Persistent Store Key
QTIL	Qualcomm Technologies International, Ltd.
SLC	Service Level Connection