

1 Introduction

The Blue5 is an add-on device for the PalmV and Vx that enables your PDA to communicate over Bluetooth with other Bluetooth devices.

The Blue5 uses pre-qualified components to implement lower layers of the Bluetooth stack, that is the radio, baseband, link manager, HCI, L2CAP, SDP and RFCOMM. It supports the Bluetooth profiles GAP, SDAP, SPP and DUN. These profiles are implemented by Tactel as software running on the Blue5 unit. Tactel also presents software running on the Palm, which enables the Palm to control mobile phone functions over the Bluetooth link.

2 Architecture

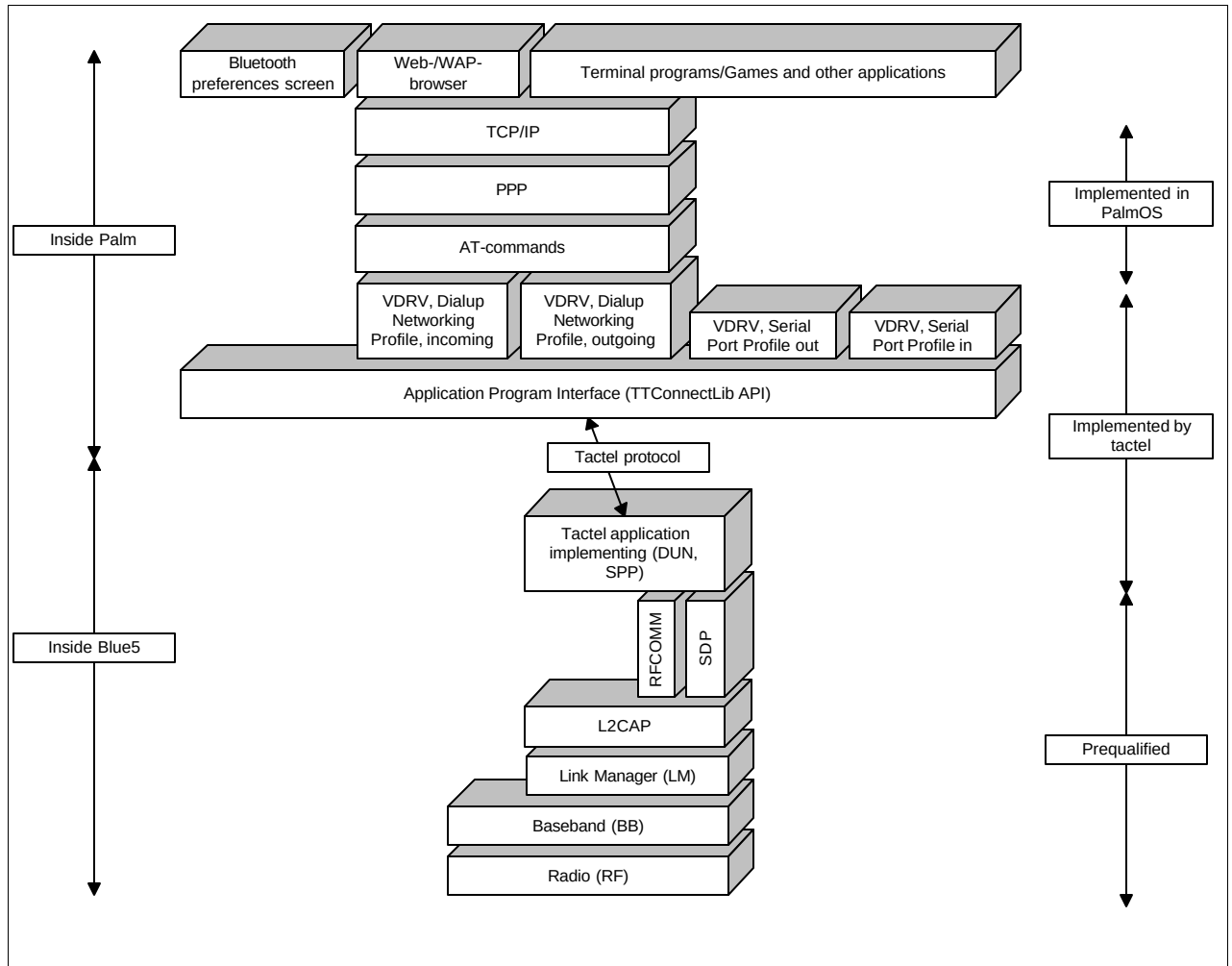


Figure 2-1 The architecture of the Blue5

2.1 Radio

The Blue5 radio is implemented by the “Ericsson Bluetooth Radio ROK 101 002/1”. This component is a pre-qualified component.

