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# **IDWedgeBT™ Users Guide**

## **Serial Port Profile Mode**

### **Version 2.3 Software**



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1.0	Initial	PC	07272012
1.1	Change wording for SD card access	PC	08062012
1.2	Update Config.xml, firmware rev 1.5	PC	11292012
1.3	Change version to match firmware release 1.6. Update Config.xml, improve Magnetic formula description, add Self Test appendix	PC	01092013
1.4	Update Magnetic parsing, rev 1.8	PC	02262013
1.5	Rev 1.9 software, updated parsing bugs	PC	03052013
1.6	Add Document Issue Date, rev 2.0	PC	03062013
1.7	BT Conn. LED stays on during SD access Function button displays 1 <sup>st</sup> LED = HID Function button outputs configurable string	PC	04112013
1.8	Move SD Access to beginning of code, add raw data mode (Lng=99) to magnetic cards	PC	05012013
1.9	Change power up initialization, add appendix 2,3	PC	05312013

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# 1 Introduction

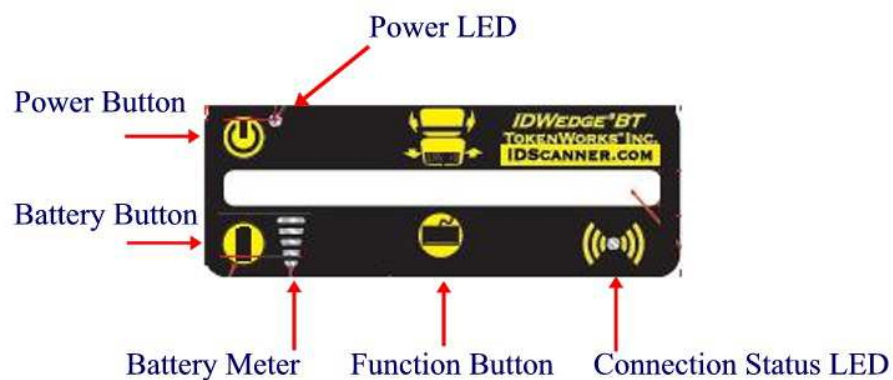
The IDWedgeBT is a barcode/magnetic card scanner that supports a Bluetooth connection to a host computer/tablet and functions as a Serial Port Profile device. Cards are scanned and parsed into fields, and these fields are sent as a Comma Separated Value (CSV) string to the host.

## 1.1 Document overview

This document will describe the basic functionality of the IDWedgeBT and how to configure the application parameters and formulas used to control the output of data from the scanner.

## 1.2 Operational overview

The diagram below shows the top view of the IDWedgeBT scanner and the location of the LED indicators and button switches used during the operation of the device.



### **1.2.1 Power**

The Power Button switches the battery power on/off to the unit. Power can be applied by connecting the 12VDC power supply, which charges the internal battery. The USB cable can also supply power, but does not charge the battery. If either of these two cables is connected the device powers on and ignores the state of the Power Button. When the device is powered on, the device will perform a self-test. After approximately 5 seconds the scanner is operational. See appendix 1 for detail on the Self Test

### **1.2.2 Battery**

The Battery button displays the state of the internal battery, press it once and view the state of the battery on the 5 segment LED. The Battery button serves a dual purpose of providing access to the SD card. To access the SD card, with the power off, press and hold the Battery button, and then power on the device. Continue to hold the Battery button for 3-4 seconds, and then release it. When the USB cable is connected to a PC, the IDWedgeBT will now appear as an external USB memory device, and the Connection Status LED will stay lit.

NOTE: The USB cable supplied with the Scanner supplies operational power. The preferred method of accessing the SD card is to hold the battery button down, and plug in the USB cable to the PC; this will avoid having to press the power button.

### **1.2.3 Function Button**

The Function button is used to re-program the device. If you press and hold this button during power up, you will put the device into programming mode and the device will no be operational, this mode is used to re-flash the firmware of the IDWedgeBT. A custom cable is required to re-program the device. When you press the Function button, the 1<sup>st</sup> and 2<sup>nd</sup> segments of the 5 segment LED will light to identify the SPP application. The Function button also outputs the string stored in the Config.xml file under the FuncKey variable. This string can be 10 digits or less. If a string longer than 10 digits is used, then the default string of "TokenWorks" will be output.

