



# MonkeyBUS Development Platform User's Guide

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## 1 Introduction

The MonkeyBUS is a development platform can be use to evaluate the PIC1814K50 microcontroller with an in-circuit programmer or using its onboard bootloader. It can also be used as part of a finishing product in conjunction with other devices.

### 1.1 Development Kit Content

The MonkeyBUS development kit comes with the following:

- MonkeyBUS board
- Pin headers
- Jumpers

### 1.2 MonkeyBUS hardware components

The following is the breakdown of the MonkeyBUS hardware

1. PIC18F14K50-SOIC microcontroller
2. Switch SW1 for RA3 input
3. Jumper switches JP6-1, JP6-2, JP6-3 and JP-4 for LED or I/O selection. By default, LED control is configured by PCB tracks. Jumper will only become effective when the track is cut
4. Mini USB connector. MonkeyBUS can be powered by computer's USB power
5. JP4 power input selection. Select from USB power's 5V (VBUS), 3.3V or external input EXTVIN
6. 12MHz crystal
7. In circuit debugger connector pad. Left blank when not used.
8. Jumper JP1 and JP2 connector for input and output of the PIC18F14K50 microcontroller as well as pin2 SV1
9. Jumper JP3 is a combination of JP1 and JP2 can be use to connect HD44780 LCD
10. PWM selection on JP5
11. 10 kilo ohm potential meter
12. SJ1 and SJ2 pad for pull up resistor selection use for I2C
13. Device port SV1 can be used to communicate with external devices on I2C, SPI and full featured UART as well as digital input/output.
14. VIN-1 and VIN-2 (Ground) use for external power supply

### 1.3 Software and Sample Programs

Download the following software. The links to these softwares can be found on [www.monkeyboard.org/getting-started](http://www.monkeyboard.org/getting-started)



- Free IDE MPLAB from Microchip
- MPLAB C for PIC18 v3.40 Standard-Eval Version
- Microchip Solutions v2011-07-14

## 2 Getting Started

### 2.1 MonkeyBUS as a Standalone Device

The MonkeyBUS can be implemented as:

- Using the program loaded on the PIC18F14K50 and HID keyboard interface
- Reprogramming the MonkeyBUS with alternate demonstration program or user program

#### 2.1.1 Using the MonkeyBUS As Is

Setup MonkeyBUS to demonstrate PIC18F14K50 microcontroller:

1. Place Jumper switch on VBUS
2. Connect mini USB port to MonkeyBUS and PC
3. Install USB driver (See section 2.2)
4. Open notepad
5. Press SW1 switch to see alphabet and numeric letters being typed in on every press of the button.

#### 2.1.2 Reprogramming MonkeyBUS

Reprogramming MonkeyBUS with other demonstration program or user program using MonkeyBUS as a standalone device, the following is required:

- Example source code from Microchip Solutions v2011-07-14 or user source code
- The compiler MPLAB C compiler for PIC18 V3.40 compiling the source code into a HEX file
- Microchip Solutions v2011-07-14 package is installed. The HIDBootLoader.exe the Microchip Solutions v2011-07-14\USB\Device - Bootloaders\HID directory is used to reprogram the MonkeyBUS

