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MCF5253 Evaluation Board Quick Start Guide

1 Overview

1.1 Introduction

Welcome to the MCF5253 Evaluation Board (EVB). The EVB features the MCF5253 microcontroller, which is a part of the ColdFire® family and includes a high speed Universal Serial Bus On-The-Go (USB OTG) module. This module is USB 2.0 compliant, contains an internal USB physical transceiver (PHY) with a USB transceiver macrocell interface (UTMI+), and supports device and host mode.

1.2 Purpose of this Document

This document:

- Introduces you to the EVB components
- Provides you with instructions for connecting the EVB to a power supply and to a computer
- Guides you in running a demonstration of the EVB's high speed Universal Serial Bus On-The-Go (USB OTG) module.

Contents

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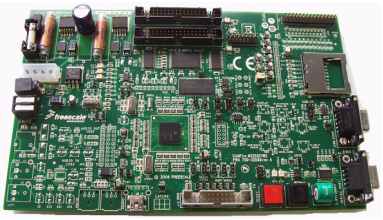
1.3 Components of the EVB

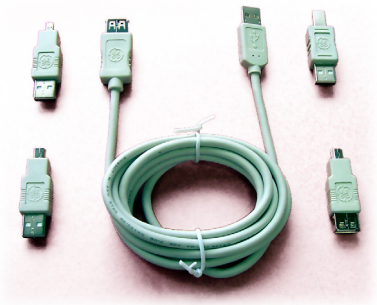
1.3.1 EVB Kit Contents

Figure 1 shows the components included in the MCF5253 EVB kit. Please inspect your kit to ensure all components are present and undamaged. If any of these components are missing or damaged, please contact Freescale Semiconductor using resources available at http://www.freescale.com/support.



EVB circuit board

Power adapter with plugs



GE 6-in-1 Cable

USB A-B cable (6')

P&E USB BDM interface

- MCF5253 Evaluation Board Quick Start Guide (this document)
- Warranty Registration Card (920-75133)
- Technical Information Center Worldwide Contact List
- MCF5253 ColdFire® Reference Manual
- M5253EVB User's Manual
- ColdFire Programmer's Reference Manual

Additional components

Figure 1. Components in the MCF5253 EVB Kit

1.3.2 What You Need to Provide

In addition to the components listed in Section 1.3.1, "EVB Kit Contents", you may also require the following components not included in the EVB kit:

- Two standard circuit board jumpers
- A DB-9 serial cable (male to female)
- A USB-to-serial adapter (if your computer is not equipped with a serial port)
- A USB flash drive (also known as a jump drive or a thumb drive)
- A computer meeting the following requirements:
  - Windows 98SE or later
  - An available DB-9 serial port (or an extra USB port for a USB-to-serial adapter)
  - An available USB port

2 Preparing the EVB for Operation

This section provides instructions for setting jumpers on the EVB circuit board and connecting it to your computer.

2.1 Configuring the EVB Jumpers

The EVB circuit board is shipped from the factory with several jumpers. A complete listing of the jumpers is found in the *M5253EVB User's Manual*.

To run the USB demonstration:

- Leave the factory-installed jumpers in their place
- Add jumpers to the JP42 and JP43 jumper blocks, located as shown in Figure 2.

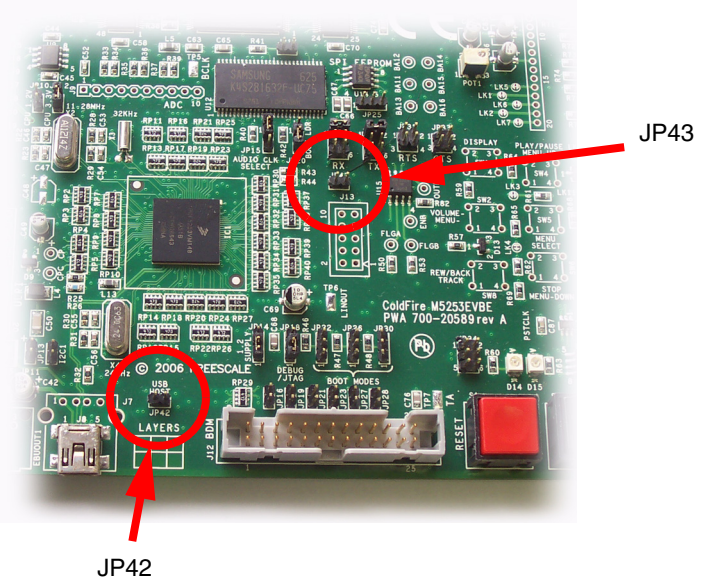


Figure 2. Location of JP42 and JP43 Jumper Blocks

2.2 Connecting the EVB to Your Computer

The EVB communicates with your computer using a serial interface. The EVB circuit board includes a DB-9 female serial connector, which is labeled SERIAL PORT.

