Megawin

USB EasyCOM

User Manual

Index

1. Introduction

In the PC world, the UART has been the industrial standard port for connection throughout decades. Nowadays, a lot of different connection protocols are getting stronger supports because the performance of UART is not catching up with current requirement.

Despite this, many applications still use COM port as a typical way to communicate with a peripheral device. A challenge remains at hand to boost the performance of this port without sacrificing huge efforts.

The USB (Universal Serial Bus) due to its speed and performance, has become the better choice in comparison with the standard COM port. So, Megawin provides the USB EasyCOM solution for users to transfer their system easily from UART to USB.

This document will show the user how to implement a "**Virtual COM**" solution. **It retains the current setting of COM, but gives more high performance**. In this solution, Megawin USB EasyCOM supports full COM port function including Read/Write data, Line Control/Status and Modem Control/Status.

In addition, MG84FG516 not only makes the device simple and easy to use, but also integrates some powerful peripherals into the same chip, such as: SPI, TWSI, and General IO. It helps the user to easily control any device on the system.

2. Advantage

USB is on every new computer.
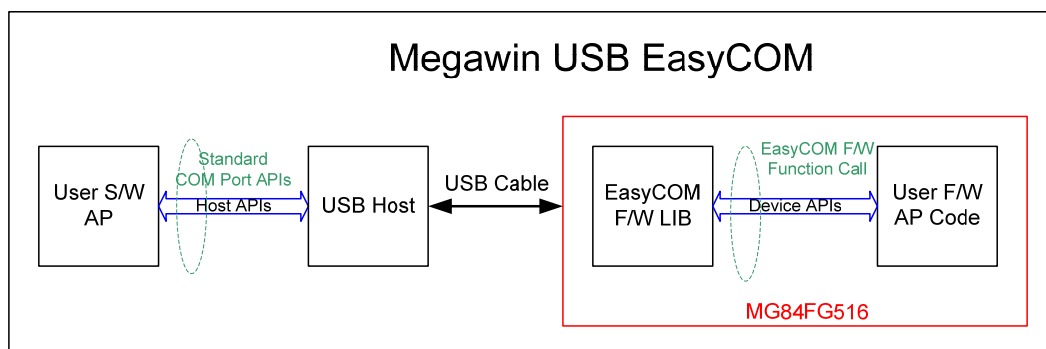
No modification on the PC application.

More flexibility on the USB: data buffering, no data lost, etc.

USB provides the power supply for the application

Window Build-In driver on Win2K, WinXP, Vista32, Vista64.

3. Use Megawin USB EasyCOM

3.1. System Handle Block

Fig-1

3.2. Hardware Installation

Plug the "**MG84FG516 EV Stick**" (Please reference the " ~Megawin Easy USB\MG84FG516\Hardware\Evaluation Stick\MG84FG516 Evaluation Stick for more details to confirm the EasyCOM sample code stored in MG84FG516 Evaluation stick) into a PC's USB port, and instruct Device Wizard where the installation file **"0E6A0316_USBEasyCOM_v1.04.inf"** is located. After the driver is successfully installed, user will see the following page in the "**System\Hardware\Device Manager**", and see a new entry (COM*n*) added to the list of available COM ports. (**Fig-2**)
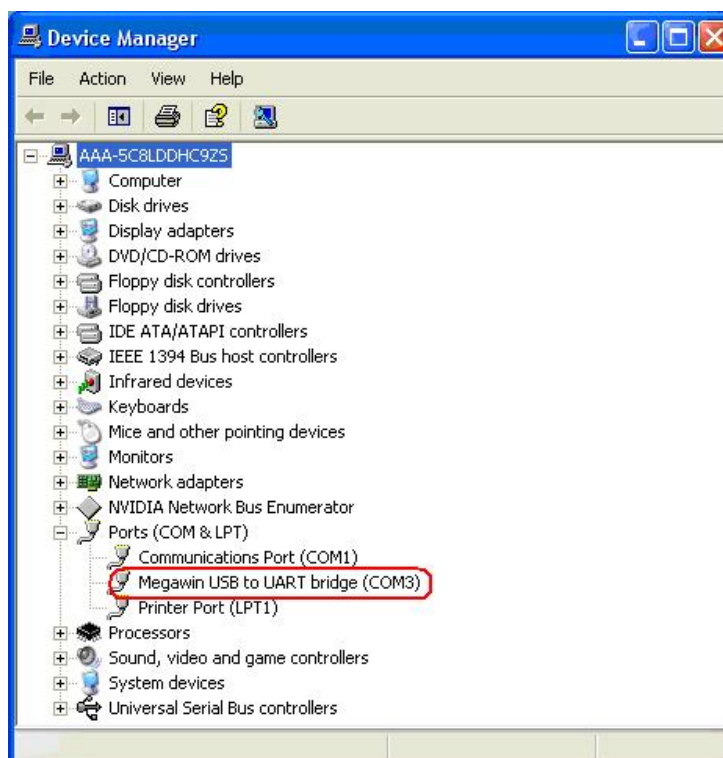
Fig-2