Do the following steps to reprogram the MonkeyBUS

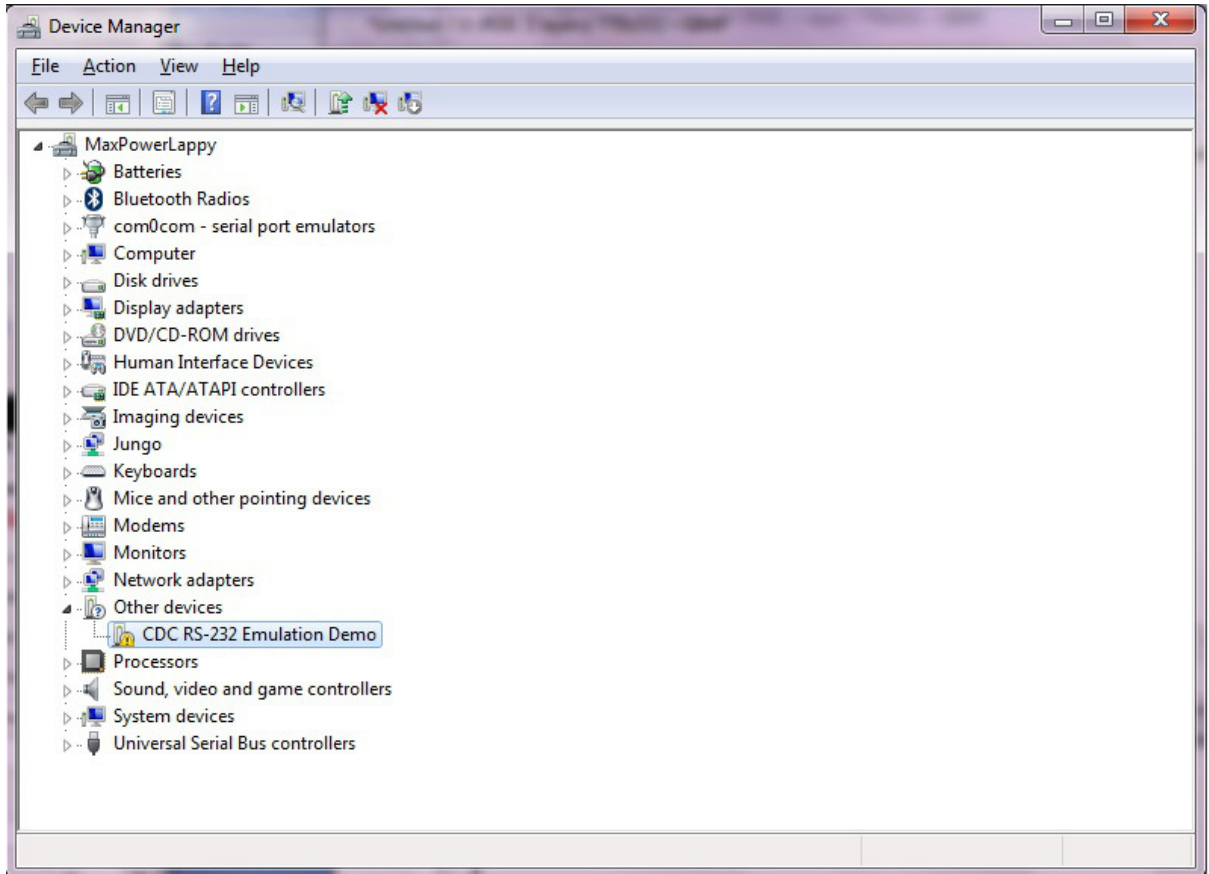
1. Run HIDBootLoader.exe
2. Open hex image
3. Power on MonkeyBUS by placing jumper switch on one of the JP4 position while holding SW1
4. Program the MonkeyBUS
5. Power cycle MonkeyBUS

