IDBlue™ : Theory of Operation

IDBlue™ is a handheld, pen shaped device with onboard RFID and Bluetooth® modules. The RFID module allows the user to read from or write to RFID tags, and the Bluetooth® module allows the user to transmit data wirelessly to/from a host device if desired. IDBlue™ can operate in two different modes. These modes are defined as connected and stand-alone(batch). These modes are explained further below.

Connected Mode:

In connected mode, the IDBlue™ device (here on known as 'the device') is paired with a host device using an active Bluetooth® connection. In this mode, the device receives commands from and sends data to the host device via the Bluetooth® link.

Read Tag (Connected Mode)

The user initiates an RFID operation by pressing and releasing the device button. This action will prompt the IDBlue™ device to send a generic 'button press' event back to the host over the Bluetooth® connection. Upon receiving this event, the host will send the appropriate read commands back to the device. The host can choose to read just the tag ID, a single memory block, or multiple memory blocks depending on the application. Upon receiving the host command, the device will execute and carry out the correct operation. Once it has retrieved the data from the tag, the device will send this data over the Bluetooth® link back to the host device. The host device will then interpret this data and display the information in the user interface.

Write Tag (Connected Mode)

In order to write data to a tag, the user must first input the data into the user interface. The user interface could be a Pocket PC form or a desktop application. Once the appropriate information is inserted, the user must initiate a write sequence that will send a write command to the device. This write command is stored in a command buffer that will be executed on the next button press. The user initiates this write command by pressing and releasing the device button. The data that was sent to the device is written to the tag, and the device will send either a confirmation or fail acknowledgement back to the host, which will be displayed on the user interface.

Stand-Alone Mode:

In stand-alone mode there is not active Bluetooth™ connection, thus the device is pre-configured to execute a specific operation on a button press. The most common operation is to read the tag ID along with one or two memory blocks of interest.

Read Tag (Stand-Alone Mode)
The user initiates an RFID operation by pressing and releasing the device button. This action will prompt the device to execute the pre-configured command, and read the appropriate data from the tag. This data, along with a timestamp, is then stored in internal memory on the device itself. The user can continue to read multiple tags, storing the retrieved data on the device. The device can store up to 1200 entries on board at once.

Synchronization
Once the user has scanned all tags of interest, the information stored on the device can be retrieved using a synchronization application. This application will connect to the device, upload the data, and clear the memory.

User Feedback

There are two types of user feedback on the device:

1. Tri-color LED
    a. Green
    b. Red
    c. Amber (orange)
2. Audio buzzer

The device will give the user both visual and audio feedback to show its status. When the device is in a connected state, a double flashing green LED will be displayed. When the device is in a disconnected state, a single flashing green LED will be displayed. On a successful RFID operation, an audible tone will be sounded, and a solid green LED will be displayed for 0.5 seconds. On an unsuccessful RFID operation, no tone will be sounded, and a solid red LED will be displayed for 0.5 seconds. A table showing the LED states is shown below.

LED states:

LED Behavior	Connection Status	Battery Status	RFID Operation
Green, Single-flash	Unconnected	Battery Ok	None
Green, Double-flash	Connected	Battery Ok	None
Red, Single-flash	Unconnected	Battery Low	None
Red, Double-flash	Connected	Battery Low	None
Amber, Solid	N/A	N/A	In progress
Red, Solid	N/A	N/A	Failed
Green, Solid	N/A	N/A	Success

Red, Rapid flash	Device needs to be updated using the Cathexis Firmware Update tool.		