Chapter 6B: More Classic Bluetooth

Time: 1¼ Hours

At the end of this chapter you will know about additional Classic Bluetooth Profiles such as A2DP, AVRCP, HSP, HFP, and HID as well as other more advanced topics.

6B.1 Profiles

Classic Bluetooth devices communicate with one another by using one or more of a standard set of profiles (often called services) which is maintained by the Bluetooth Special Interest Group (SIG). By using standard profiles, devices only need to determine the profile to use to start communicating rather than having to transmit the communication parameters themselves. A list of Bluetooth Profiles can be found at:

https://en.wikipedia.org/wiki/List_of_Bluetooth_profiles

Some of the more commonly used profiles are:

6B.1.1 Advanced Audio Distribution Profile (A2DP)

The A2DP profile is used for streaming multi-media audio. It is used, for example, when streaming audio from a mobile phone to a wireless headset or a car sound system. This profile is often used in conjunction with AVRCP, HSP, or HFP as described below.

The A2DP profile is designed for a unidirectional audio stream of up to 2-channel stereo. There may be more than one A2DP profile on a single device.

6B.1.2 Audio/Video Remote Control Profile (AVRCP)

The AVRCP profile is designed to provide a standard remote-control interface for devices such as televisions, stereo equipment, in-car navigation systems, etc.

There are several versions available depending on the functionality required, each of which is a superset of the previous version.

Version	Functionality
1.0	Basic remote (play, pause, stop, etc.).
1.3	1.0 plus metadata (such as artist, track name, etc.) and player state (such as playing, stopped, etc.)
1.4	1.3 plus multiple media player browsing including a "Now Playing" list and search capabilities. Also has support for absolute volume.
1.5	1.4 plus corrections/clarifications to absolute volume control
1.6	1.5 plus browsing and track information. Support for sending cover art through BIP/OBEX (Basic Imaging Profile and Object Exchange Profile)

6B.1.3 Headset Profile (HSP)

The HSP provides support for headsets including two-way 64 kbit/sec audio and minimal controls for ringing, answer a call, hang up and adjust the volume.

In a typical headset, A2DP will be used when listening to music since it provides the best quality stereo connection, but HSP will be used when making a phone call since it allows two-way communication.

6B.1.4 Hands-Free Profile (HFP)

The HFP is commonly used to allow car hands-free kits to communicate with mobile phones. It provides relatively low-quality monaural audio to allow the user to control some features of their phone such as making calls, playing music, etc. It is often used with other profiles such as A2DP to provide high quality audio streaming.

6B.1.5 Human Interface Device Profile (HID)

The HID is used for devices such as mice, keyboards, and joysticks. It provides a low-latency link with minimal power requirements.

Keyboards and keypads must be secure, but for other devices using the HID profile security is optional.

6B.1.6 Object Exchange (OBEX)

The OBEX (short for OBject EXchange, also called IrOBEX) is used to transmit binary objects between devices (such as business cards, data, or even applications). The transfer is similar to HTTP, as it provides a way to connect to a server (another Bluetooth device) and request or provide objects.

6B.1.7 Personal Area Networking Profile (PAN)

This profile is intended to allow the use of Bluetooth Network Encapsulation Protocol on Layer 3 protocols for transport over a Bluetooth link.

6B.1.8 File Transfer Profile (FTP)

Provides the capability to browse, manipulate and transfer objects (files and folders) in an object store (file system) of another system. Uses GOEP (Generic Object Exchange Profile) as a basis.

6B.1.9 Intercom Profile (ICP)

Commonly referred to as “walkie-talkie profile”, this profile is used to allow voice calls between two Bluetooth-capable handsets over Bluetooth, but the standard was withdrawn in 2010.

6B.1.10 Device ID Profile (DIP)

This profile is used to enable identification of the manufacturer, project ID, product version, and the version of the Device ID specification being met. This assists in identifying the correct drivers when a Bluetooth device attempts to connect to a PC.

6B.1.11 Health Device Profile (HDP)

This profile is used for the transmission and reception of Medical Device data.

The Health Thermometer Profile (HTP) and Heart Rate Profile (HRP) fall under this category as well.

6B.2 Master

TBD

6B.3 Exercises

Exercise - 6B.1 Create an HID Device

TBD