NOTE

Do not confuse the SERIAL PORT connector with the adjacent FLEXCAN connector, which also uses a DB-9 interface.

Attach the male end of a DB-9 serial cable to this connector. Attach the other (female) end to the serial connector on your computer.

If your computer does not have a serial port, install a USB-to-serial adapter. This adapter creates a virtual serial port on your computer and allows the EVB to communicate with the computer.

3 Running the USB Demonstration

The EVB is shipped with a sample uClinux-based application, preloaded in the EVB's flash memory, which allows you to read the contents of a USB flash drive. This application serves as one demonstration of the MCF5253's high speed USB OTG capabilities.

Follow the steps in this section to run the demonstration.

3.1 Configure a Terminal Application for Viewing the EVB Output

Run a terminal application, such as HyperTerminal, to communicate with the EVB and to view its output.

Start the terminal application and set its communication parameters as shown in Table 1.

Table 1. Terminal Communication Parameters

Parameter	Value
COM port	The PC port the DB-9 cable is connected to
Baud rate	115200 or 19200[1]
Data bits	8
Parity	None
Stop bits	1
Flow control	None

[1] If communication with one baud rate is not possible, select the other baud rate.

3.2 Apply Power to the EVB

Follow these steps to apply power to the EVB:

1. Select the appropriate plug for your electrical system.
2. Connect the plug to the power adapter.
3. Insert the power adapter's barrel plug into the corresponding socket (P2) of the EVB circuit board.
4. Insert the electrical plug into an electrical outlet.

When the EVB is properly receiving power, the green power LEDs on the circuit board glow.

3.3 Ensure Demo Starts Properly

After you apply power as described in Section 3.2, "Apply Power to the EVB", check that the following events occur:

1. Your terminal application displays the startup message shown in Figure 3.

```
Hard Reset

ColdFire MCF5253 on the M5253EVB
Firmware v4c.1b.1a (Built on Nov  7 2006 12:11:38)
Copyright 2006 Freescale Semiconductor, Inc.

Enter 'help' for help.

Press any key to stop autoboot
3
```

Figure 3. Demonstration Startup Message

2. The last line in Figure 3 changes to reflect a three-second countdown.
3. Your terminal application displays a series of messages reflecting the boot process of the preinstalled uClinux kernel and drivers. At the end of the process, your terminal application displays information similar to that shown in Figure 4.

NOTE

You may need to press the Enter key to see the uClinux # prompt shown in Figure 4.

```
Starting syslogd and klogd
/sbin/ifconfig missing, unable to configure the network
Setting system clock to RTC
WARN: Real-time clock power loss.
      Date information may be corrupt!
WARN: Real-time clock power loss.
      Date information may be corrupt!
Wed Feb 21 04:56:21 2007  0.000000 seconds


BusyBox v1.00 (2007.03.01-23:27+0000) Built-in shell (msh)
Enter 'help' for a list of built-in commands.

#
```

Figure 4. Typical Result of the uClinux Boot Process

If these events do not occur, it indicates the USB demo was not properly preloaded onto your EVB's flash memory. Please see Section 4, "The CF Flasher Tool", for information on how to reload the demo into the EVB's flash memory.

3.4 Attach the Flash Drive to the EVB

Follow these steps to attach your USB flash drive to the EVB:

1. Use the GE 6-in-1 USB cable and adapters to create a cable with the following connectors:
   - Mini-A plug
   - Standard-A socket
2. Attach the mini-A plug of the cable to the mini-AB socket on the EVB.
3. Attach the USB flash drive to the standard-A socket of the cable.

3.5 View Contents of the Flash Drive Using uClinux

Follow these steps to mount your flash drive and to access its contents using the uClinux command line.