### 2.2 PC Connection Via USB

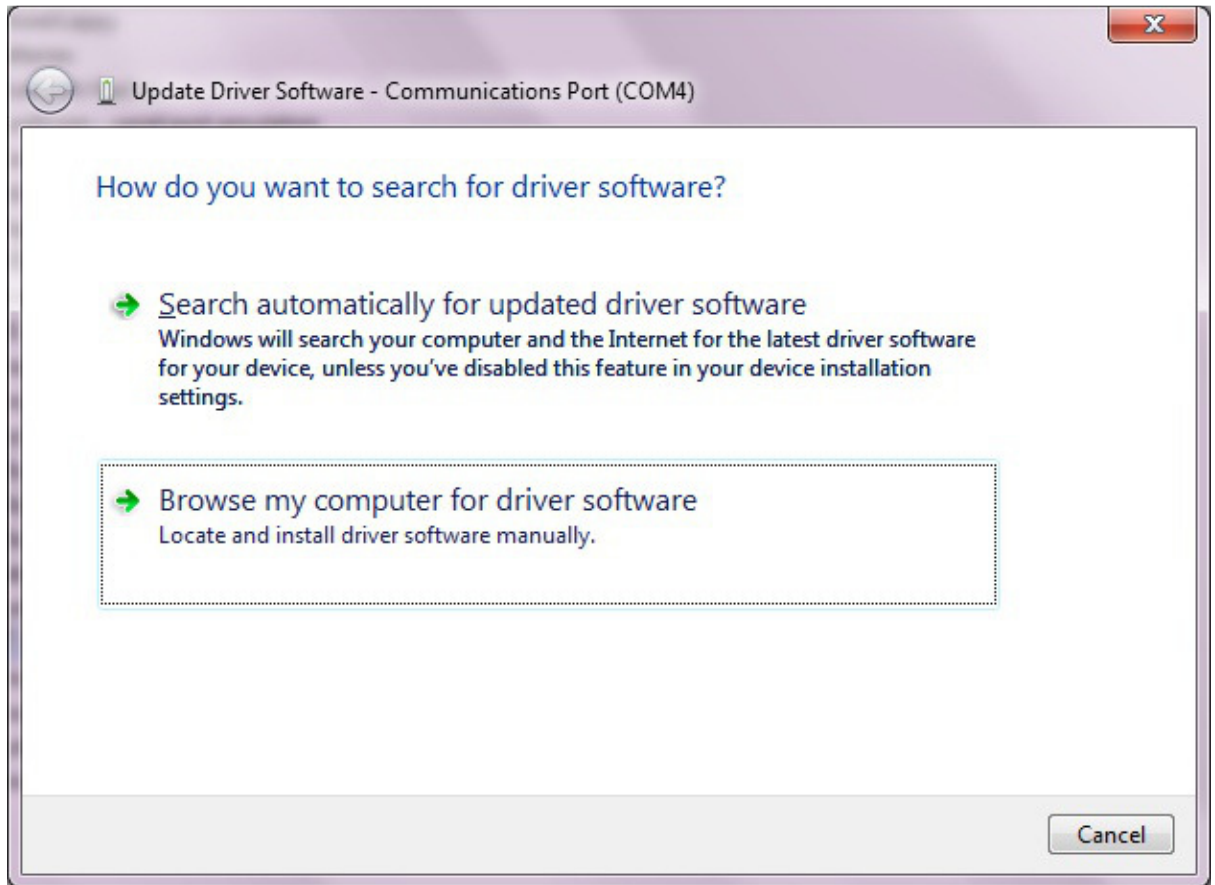
The MonkeyBUS can communicate with the PC via the USB port. The data is routed through the onboard USB stack and emulates RS-232 communication. To use MonkeyBoard with USB communication, install mchpcdc.inf file on the host PC:



1. Create a folder named, HPCINF, anywhere on the host PC's hard drive.
2. Locate the mchpcdc.inf under Microchip Solutions v2011-07-14\USB\Tools\USB CDC Serial Demo\inf
3. Copy the content of the inf folder to HPCINF folder created in step 1
4. Connect the board to the PC and power up the board.
5. On Windows start bar press Start then right click on Computer and select property
6. Click on Device Manager and you will see the driver is not found for CDC RS232 Emulator Demo



7. Right click on the CDC RS232 Emulator Demo and select Update Driver Software
8. Click on "Brows my computer for driver software"



9. Locate the file (created in Step 1) and click Next. The following screen will appear.



### 3 Hardware Elements

#### 3.1 MonkeyBUS Power Configuration

The jumper JP4 is use to select the power supply to the Microcontroller, the board and power output (pin 2) on SV1 device port.



A typical PC USB port can supply up to 100mA. If more current is require, use the EXTVIN jumper and power the MonkeyBUS with 3.3V or 5V on VIN-1 and ground with VIN-2.

### 3.2 LEDs

The four LEDs on the MonkeyBUS by default are linked to RC0 to RC3 output. They can be used as a digital input or output by cutting the track on the bottom layer of the PCB. A jumper can be used thereafter to select between LED control and digital input/output.

### 3.3 Straight Through Pins

All function pins of the PIC18F14K50 are routed through to JP1 and JP2. Header pins are provided so that they can be placed at user's discretion.

### 3.4 LCD Connector

The PIC18F14K50 function pins are rearrange to suit the Hitachi based LCDs. The HD44780 can be dropped in directly into JP3

### 3.5 PWM On/Off Switch

When using the PWM function on the PIC18F14K50, place jumper switch on JP5 and short SJ4 on the JP5 side. This is designed to be used to control the backlight of the HD44780 LCD. If a constant brightness is used, short SJ4 pad on the LED- side.

### 3.6 Potentiometer

The onboard potentiometer can be used to control the contrast on the HD44780 or analogue input. Short SJ3 on the R9 side to use as analogue input for MonkeyBUS or V0 side to control the contrast of the HD44780 LCD

### 3.7 Pull Up Resistors

Two pull up resistors are provided on the MonkeyBUS as some I2C devices require pull up on the data and clock signal. To use the pull up resistors, short pads SJ1 and SJ2.

### 3.8 Pickit 2 Connector

Microchip's low-cost programmer, PICkit 2, can be connected to the 6-pin interface provided by ICSP.