2.2 Baseband and Link Manager

The Blue5 baseband and Link Manager are implemented by the pre-qualified Ericsson component “IrmaB HCI R1A”. This component is unchanged and the functionality of the Blue5 for those layers is the same as for the pre-qualified component.

2.3 L2CAP, SDP and RFCOMM

The L2CAP, SDP and RFCOMM layers are implemented by the pre-qualified Ericsson component “Bluetooth HOST Stack CNX 901 184” compiled for the ARM7TDMI processor that is used inside the Blue5.
The Blue5 functionality of these layers is the same as for the pre-qualified component.

2.4 GAP, SDAP, SPP and DUN

As seen in figure 2-1 (page 4) there is a Tactel application inside the Blue5. This application implements the supported profiles GAP, SDAP, SPP and DUN. It also handles the communication protocol with the software inside the Palm. This protocol is a packet-based protocol developed at Tactel to be optimized for the special environment. The protocol supports multiplexing of data flowing from other Bluetooth devices and simultaneous control of Bluetooth links. This enables several RFCOMM Bluetooth connections between two devices and in future versions easy support for multipoint connections. The protocol is designed so that most critical Bluetooth functions are implemented inside the Blue5. The electrical interface is RS232 with ESD protected drivers ($\pm 15\text{KV}$ Human Body model, $\pm 15\text{KV}$ IEC1000-4-2 Air Discharge, $\pm 8\text{KV}$ IEC1000-4-2 Contact Discharge).

2.5 The applications inside the Palm

The software written by Tactel inside the Palm consists of three layers. The lowest layer is the TTConnectLib, which is a Palm OS library (see appendix-API reference for TTConnectLib section 2.6). This library allows other applications to take advantage of Bluetooth. The library implements the Tactel protocol and also handles multiplexing with several applications. The next layer is “virtual drivers”. The following “virtual drivers” are implemented:

Dialup networking, outgoing: This is used to establish a normal dial-up networking connection to a dial-up networking gateway.

Dialup networking, incoming: This is used to establish a dial-up networking connection to a dial-up networking gateway, when an incoming call is expected.

Serial Port Profile Out: This is used to establish a Serial port profile connection when (Role Device A).

Serial Port Profile In: This is used to wait for an incoming Serial Port Profile connection (Role Device B).

These “virtual drivers” uses the TTConnectLib to establish connections with other Bluetooth devices. The “virtual drivers” is a Palm OS 3.3 and later concept that enables existing applications, like dialup networking, to work with Bluetooth without modifications.

The third layer is the “Bluetooth preferences screen” which uses the TTConnectLib directly to search for other Bluetooth devices and configure the behavior (passkey mode, Bluetooth device address) of the virtual drivers.

2.6 Appendix-API Reference for TTConnectLib

3 Hardware Description

3.1 General

The hardware is based on Ericsson Bluetooth chipset. The main components are the Bluetooth Radio (U2, see section 3.6 Component Placement and section 3.7 Bill of Material) and the Baseband processor (U1) and flash memory (U3). Other important components are those that handle the connection to the Palm and the replicated port (U4, U13, U14, U15, U16, U17). The power supply to the device is taken from the Palm and regulated to 2.8 and 3.0v. The 2.8v is used to power the Bluetooth components (U1, U2 and U3) and the switch regulator (U9) which provides the necessary voltage for the Blue LED (D2). The voltage is shut of when no RS232 signals are detected on the Palm connector (J3) or when RS232 signals are detected on the replicated port. Which means that Bluetooth cannot be used at the same time as the Palm is connected to the PC. All other components are supplied with the 3.0v voltage. The replicated port (J1) is available so that the user don't have to remove the Blue5 before performing a HotSync® or charging the Palm.