1. In your terminal application, ensure the # uClinux prompt is visible. If it is not, press the Enter key to display it.
2. Type the following command and press Enter:

```
insmod /lib/modules/2.6.17.7-uc1/kernel/drivers/usb/host/ehci-hcd.ko
```

3. Observe the output in your terminal application and ensure it resembles the output shown in Figure 5. If it does not, repeat the steps in Section 3.4, "Attach the Flash Drive to the EVB" and Section 3.5, "View Contents of the Flash Drive Using uClinux" with another flash drive.

```
MCF5253 USB EHCI: is found. ID=0x5 Rev=0x40
ehci ehci.1: EHCI Host Controller
ehci ehci.1: new USB bus registered, assigned bus number 1
ehci ehci.1: irq 180, io mem 0x80000600
ehci ehci.1: USB 0.0 started, EHCI 1.00, driver 10 Dec 2004
usb usb1: Product: EHCI Host Controller
usb usb1: Manufacturer: uClinux 2.6.17.7-uc1 ehci_hcd
usb usb1: SerialNumber: ehci.1
usb usb1: configuration #1 chosen from 1 choice
hub 1-0:1.0: USB hub found
hub 1-0:1.0: 1 port detected
ehci-mcf5253: can't find transceiver!
ehci: probe of ehci.0 failed with error -16

# usb 1-1: new high speed USB device using ehci and address 2
usb 1-1: Product: Cruzer Micro
usb 1-1: Manufacturer: SanDisk Corporation
usb 1-1: SerialNumber: 200443176107C3E0C684
usb 1-1: device v0781 p5151 is not supported
usb 1-1: configuration #1 chosen from 1 choice
scsi0 : SCSI emulation for USB Mass Storage devices
  Vendor: SanDisk   Model: Cruzer Micro      Rev: 0.1
  Type:   Direct-Access                    ANSI SCSI revision: 02
SCSI device sda: 501759 512-byte hdwr sectors (257 MB)
sda: Write Protect is off
sda: assuming drive cache: write through
SCSI device sda: 501759 512-byte hdwr sectors (257 MB)
sda: Write Protect is off
sda: assuming drive cache: write through
 sda:<7>usb-storage: queuecommand called
 sda1
sd 0:0:0:0: Attached scsi removable disk sda

#
```

Figure 5. Typical output of the *insmod* command

4. Type the following commands, pressing Enter after each command, to mount the flash drive in uClinux:

```
mkdir /tmp/mydisk
mount /dev/sda1 /tmp/mydisk
```

NOTE

If your flash drive is formatted using a Windows-based file system (FAT or NTFS), you may receive the message shown in Figure 6. This message does not affect the functionality of this demo.

```
VFS: Can't find an ext2 filesystem on dev sda1.
```

Figure 6. Warning Message During the Mount Process

5. Type the following commands, pressing Enter after each command, to view the contents of the flash drive:

```
cd /tmp/mydisk/
ls
```

6. Type the following command to create a new, empty file called newfile.txt on your flash drive:

```
touch newfile.txt
```

Congratulations. You have successfully used the high speed USB OTG module of the MCF5253 in host mode to communicate with a USB device.

4 The CF Flasher Tool

CF Flasher is a Windows-based software tool that is used to program and erase the flash memory on the EVB. The tool can be downloaded from the MCF5253 Product Summary Page on the Freescale ColdFire Web site, http://www.freescale.com/coldfire. If you have trouble running the USB demonstration application discussed in Section 3, "Running the USB Demonstration", use CF Flasher to clear the EVB's flash memory and transfer the demonstration to it.

This section guides you through installing CF Flasher, connecting the required hardware to use it, and using it to transfer the USB demonstration application to the EVB flash memory.

4.1 Installing CF Flasher

To install CF Flasher on your computer.

1. Start your computer and ensure that you are logged in with administrative privileges.
2. Create a folder called `CFFLASHER` on your desktop.
3. Download CF Flasher from the MCF5253 Product Summary Page on the Freescale ColdFire Web site, http://www.freescale.com/coldfire, and save the files to the `CFFLASHER` folder on your desktop.
4. Open the `CFFLASHER` folder on your desktop, and extract the contents of the `CFFLASHER.zip` archive (two applications, `CFFlasher 3.1 setup.exe` and `CF Flasher 3.1 M5208EVB patch.exe`) to the same folder.
5. Run the application `CFFlasher 3.1 setup.exe` to begin installing CF Flasher and required drivers for the P&E USB BDM interface.
6. Accept all default options during the installation.
7. When prompted, restart your computer.
8. Run the application `CF Flasher 3.1 M5208EVB patch.exe` to apply a necessary patch to CF Flasher.