### **1.2.4 Connection Status**

This LED will flash when the IDWedgeBT has successfully paired with a compliant Bluetooth host. The default mode for the Bluetooth connection is Slave; the host device controls all aspects of pairing and connecting to the device. When the unit is set up to access the SD card via USB cable connection to PC, the LED will stay on solid until the next power cycle.

## 2 Configuration file

The IDWedgeBT maintains configuration file called *Config.xml*. This file stores the application parameters. If the file gets erased, it will be created automatically using default settings. If the file contains editing errors or is corrupted and cannot be opened, then a file called *ConfigError.txt* will be written to the SD card. Once the errors have been corrected and the file can be read, the *ConfigError.txt* file will be automatically erased.

### 2.1 Config.xml

Below is an example of the default *Config.xml* file. Each tagged item in the file represents an application variable and these variables control the operation of the IDWedgeBT.

```
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
  <appSettings>
    <add key="Version" value="2.3S" />
    <add key="Name" value="IDWEDGEBT" />
    <add key="PIN" value="1234" />
    <add key="Auth" value="0" />
    <add key="FuncKey" value="TokenWorks"/>
    <add key="CreditCard" value="True" />
    <add key="1Dbarcode" value="True" />
    <add key="MagTrackCard" value="True" />
    <add key="MidInitial" value="True" />
    <add key="5DigitZip" value="True" />
    <add key="ScanMsg" value="True" />
  </appSettings>
</configuration>
```

### **2.1.1 Version**

This is the firmware version; it has the letter 'S' appended to the end of the string, to differentiate it from the HID version of firmware. E.g. 2.3S

### **2.1.2 Name**

This is the Bluetooth name that gets broadcast to the host during pairing and is displayed in the list of Bluetooth devices on the Host.

### **2.1.3 Pin**

This the 4-digit pin code used during the pairing process.

### **2.1.4 Auth**

This is the Authentication setting. It is set to 0 for Serial Port Profile, it also support a value of 1,2,4.

Auth Value	Description
0	Bluetooth 2.0 Encryption disabled (uses 4 digit pin)
1	Bluetooth 2.1 Keyboard I/O (verify 6 digit code)
2	Bluetooth 2.1 Simple Secure Pair (no pin code)
3	Bluetooth 2.0 Pin Code Authentication (uses 4 digit pin)

NOTE: These settings are included for backwards compatibility with legacy systems, see appendix 3 for details on Auth setting.

### **2.1.5 FuncKey**

FuncKey holds a custom string, 10 character maximum length, with a default value of TokenWorks. The FuncKey is also used to re-program the unit.

### **2.1.6 CreditCard**

CreditCard Controls the output of Credit Card scans

### **2.1.7 1DBarcode**

1DBarcode controls the output of Code 128 One dimension barcode scans

### **2.1.8 MagTrackCard**

MagTrackCard controls the output of Magstripe cards like Student Ids, AAA cards, etc.

### **2.1.9 MidInitial**

MidInitial controls the Middle name field, if set to true only the middle initial is parsed, if set to false then the whole middle name (if available) is parsed.

### **2.1.10 5DigitZip**

5DigitZip determines if the Zip Code field will be truncated to the first 5 digits only

### 2.1.11 ScanMsg

The ScanMsg determines if any error messages associated with card scan will be output, such as “MNR” which means Mag No Read.

## 2.2 Reading/Writing Config.xml

To Access the Config.xml file, you must boot the IDWedgeBT while holding the battery button as described in section 1.2.2. Once you have connected a USB cable and can explore the contents of the SD memory card, you will be able to read and write the *Config.xml* file. You can use any text editor to change items in the file and save them to the SD card. To ensure you have not made any errors, open up the Config.xml file using an Internet browser, if a browser cannot open the file, then there probably are editing mistakes that must be corrected before the IDWedgeBT can be operational.

## 3 Formulas and CSV output strings

The CSV output string for DL/ID cards and the CSV output string for credit cards are predefined, and provide all available fields from a card scan.

Only the card type Magnetic has it's own formula. The Magnetic card formula parses two fields from a card, given an offset and length to define a field.

### 3.1 DL/ID Card CSV string

For Drivers License/ID cards the data will be output using a formula string that represents each field, separated by a comma.

F[, ]M[, ]L[, ]T[, ]A[, ]C[, ]S[, ]Z[, ]D[, ]E[, ]B[, ]X[, ]H[, ]I[, ]U[, ]P[, ]O[, ]V[, ]?[, ]&

The letters in the above formula represent parsed fields from a DL/ID card.