3.3. Software Developing Resource

3.3.1. INF: 0E6A0316_USBEasyCOM_v1.04.inf (Driver Installation file)

3.3.2. API: Used standard COM port APIs in OS defined.

3.4. Firmware Develop Requirements

3.4.1. EasyCOM.LIB (Firmware Library File)

3.4.2. EasyCOM.H (Firmware Header File)

3.4.3. DFU.EXE (Device Firmware Upgrade Software)

3.5. Firmware Library Install

3.5.1. Add the " **EasyCOM.LIB** "into your own project. (**Fig-3**)

 3.5.1.1.   **InFlag , in " Extern.h"** (This flag indicates the data has been received in **InBuffer**)

 3.5.1.2.   **InLen , in " Extern.h"** (Indicate the data size in **InBuffer**)

 3.5.1.3.   **InBuffer[64] , in " Extern.h"** (Data Buffer)

 3.5.1.4.   **Initial();, in " Extern.h"**(This function enables USB and will be called in user project)

 3.5.1.5.   **USB_Read_Data_Complete(); , in " Extern.h"** (This function will release buffer for next data transfer from PC)

 3.5.1.6.   **USB_Send_Data_To_PC(Len , Buffer); , in " Extern.h"** (This function will send **"Len"** Data to PC)

 3.5.1.7.   **USB_Event(); , in " Extern.h "** (Notice the USB power event from Host)

  3.5.1.7.1.   **Suspend :** Suspend event from the Host

  3.5.1.7.2.   **Wakeup :** Wakeup event from the Host

  3.5.1.7.3.   **Reset :** Reset event from the Host

  3.5.1.7.4.   **EmuOK:** USB enumeration OK

 3.5.1.8.   **UART_Event(); , in " Extern.h "** (Notice the UART Line/Control state from Host ,and return UART state to Host)

  3.5.1.8.1.   **LC.Flag :** Setting Line coding properties event from Host

   ➢   **Com.LC.BaudRate.DW :** Data terminal rate (BaudRate), in bits per second. Please refer sample code to get more clear definition easily.

   ➢   **Com.LC.StopBit :** 0 for 1 Stop bit, 1 for 1.5 Stop bits, 2 for 2 Stop bits

   ➢   **Com.LC.ParityChk :** 0 for None, 1 for Odd, 2 for Even,

3 for Mark, 4 for Space

> **Com.LC.DataBit :** 5, 6, 7, 8, 16. It defines the data bit count in one packet transfer.

3.5.1.8.2. **LS.Flag :** Setting Line state event from Host and "**Com.LS.State**" content indicates the control signal bitmap as following definition:

> Bit0 (DTR) : Indicates to DCE if DCE is present or not , 0 for not present , 1 for present

> Bit1 (RTS) : Carrier control for half duplex modems , 0 for Deactivate carrier , 1 for Activate carrier

3.5.1.8.3. **SB.Flag :** Send break event from Host and " **Com.SB.Time.W** " contains the length of time in milliseconds.