9. Accept all default options during the installation.
10. If prompted, restart your computer.
11. Ensure that the icon CF Flasher 3.1 appears on your desktop. If it does not, repeat the steps in this section.

4.2 Connecting Required Hardware

CF Flasher communicates with the MCF5253 EVB through the provided P&E USB BDM interface. Follow the steps below to connect the proper components for CF Flasher to operate.

1. Connect the standard-A plug of the 6' USB cable to your computer.
2. Connect the standard-B plug of the 6' USB cable to the P&E USB BDM interface.
3. Locate the the BDM port (labeled J12 BDM) on the EVB circuit board.
4. Connect the P&E USB BDM interface to the BDM port on the EVB circuit board, making sure that pin 1 on the interface (as labeled on the tag near the connector) aligns with pin 1 on the port.
5. If the EVB has not been connected to its power supply as described in Section 3.2, "Apply Power to the EVB", follow the instructions therein to apply power to the EVB.

4.3 Transferring the USB Demonstration to the EVB

The USB demonstration is stored as a flash memory image in the CF Flasher folder (see Section 4.1, "Installing CF Flasher"). Follow the instructions in this section to transfer this image to the EVB's flash memory.

1. Ensure you have completed the steps in Section 4.1, "Installing CF Flasher" and Section 4.2, "Connecting Required Hardware".
2. Start the CF Flasher application. The main CF Flasher window, shown in Figure 7, appears.

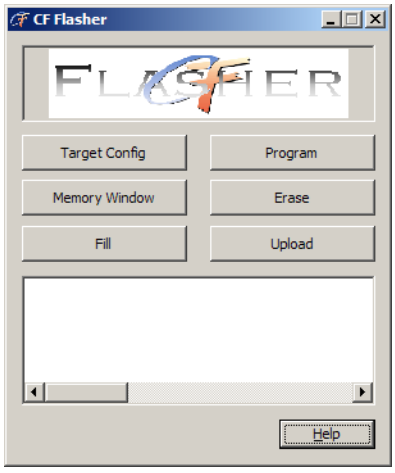


Figure 7. The CF Flasher Main Window

3. Click the Target Config button. The target configuration window, shown in Figure 8, appears.

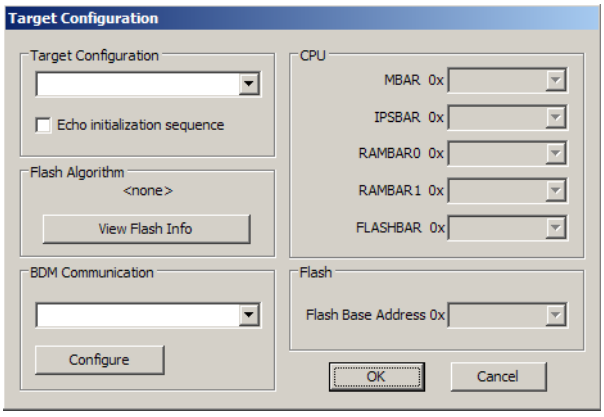


Figure 8. The Target Configuration Window

4. Select the option M5253EVBE from the Target Configuration pull-down menu.
5. Select the option PE_USB_ML from the BDM Communication pull-down menu.
6. Click the OK button to close the target configuration window and return to the CF Flasher main window.
7. Click the Program button. The Program window, shown in Figure 9, appears.

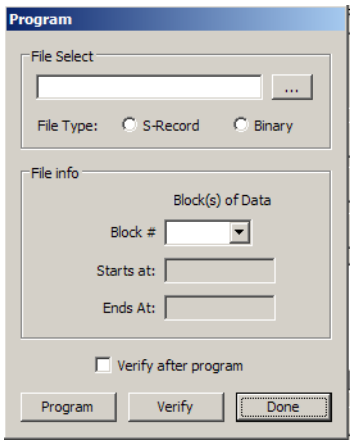


Figure 9. The Program Window

8. Click the "..." (Browse) button. The standard Windows file browser appears.
9. Navigate to the CFFLASHER folder on your desktop.
10. Select the file `m5253evb_flash.s19`, and click Open.
11. Click the Program button.

The successful completion of these steps indicates that the USB demonstration has been properly transferred to the EVB's flash memory. You may now run the demonstration as described in Section 3, "Running the USB Demonstration".

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