EVB-USB2240-IND User Manual Revision B

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1 Overview

The SMSC EVB-USB2240-IND is an Ultra Fast USB 2.0 Multi-Slot Flash Media Controller with SD, MS, and xD connectors. The USB2240 Evaluation Board demonstrates a standalone high speed Mass Storage Class Peripheral Controller intended for reading and writing to more than 22 popular flash media formats from the xD Picture Card™ (xD), Memory Stick™ (MS), Secure Digital (SD), and MultiMediaCard™ (MMC) families.

1.1 Features

- Operates either USB Bus-powered or from a single voltage (+5.0 Volts, regulated) 'wall wart' external power supply.
- Supports these Media Types:
  - MultiMediaCard™ 2.0 / 4.2
  - xD Picture Card™
  - Secure Digital (SD2.0, HS-SD, HC-SD)
  - Memory Stick™ 1.43
  - High Speed Memory Stick™
  - Memory Stick Pro-HG™
  - Memory Stick Duo Memory Stick Pro™
- Socket for optional serial I^2C EEPROM for configuration data.
- Single onboard +3.3 Volt regulator.
- Single internal FET Power Switch for All Media Types.
- Single 24 MHz crystal clock source.
- Media activity LED indicator.
- Optional +3.3V power LED indicator.
- Optional Card power LED indicator.

1.2 General Description

The EVB-USB2240-IND is a platform featuring the USB2240 Flash Media Controller. The EVB-USB2240-IND connects to a USB 2.0 port (J7). It is normally assembled for USB bus powered operation. The platform has three media sockets supporting 22 different media formats. Only one media socket can be operational with media inserted at any given time. To provide a small form factor the USB2240 is housed in a low-pin count 36-pin QFN package.

The EVB-USB2240-IND is designed to support internal default settings and an external I^2C EEPROM for customized functionality. The EEPROM must be at least 256 bytes. Several manufacturers provide EEPROMs compatible with the USB2240.

2 Hardware Configuration

2.1 Hardware Description

The USB2240 has one onboard regulator, which generates 3.3 Volts from the 5 Volt power supply. The USB2240 generates its own on chip 1.8 Volt supply. The USB2240 Flash Media Controller consumes power from the 3.3 Volt supply and supplies voltage to all three media connectors. The USB2240 also supports an optional serial EEPROM for customized configuration.

The EVB-USB2240-IND is configured by internal default registers. In this configuration it operates as a generic bus-powered USB 2.0 Media Controller with SMSC standard VID/PID/DID settings.

2.2 Configuration

The SMSC EVB-USB2240-IND is designed for flexible configuration solutions. It demonstrates functionality with default internal register settings, configurable external EEPROM, and EEPROM configuration update via the USB host. When an EEPROM is attached, the USB2240 will auto detect the interface and configure itself with the EEPROM contents. The EVB-USB2240-IND demonstrates how the EEPROM configuration settings can be changed without physical EEPROM removal.

2.2.1 Configuration Source - Internal Default

When the device does not detect an EEPROM upon power-up, the EVB-USB2240-IND uses internal default register settings; it sets the Vendor ID, Product ID, Language ID, and Device ID, and a few other choices. An improved feature with the USB2240 is that external passive components are not needed to set the IC configuration mode.

2.2.2 Configuration Source - External EEPROM

Upon power-up the USB2240 looks for an attached EEPROM on its I^2C interface. The EVB-USB2240-IND provides an 8-pin DIP socket IC U2 for an external EEPROM of type 24C02 to customize the Media Controller's settings. The EEPROM contains 256 bytes of user customizable settings. Among the settings are Vendor ID, Product ID, and Device ID numbers. For details on the fields please see the USB2240 Software Release notes.

2.2.3 Power source - Self/Bus Powered

The EVB-USB2240-IND supports both self and bus powered operation. By default the EVB-USB2240-IND is populated for bus powered operation. Refer to the table below for resistor population options to change the power source.

Table 2.1 Population Options for Self or Bus Powered Operation

POWER SOURCE	R14	R16
Bus Powered (Default)	Populate	Do not Populate
Self Powered	Do not Populate	Populate

2.2.4 Clock Source - Crystal or Resonator

The EVB-USB2240-IND is designed to support either a crystal or a resonator. Because crystals offer more accurate center frequency, the evaluation board is populated with a crystal and load capacitors. Some customers prefer lower cost resonators, which eliminates the need for external load capacitors, lowering the bill of material expense.

2.2.5 Configuration Source - USB Upstream

When the optional serial EEPROM is installed it can be configured via a USB cable connected to the upstream connector with a SMSC configuration tool named USBDM see USB2240 Software Release Notes for details. USBDM allows for modification of Vendor ID, Product ID, Language ID, Device ID, and configuration settings, see Figure 2.1, "USBDM Configuration Interface".