F = First Name	Z = Zip code	U = Weight
M = Middle Name	D = ID #	P = Hair Color
L = Last Name	E = Expiration	O = Class
T = Title	B = DOB mmddyyyy	V = Endorsement
A = Address	X = Sex	? = Restriction
C = City	H = Height	& = DocIssueDate*
S = State	I = Eye color	

\* DocIssueDate is available on PDF417 2D Barcodes only.



## 3.2 Credit Card CSV string

For credit cards the data will be output using a formula string that represents each field, separated by a comma. The field codes are lowercase.

`f[, ]l[, ]p[, ]m[, ]y`

`f` = First name

`l` = Last name

`p` = PAN (Card number)

`m` = EXP MM

`y` = EXP YY

## 3.3 Magnetic.txt

The Magnetic Formula used to send fields to the host and is stored in a file on the SD card. To Access the Config.xml file, you must boot the IDWedgeBT while holding the battery button as described in section 1.2.2

The magnetic parsing formula will allow for two tracks to be parsed and two fields of specific lengths and specific offsets to be parsed per track for a total of 4 fields. Each field is represent by a track number, and offset starting from zero and a length. There are three tracks and each track as 2 fields associated with it, for a total of 6 field designators

The total number of possible field is 6 and each field is mapped to a lower case letter (field designator):

**q** – Track1 Field1

**r** – Track1 Field2

**s** – Track2 Field1

**t** – Track2 Field2

**u** – Track3 Field1

**v** – Track3 Field2

The *Magnetic.txt* must have two lines of data; the first line defines the track number, offset, and length associated with each field. These values are

stored as a comma separated string of 10 integer values. Any formula with less than 10 values will be rejected. If you do not need all of the 4 possible fields, then populate the unused track, field and offset with zeros.

Example of first line of Magnetic.txt: 1,2,4,6,9,2,1,5,6,5

(Track 1, offset1 = 2, length1 = 4, offset2 = 6, length2 = 5, track 2, offset1 = 1, length1 = 5, offset2 = 6, length2 = 5).

The second line of the Magnetic.txt uses brackets to create the commas

Example of second line of Magnetic.txt:

q[,]r[,]s[,]t

Below is an example of the Magnetic.txt file for the formula above.

Example:

1,2,4,6,9,2,1,5,6,5

q[,]r[,]s[,]t

If no second offset is required, then these fields are populated with zero and the unused lowercase field designators are not required

For example, 1,1,6,0,0,2,1,6,0,0

q[,]s

In version 2.2 and later, Raw data can be extracted from each track by using the value 99 for the length.

If you want to extract the Raw Data from tracks 1 and 2:

1,0,99,0,0,2,0,99,0,0

q[,]s

**Raw data mode** for magnetic cards, if a track does not read, and **ScanMsg** is set to *true* then the output will be %NR? (Track 1 No Read) Or %ND? (Track 1 No Data)

If **ScanMsg** is set to *false* and a track does not read, the output will be just the sentinels, E.G

Track1 no read /no data = %?

Track2 no read /no data = ;?

Track3 no read /no data = %

The Magnetic formula and parsing has been designed to handle cards on any of the 3 possible tracks. The Magnetic formula applies to cards that have 25 or less characters of information encoded on any track (Except old New Mexico ID/DL). The following list of cards is used to identify Drivers License/ID cards, Credit Cards and AAA cards.

Track2 starts with	and a length of	Card Type
;000000	>28	old AZ state ID/DL
;06360	>28	old AK state ID/DL
;10	>36	Newfoundland ID/DL
;20	>36	Newfoundland ID/DL
;34	>28	AMEX Credit Card
;37	>28	AMEX Credit Card
;4	>31	VISA Credit Card
;4290	>36	AAA Membership Card
;4381	>36	AAA Membership Card
;4382	>36	AAA Membership Card
;51	>31	MasterCard Credit Card
;52	>31	MasterCard Credit Card
;53	>31	MasterCard Credit Card
;54	>31	MasterCard Credit Card
;55	>31	MasterCard Credit Card
;5490	>36	AAA Membership Card
;6006	>28	old CA state ID/DL
;6011	>31	Discover Credit Card
;610054	>28	Ontario Health ID Card
;6202	>36	AAA Membership Card
;6360	>28	United States ID/DL
;636005	>28	South Carolina ID/DL
;6=	>23	old NM state ID/DL

NOTE: AAA membership cards fall into the Magnetic formula, Credit Cards fall into Credit Card parsing, and ID/DL cards are treated as Drivers Licenses.