> 0xFFFF : Continuous break

> 0x0000 : Stop break

3.5.1.9. **USB_Send_UartState_To_PC(State); , Extern.h"** (This function will send Uart State to PC)

3.5.1.9.1. **Com.State :** (bitmap), set "1" for event active.

> Bit0 : " **UART_RX_CARRIER** " return the state of carrier detection mechanism of device (DCD)

> Bit1 : " **UART_TX_CARRIER** " return the state of transmission carrier (DSR)

> Bit2 : " **UART_BREAK** " return the state of break detection mechanism of device

> Bit3 : " **UART_RING_SIGNAL** " return the state of ring signal detection of device (RI)

> Bit4 : " **UART_FRAM_ERROR** " return a framing error has occurred

> Bit5 : " **UART_PARITY_ERROR** " return a parity error has occurred

> Bit6 : " **UART_OVER_RUN** " return a received data has been discarded due to overrun in the device

> Bit7 : Reserved

3.5.2. Include the Header file " **EasyCOM.H** " in the source modules which will use parameter or function call (**Fig-3**) , The following items could be modified by user application.

3.5.2.1. **USB_VID , in " Define.h"** (This VID, 0x0E6Ah, is registered under Megawin Technology Co., Ltd. at **USB-IF**, Any third party needs the written approval from Megawin in order to use this VID)

3.5.2.2. **MF_STRING , in " Define.h"** (Define for Manufacture String are
supported)

3.5.2.3. **PD_STRING , in " Define.h"** (Define for Product String are supported)