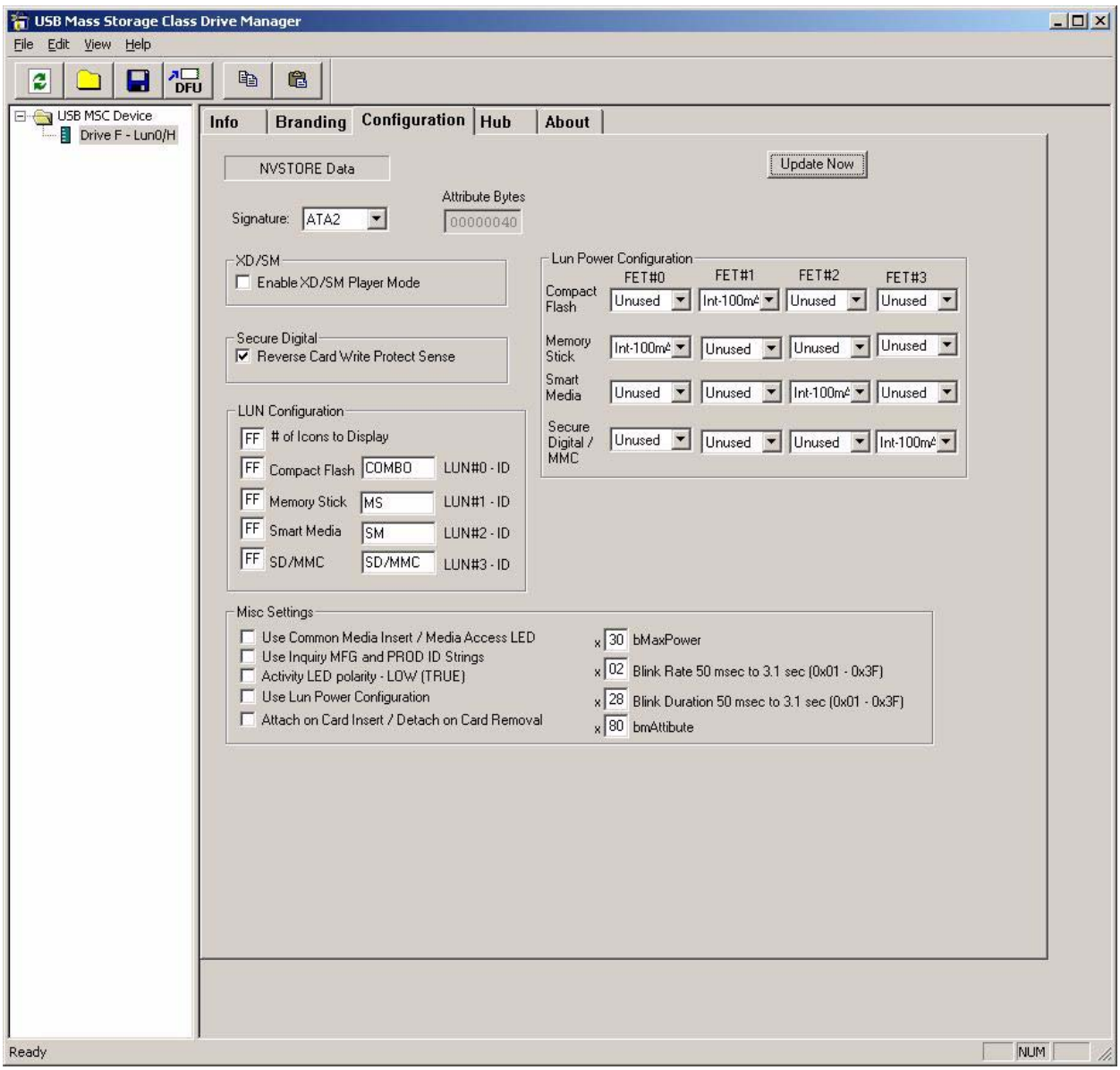

Figure 2.1 USBDM Configuration Interface

2.2.6 Layout Considerations

The USB2240 is designed on four PCB layers, two signal layers and two supply layers. The PCB layer stack is shown in Table 2.2, "PCB Layer Stack". All signals are routed on top and bottom layers. Internal layers are ground and power. Component and solder side views are shown in Figure 2.2, "Component Side Silk Screen and Copper Layer" and Figure 2.3, "Solder Side Copper Layer".