Each of the above numbers is also tested for the presence of the '=' sign and a length, to help identify the card type. Cards that do not meet the test will be parsed using Magnetic formula. There is one exception and that is the South Carolina ID/DL, that card is not tested for the '=', only the length is tested.

The Location of the '=' sign for Credit cards use a value consistent with a 15 or 16 digit PAN.

Revision information: Rev 1.8 and newer allows magnetic card of less than 10 characters to be parsed, previous versions of IDWedgeBT required that all cards have 10 or more characters encoded.

## 4 Serial Protocol

The outgoing messages will be bounded by start and end characters:

Start: 0x01,0x02

End: 0x03,0x04

Outgoing messages consists of two types:

- Card Scan message
- Response to Bluetooth command

Incoming messages will be bounded by start and end characters:

Start: 0x01

End: 0x04

### 4.1 Outgoing Card Scan message

There are two possible types of card scan messages

- Successful card scans
- Card Error messages

A Successful card scan will return a CSV string bounded by the start and end sentinels.

Example of Credit Card Scan:

01 02 Joe,Tokenworker,6011330055448899,01,15 03 04

The Card Error messages will be output if the ScanMsg variable in the Config.xml is set to True.

Example of possible error messages:

Mag card No Read (MNR) *	01 02 4D 4E 52 03 04
Mag card No Data (MND) *	01 02 4D 4E 44 03 04
PDf417 No Read (LNR)	01 02 4C 4E 52 03 04
1D No Read (CNR)	01 02 43 4E 52 03 04
Mag parsing error (MPE)	01 02 4D 50 45 03 04
PDF parsing error (LPE)	01 02 4C 50 45 03 04
PDF Formula Error (LFE)	01 02 4C 46 45 03 04

Magnetic Formula Error (MFE)	01 02 4D 46 45 03 04
Magnetic offset error (OTx) x=track # 1-3	01 02 4F 54 3x 03 04

\* Note: the MNR, MND message will append the track# for Magnetic parsing.

## 4.2 Incoming Bluetooth Commands and Outgoing Responses

Once the Host and the scanner are paired and connected, the host can send commands to the IDWedge. If the commands are accepted by the scanner then a response will be output to acknowledge the receipt of the command.

Below is a list of Bluetooth commands and the responses that are to be expected:

### 4.2.1 Ping

The Ping command is useful for testing the Bluetooth connection

Send: 01 <TXPING:> 04

`byte[]` PingCmd = { 0x01, 0x3C, 0x54, 0x58, 0x50, 0x49, 0x4E, 0x47, 0x3A, 0x3E, 0x04 };

Receive: 01 02 ACK 03 04

`byte[]` ACK={0x01, 0x02, 0x41, 0x43, 0x4B, 0x03, 0x04}

### 4.2.2 Get Serial Number

The Get Serial Number command returns the S/N of the Scanner

Send: 01 <SERIAL:> 04

`byte[]` GetSN = { 0x01, 0x3C, 0x53, 0x45, 0x52, 0x49, 0x41, 0x4C, 0x3A, 0x3E, 0x04 };

Receive: 01 02 2600001630 03 04

{0x01, 0x02, 0x32, 0x36, 0x30, 0x30, 0x30, 0x30, 0x31, 0x36, 0x33, 0x30, 0x03, 0x04}

### 4.2.3 Speaker Volume

The Speaker Volume command controls the Volume of the speaker in the Scanner

There are 4 possible commands

Send: 01 <SPVOLU=OFF> 04

Send: 01 <SPVOLU=LOW> 04

Send: 01 <SPVOLU=MEDIUM> 04 \* Default

Send: 01 <SPVOLU=HIGH> 04

`byte[]` SPLOW = { 0x01, 0x3C, 0x53, 0x50, 0x56, 0x4F, 0x4C, 0x55, 0x3D, 0x4c, 0x4F, 0x57, 0x3E, 0x04 };

Receive: 01 02 ACK 03 04

`byte[]` ACK ={0x01, 0x02, 0x41, 0x43, 0x4B, 0x03, 0x04}

### 4.2.4 Read Battery Level

The Read Battery Level command returns a number from 1 to 5, which correlates to the number of LEDs that light up when the battery button is pressed. This allows the application to know when the battery is getting low and needs to be charged.