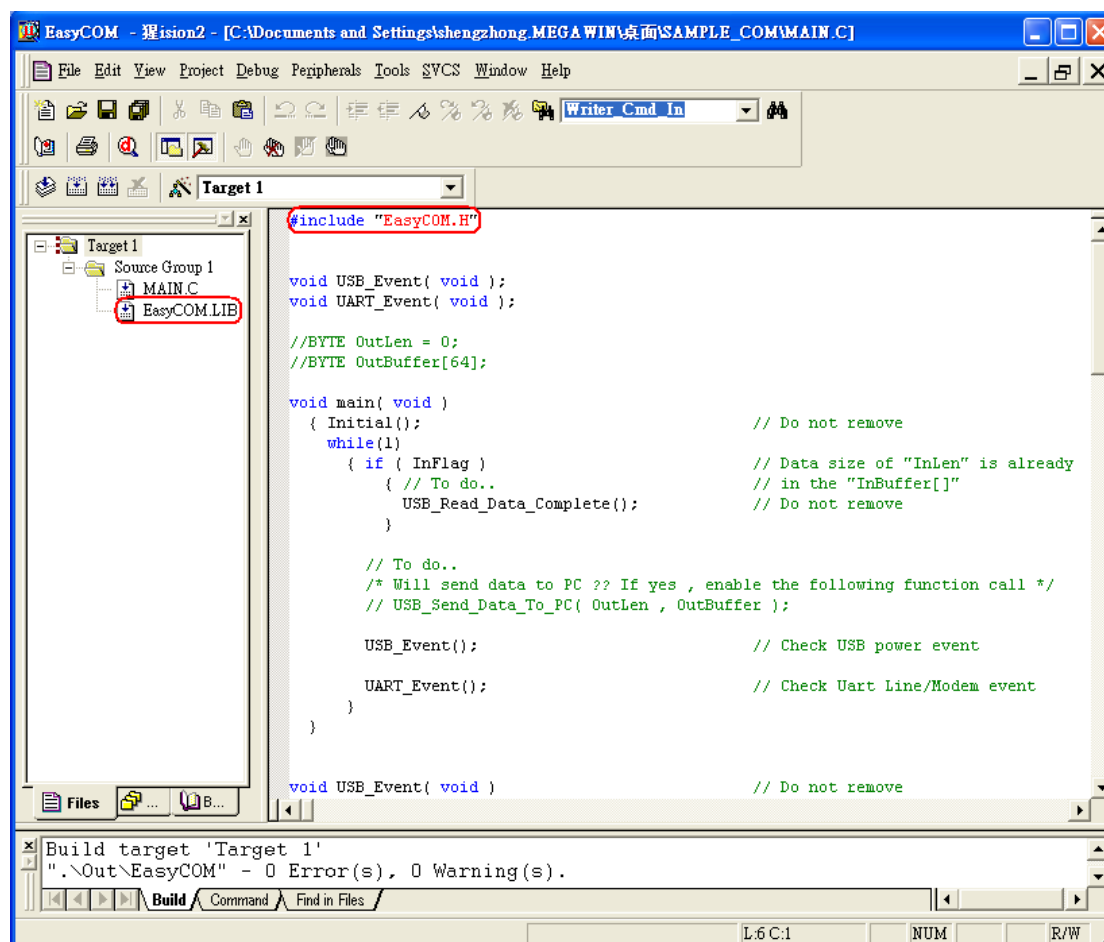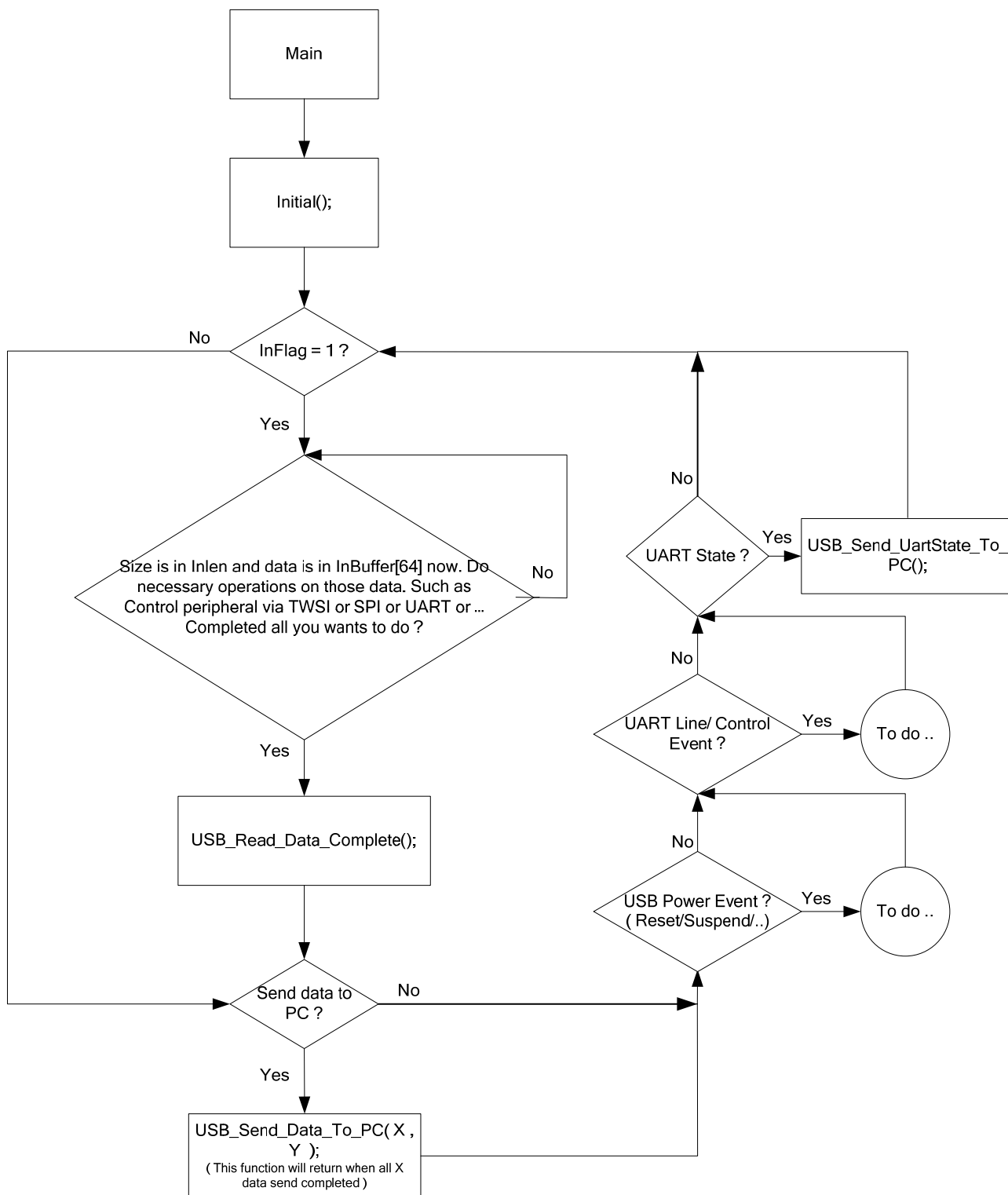3.5.2.4. **SN_STRING , in " Define.h"** (Define for SerialNumber String are
supported **)**

