

everythin <u>g</u>®

BCM1600-BTE AUDIO PRODUÇT



BTE-AUDIO SOFTWARE AND DEVELOPMENT ENVIRONMENT

FEATURES

• Bluetooth[®] software stack

- Interoperable with the BTE-Mobile and BTW stack
- Optimized for audio applications
- Bluetooth 2.0 + EDR compliant—upgradable to future versions

• BTE-Audio core stack

- HCI (Host Controller Interface)
- L2CAP (Logical Link Control and Adaptation Protocol)
- RFCOMM (RS-232 Serial Cable Emulation Profile
- SDP (Service Discovery Protocol)
- Bluetooth manager
- GKI (Generic Kernel Interface)
- SBC (Subband codec)

• BTE-Audio profiles

- HSP (Headset Profile)
- HFP/HFP1.5 (Hands-Free Profile)
- AVDTP (A/V Distribution Transport Protocol)
- AVCTP (A/V Control Transport Protocol)
- GAVDP (Generic A/V Distribution Profile)
- Upgradable to other profiles

FEATURES

- BTE Insight development environment
- PC simulation environment
- Bluetooth protocol trace and debug
- Headset configuration graphical user interface
- Compile and download to target BCM2047 and BCM2044 hardware

SUMMARY OF BENEFITS

- Based on field-tested and well-deployed BTE-Mobile stack
- Highly interoperable with BTE-Mobile and BTW on sources
- Easy-to-use development environment

APPLICATIONS

- Basic mono headset
- Midrange mono headset
- Quality mono headset
- Stereo headphones
- Stereo headset
- Clip headset with LCD

BTE Insight Development Environment for Audio

| 9 Ele Edt Ve | w Application Tools Window | Pep | - 6 |
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| N 🖲 💣 | Simulator Application Stui_app | a 📲 🔛 🔕 | |
| 4139153.189 | [HCI] RCVD Event | from BOI. Name: BCI_Command_Complete | |
| 4:39:53.189 | [HCI] Parameters | | |
| 4:39:53.189 | (HCI] | Num HCI Cmd Packets : 10 (OxOa) | |
| 4:39:53.189 | (HCI] | Cnd Code : 0x1003 (| |
| 4:39:53.189 | (HCI] | Status : Success (| |
| 4:39:53.189 | (HCI] | LHP Features : d7 18 09 | |
| 4:39:53.189 | (MCI] | : 3 slot pa | |
| 4:39:53.189 | (HCI] | : 5 slot pa | |
| 4:39:53.189 | (HCI] | : Eneryptio | |
| 4133123-103 | (net) | : Isning ac | |
| 4133133-163 | (net) | : noid node | seange Unangeo |
| 4133133-103 | (net) | South and | |
| 4139133.109 | (net) | : 500 116e | |
| 4.50.55 185 | (BOT) | 1 MM packe | |
| 4.50.50 100 | CHART 1 | into pacto | |
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| 4+59+55.189 | (RCT 1 | CV3D avro | |
| 4.10.00 100 | ruer 1 | Transmark | leadphore Setup |
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| eneral Buttons | LEDs Beeps C | ther Services Hig | gh-quality Audio | | |
|-------------------|------------------------|-----------------------|--------------------|--------------------|----|
| Device Name | | | | | |
| Enter the name | that your headset wi | I display to other de | vices. | | |
| Name: My Biu | uetooth Headset | | | | |
| Security | | | | | |
| Enter the securi | ty code (PIN code, p | assword, passkey, | pass code) that wi | Il be required whe | en |
| connecting to th | nis headset. | | | | |
| Security Code: | 0000 | | | | |
| Long Button Tin | nina | | | | |
| Enter the minimu | um time for a button t | o be held down for | a long button pres | s in seconds. | |
| Time: 2 | | | | | |
| Profiles | | | | | |
| Select the profil | es that this headset 1 | will support. | | | |
| ₩ Hands-free | ✓ Headset | I Audio Si | nk | | |
| | | | | | |
| | | | 1 (| 1 | |
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| eneral Buttons LEDs Beep: | s Other Services | s High-quali | ty Audi | | |
|-------------------------------|--------------------|----------------|----------|----------------|---|
| Button 0 | | Button 4 | | | |
| Short: Multifunction | * | | Short: [| Play | - |
| Long: Multifunction | * | | .ong: | Play | * |
| Button 1 | | Button 5 | | | |
| Short: Reject Cal | • | | Short: | Stop | - |
| Long: Reject Call | • | | .ong: [| Stop | - |
| Button 2 | _ | Button 6 | | | |
| Short: Volume Up | • | | Short: [| Previous Track | - |
| Long: Volume Up | • | | .ong: [| Previous Track | - |
| Button 3 | | Button 7 | | | |
| Short: Volume Down | • | | Short: [| Next Track | - |
| Long: Volume Down | • | | .ong: [| Next Track | • |



OVERVIEW





Stereo Headset Application Application Programming Interface BTA Audio APIs Utilities BTA DM BTA AK BTA HS BTA and (GAP and (HSP and Upper Core A2DP and Stack SDAP) AVRCP) HFP) Call-Ins/ Call-Outs Upper Layer Stack Host Controller Inte Audio Manage (AudioDE Bluetooth® Sound Firmware Core Bluetooth Core Lower Layer Stack Driver SBC) Bluetooth Radio Codecs Bluetooth Hardware Layer

Figure 2: BTA System Architecture for a Stereo Headset

The Broadcom BTE-Audio stack simplifies the implementation of Bluetooth protocols and profiles by providing a high-level API (BTE-Audio API) to the audio application.

The BTE-Audio API is optimized to ease audio application development, accelerate customer time-to-market, and provide customers with the flexibility to implement value-added differentiation for their solutions.

The system architecture block diagrams (Figure 1 and Figure 2) show how BTE-Audio interfaces with typical mono and stereo headsets using the BCM2047 and BCM2044 platforms.

The headset application interfaces with the BTA API to perform functions such as:

- Enabling or disabling profiles
- Connecting to a peer device
- · Performing call control, remote control commands, and so on

The data flow interface to connect the audio data to the codec is implemented through a set of functions called *call-ins* and *call-outs*.

Utility functions are provided for the application to control MMI operations involving LEDs, buttons, and beeps and also to access NVRAM.

Acronyms

| AK | audio sink |
|------|---------------------------------------|
| BTA | Bluetooth application |
| BTE | Bluetooth for embedded modules |
| BTW | Bluetooth for Windows |
| DE | data engine |
| DM | device manager |
| EDR | extended data rate |
| GAP | Generic Access Profile |
| HS | headset |
| MMI | man-machine interface |
| SAP | SIM Access Profile |
| SDAP | Service Discovery Application Profile |

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