Send: 01 <BATLVL:> 04

`byte[]` BATLVL = { 0x01, 0x3C, 0x42, 0x41, 0x54, 0x4c, 0x56, 0x4c, 0x3A, 0x3E, 0x04 };

Receive: 01 02 5 03 04 = fully charged

Receive: 01 02 1 03 04 = almost empty

`byte[]` BatResp ={0x01, 0x02, 0x35 0x03, 0x04} = fully charged

`byte[]` BatResp ={0x01, 0x02, 0x31 0x03, 0x04} = almost empty

#### 4.2.5 Write Registration

The Write Registration will send a 16-byte number or characters to the Scanner to be saved in the Scanners EEPROM memory, the length must be 16 or the message will not be recognized. The scanner will also triple beep on a successful write command.

Send: 01<REGKEY=TOKENWORKS123456> 04

byte[] SetReg = { 0x01, 0x3C, 0x52, 0x45, 0x47, 0x4B, 0x45, 0x59, 0x3D,  
0x54, 0x4F, 0x4B, 0x45, 0x4E, 0x57, 0x4F, 0x52, 0x4B, 0x53,  
0x31, 0x32, 0x33, 0x34, 0x35, 0x36, 0x3E, 0x04};

Receive: 01 02 ACK 03 04

byte[] ACK ={0x01, 0x02, 0x41, 0x43, 0x4B, 0x03, 0x04}

#### 4.2.6 Read Registration

The Read Registration command will retrieve the previously written 16-byte pattern sent by the write registration command. If no registration value was written, the command will not return any value.

Send: 01 <REGKEY:> 04

byte[] ReadReg = { 0x01, 0x3C, 0x52, 0x45, 0x47, 0x4B, 0x45, 0x59, 0x3A, 0x03, 0x04}

Receive: 01 02 TOKENWORKS123456 03 04

## **Appendix 1 – Power on BIT (Built in Test) Description**

On power up, the device will perform a self test and display the results on the 5 bar LED

### **BIT Sequence**

LED test, turn on/off each LED one at a time, then all 5 on/off

LED 1 - SD card Test, verify file create/read/erase

LED 2 - Test ESEK Communication, verify send/receive hardware signals

LED 3 – Test BT Communication, verify send/receive hardware signals

LED 4 - Read Device.txt and verify BT revision string and ESEK S/N string

LED 5 - Cumulative Pass/Fail - if LEDs 1-4 are lit, then turn on LED 5

Note: If the Scanner is paired or trying to pair during power up, it will fail to light LED 3,4 and 5. This is normal behavior.

If the Config.xml file is erased, the Scanner will triple beep on the next power cycle, this is confirmation that the scanner has received the initialization command and has been configured to read barcodes and magstripe card.

## **Appendix 2 – LED interpretation**

When the Function button is pressed the bottom 2 LED (LED1, 2) will light up to identify the IDWedgeBT SPP application. The IDWedgeBT can run other applications, the HID application will only light up the first LED, and the SPP application will light up LED1 and 2. The IDWedgeBT USB Keyboard application will light three LEDs 1,2,3. This is helpful for all users to identify what application is running on the device.

The Connection Status LED will only light when the device is in “SD Card Access” mode, see section 1.2.2. The LED will stay light until the device has been turn off/on.



## Appendix 3 – Auth settings

Authentication can have the values 0, 1, 2, or 4, depending on the mode desired with some limitations on implementation.

- 0      // With this mode, the module uses Bluetooth version 2.0 NO encryption (open mode). This mode is useful for legacy devices that do not need security. For this mode to work, both devices must support open mode. If either device requests authentication, the PIN code will be required.
- 1      // In Bluetooth version 2.1, the default is keyboard I/O mode (which is considered as a secure mode). For Android devices, the user is prompted with a 6-digit code and is asked to verify that the code matches on the module. Because the module cannot display a code, simply press OK or Yes on the remote device to authenticate.
- 2      // This mode corresponds to Bluetooth version 2.1 Secure Simple Pairing (SSP), or just works mode. This mode works with iPhones and PCs, however it may not work appropriately with some Android devices.
- 4      // This mode is PIN code mode, which forces Bluetooth version 2.0 PIN code authentication. The functionality is for Serial Port Profile only and it does not work in HID mode for iOS devices.