Fig-3 ~\Megawin Easy USB\EasyCOM\SampleCode\MAIN.C

3.6. Firmware Control Flow

```
                    ┌─────────────┐
                    │    Main     │
                    └──────┬──────┘
                           │
                    ┌──────▼──────┐
                    │  Initial(); │
                    └──────┬──────┘
                           │
         No            ◇──▼──◇
        ◄──────────── InFlag = 1 ?  ◄──────────────────
                       ◇─────◇
                        Yes
```

Main

Initial();

No — InFlag = 1 ?

Yes

Size is in Inlen and data is in InBuffer[64] now. Do necessary operations on those data. Such as Control peripheral via TWSI or SPI or UART or ... Completed all you wants to do ? — No

Yes

USB_Read_Data_Complete();

Send data to PC ? — No

Yes

USB_Send_Data_To_PC(X , Y);
(This function will return when all X data send completed)

No — UART State ? — Yes — USB_Send_UartState_To_ PC();

No — UART Line/ Control Event ? — Yes — To do ..

No — USB Power Event ? (Reset/Suspend/..) — Yes — To do ..

Fig-4

3.7.   Used MCU Resource

3.7.1. Direct Data Memory : 14 bytes

3.7.2. Indirect Data Memory : 33 bytes

3.7.3. eXternal Data Memory : 64 bytes

3.7.4. Sample Code size : 2884 bytes

3.7.5. USB ISR use "REG BANK 1"

```
TYPE      BASE        LENGTH      RELOCATION    SEGMENT NAME
-----------------------------------------------------------

* * * * * * *    D A T A    M E M O R Y    * * * * * * *
REG       0000H       0008H       ABSOLUTE      "REG BANK 0"
REG       0008H       0008H       ABSOLUTE      "REG BANK 1"
DATA      0010H       0005H       UNIT          ?DT?_USB_SEND_DATA_TO_PC?USB
DATA      0015H       0005H       UNIT          _DATA_GROUP_
DATA      001AH       0002H       UNIT          ?DT?USB
          001CH       0004H                     *** GAP ***
BIT       0020H.0     0000H.1     UNIT          ?BI?USB
          0020H.1     0000H.7                   *** GAP ***
IDATA     0021H       0013H       UNIT          ?ID?USB
IDATA     0034H       000EH       UNIT          ?ID?COM
IDATA     0042H       0001H       UNIT          ?STACK

* * * * * * *    X D A T A    M E M O R Y    * * * * * * *
          0000H       0200H                     *** GAP ***
XDATA     0200H       0040H       ABSOLUTE
```