Table 2.2 PCB Layer Stack

COMPONENT SIDE	
Solder mask	
Layer 1 Top	1.3 - 2.3 oz. Cu. finished weight
Pre-preg	4.0 - 4.5 mil FR-4
Layer 2, Ground	1.0 oz., nominal
Core	25 mil FR-4
Layer 3, Power	1.0 oz., nominal
Pre-preg	4.0 - 4.5 mil FR-4
Layer 4, Bottom	1.3 - 2.3 oz. Cu. finished weight
Solder mask	
SOLDER SIDE	

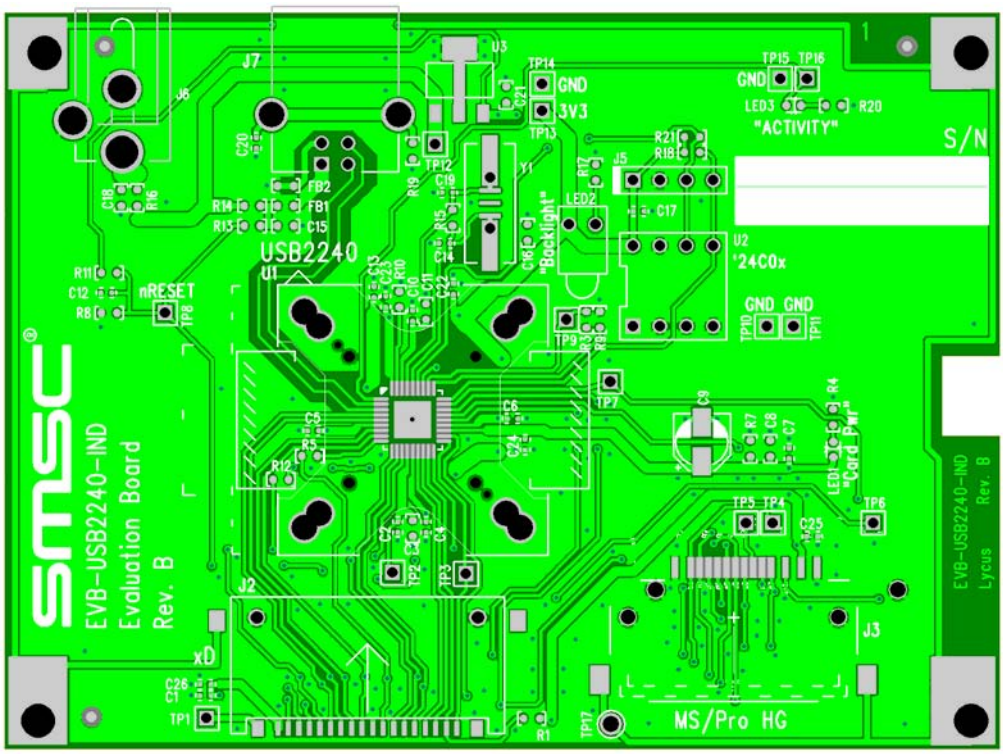

Figure 2.2 Component Side Silk Screen and Copper Layer

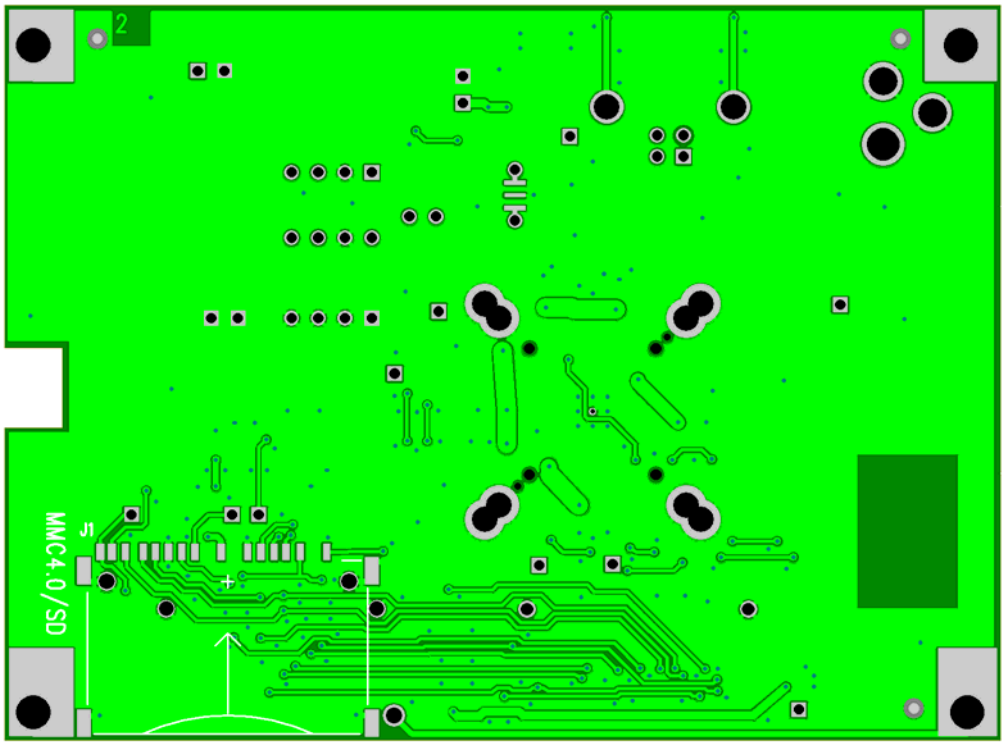

Figure 2.3 Solder Side Copper Layer