Fig-5
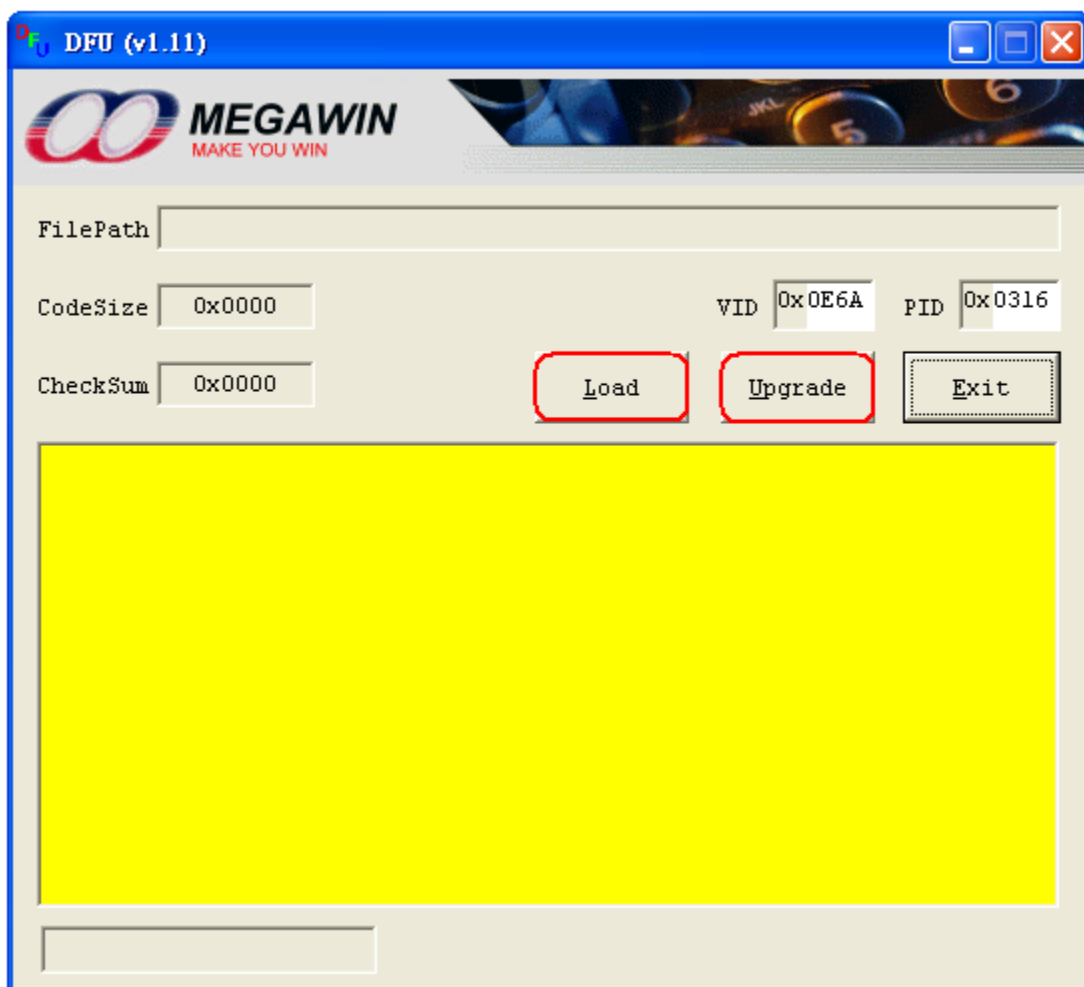
3.8.   Using Device Firmware Upgrade

After firmware development, user could update the device firmware through this software tool by following procedures.

3.8.1. Press the **DFU** (**Reset**) button on "**MG84FG516 EV Stick**".

3.8.2. Run " **DFU.EXE** (**Fig-5**)

3.8.3. " **Load** " file which you want to upgrade

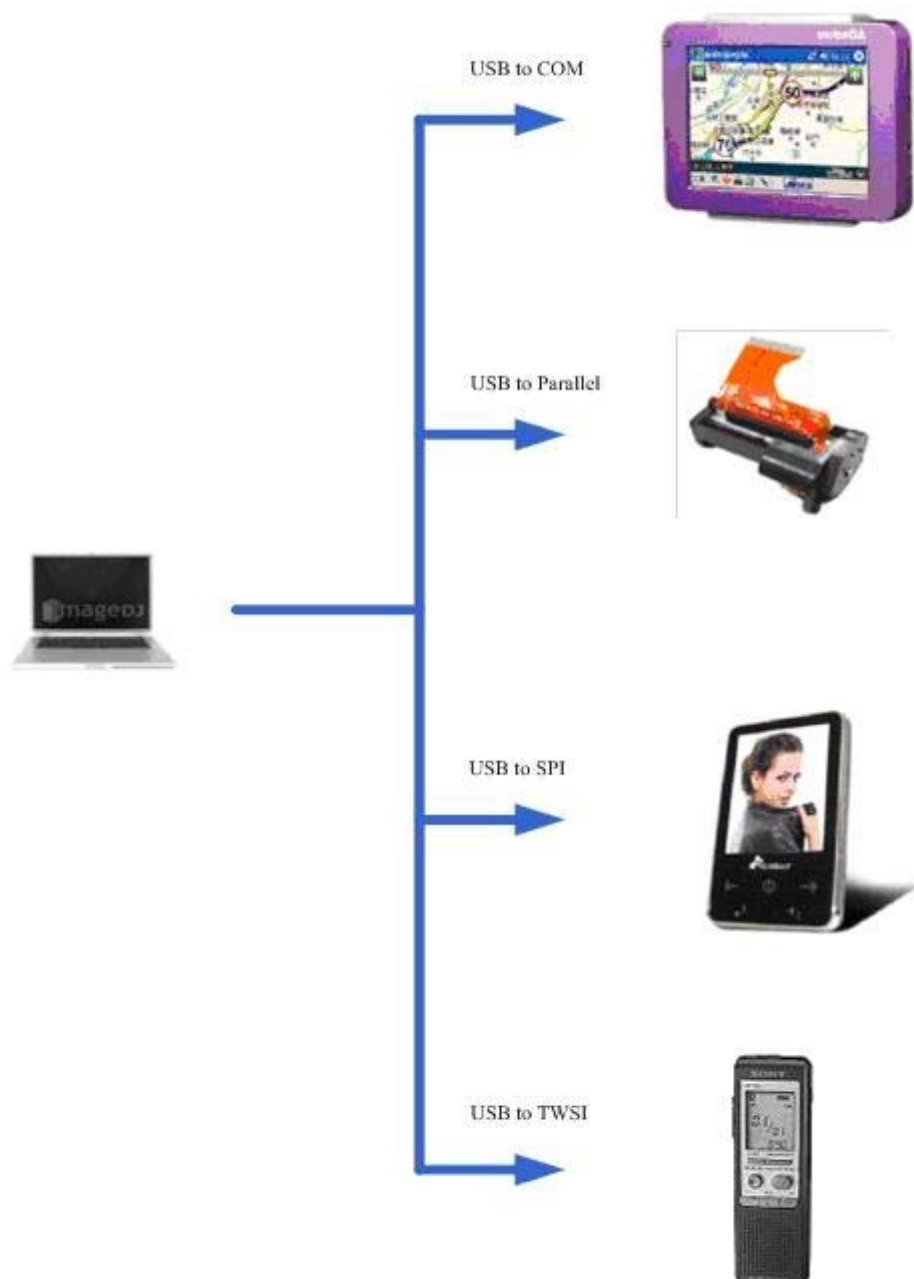**3.8.4.** " **Upgrade** " to process upgrade procedure

Fig-6

3.9.   Limitation

3.9.1. The application doesn't work with windows98/ME and Linux OS.

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4. Example Application

4.1.   USB to MCU GPIO

4.2.   USB to UART

4.3.   USB to Parallel Port

4.4.   USB to SPI

4.5.   USB to TWSI

4.6.   USB to user's interface

Fig-7

5. Obtaining The Parts

The **MG84FG516** device comes in a 64 pin surface mount LQFP-64 package. For this solution, some passives, and the USB socket. Of course, customers could obtain it from Megawin in Taiwan. Please, visit the Megawin's website at ***http://www.megawin.com.tw*** for the latest details on pricing and availability

6. Revision History

Revision	Description	Date
v1.00	Release version	2011/03/01