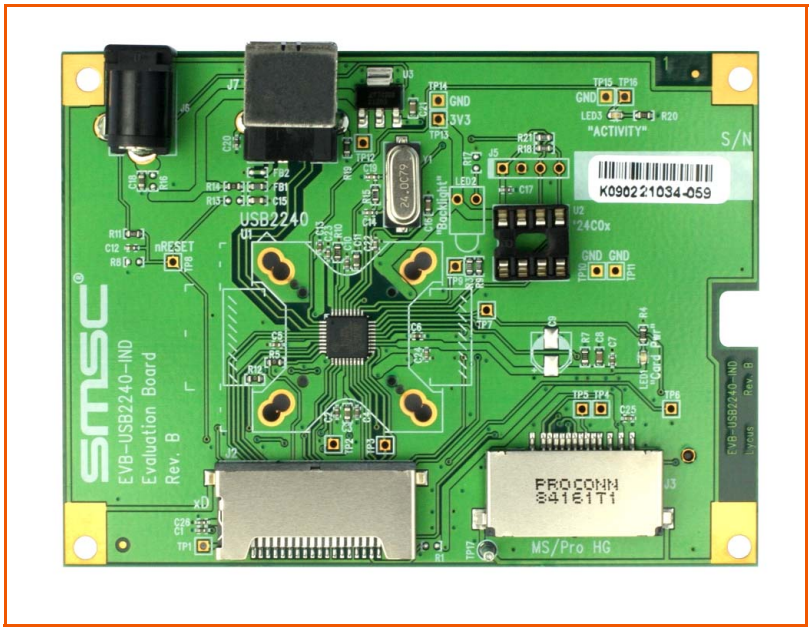
EVB-USB2240-IND User Manual Revision B



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1 Overview

The SMSC USB2240 is an Ultra Fast USB 2.0 Multi-Slot Flash Media Controller with Secure Digital (SD), MultiMediaCard™ (MMC), Memory Stick® (MS), and xD-Picture Card™ (xD) connectors. The EVB-USB2240-IND Revision B Evaluation Board demonstrates a standalone application for developers of the following applications: Flash Media Card Reader/Writer, printers, desktop and mobile PCs, consumer A/V, and flat panel displays, among others.

1.1 Features

- 36-Pin QFN (RoHS compliant) package.
- Supports these Media Types on Media I/F:
  - Secure Digital (SD2.0, HS-SD, HC-SD)
  - MultiMediaCard™ 4.2
  - xD-Picture Card™
  - Memory Stick® 1.43
  - High Speed Memory Stick™
  - Memory Stick Pro-HG™
  - Memory Stick Duo Memory Stick Pro™
- Internal FET power switch for all media types; no external power FETs needed.
- Optionally supports external configuration.
  - External I^2C EEPROM for configuration options (optional).
- Low cost 4-Layer space saving design.
- Self-powered or bus-powered operation.
- Operates from a single voltage (+5.0 VDC, regulated) external power supply or from VBUS.
- Single onboard +3.3 VDC regulator.
- Optional +3.3 VDC media power LED indicator.
- Activity LED indicator.
- Single crystal clock source.

1.2 General Description

The EVB-USB2240-IND is an evaluation and demonstration platform featuring the USB2240 Ultra Fast USB 2.0 Flash Media Controller on a 4-layer RoHS compliant printed circuit board.

The EVB-USB2240-IND is designed to demonstrate the unique features of this device using a low-cost PCB implementation. It is designed to support internal default configuration settings and an external I^2C EEPROM (optional) for customized configured functionality. When an I^2C EEPROM device is populated on the evaluation board it provides customizing via USB by using the SMSC provided USBDM utility, as required.

The EVB-USB2240-IND is compatible with the following:

- Microsoft® Vista
- Windows® XP
- Windows® ME
- Windows® 2k SP4
- Apple® OSx
- Linux® Mass Storage Class Drivers.

Schematics, Layout, and Bill of Materials are included minimizing new product development time.

2 Hardware Configuration

2.1 Hardware Description

The EVB-USB2240-IND has one onboard regulator, which generates +3.3 VDC from an external +5 VDC regulated power supply. The USB2240 generates its own +1.8 VDC for internal use using on-chip +1.8 VDC regulators. The internal 1.8 Volt regulator to the oscillator and PLL is turned off during suspend to minimize suspend current. The USB2240 consumes power from the 3.3 Volt supply.

2.1.1 USB2240 Configuration

Default: The EVB-USB2240-IND has been set up to support internal default configuration as determined by the empty state (no valid signature ID) of the EEPROM immediately after reset. When no valid EEPROM image is detected, the Vendor ID, Product ID, Language ID, and Device ID, and a few other choices are set using ROM code defaults.

EEPROM Option: The EVB-USB2240-IND can load configuration from an external two-wire, I^2C EEPROM U2. The EEPROM must be installed in socket U2. The EEPROM may be pre-programmed before installation, or it can be programmed with the USB host using the provided SMSC USBDM application.

This option allows access to all of the configuration registers and ID strings for the USB2240 device for detailed functional analysis and exercise as desired. The EVB-USB2240-IND is compatible with I^2C EEPROMs from several manufacturers. The memory capacity must be at least 512 bytes.

2.1.2 Powered State LED

An optional LED, LED1, indicates when +3.3 VDC power is present on the media sockets.

2.1.3 Activity LED

A LED, LED3, indicates when the USB2240 is active, as defined by firmware.

2.1.4 Media Interface

The USB2240 supports a wide array of devices. Media Interface accommodates all of the media types supported through the use of three media socket connectors. Adapters may be needed for some form factors.

- J1 supports SD media up to the specification limit of 4 bits wide. It also supports MMC media up to the specification 4.2 of 8 bits wide.
- J2 supports xD-Picture Card media.
- J3 supports MS, MS Pro, MS Duo, and MS Pro-HG media at up to the specification limit of 8 bits wide.

Since these connectors are all on the same media bus, only one device is allowed to be inserted into any of these media socket connectors at one time for the Media Interface.

2.1.5 Connector Description

The EVB-USB2240-IND has a standard USB style connector of type B for the upstream port. It also has a standard set of media storage style connectors, which supports popular flash media formats from the xD, MS, SD, and MMC families. Power is supplied via a 2.0 mm power jack. Table 2.1 lists all of the connectors. For more details on the pinout of the connectors please schematics in Figure 2.2 and Figure 2.3.

Table 2.1 Connector Description

CONNECTOR	TYPE	DESCRIPTION
J1	SD/MMC4.0	SD/MMC I/F
J2	xD	xD I/F
J3	MS/MS Duo/MS Pro-HG	MS I/F
J5	Header	GPIO Test - DNP
J6	Power Jack 2.0 mm	+5 VDC Power Supply
J7	USB B	Upstream Port

2.1.6 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 Table 2.2 below for resistor population options to change the power source.

Table 2.2 Population Options for Self or Bus Powered Operation

POWER SOURCE	R8	R11	R13	R14	R16
Bus Powered (Default)	DNP	Populate	DNP	Populate	DNP
Self Powered	Populate	DNP	Populate	DNP	Populate

Note: DNP = Do not populate

2.1.7 Configuration source - USB Upstream

The SMSC configuration tool named USBDM, see USB2240 Software Release Notes for details (https://www2.smsc.com/mkt/CW_SFT_PUB.nsf/Agreements/OBJ+Card+Reader), can configure the EEPROM when it is populated. USBDM can modify Vendor ID, Product ID, Language ID, Device ID, and configuration settings, see Figure 2.1.

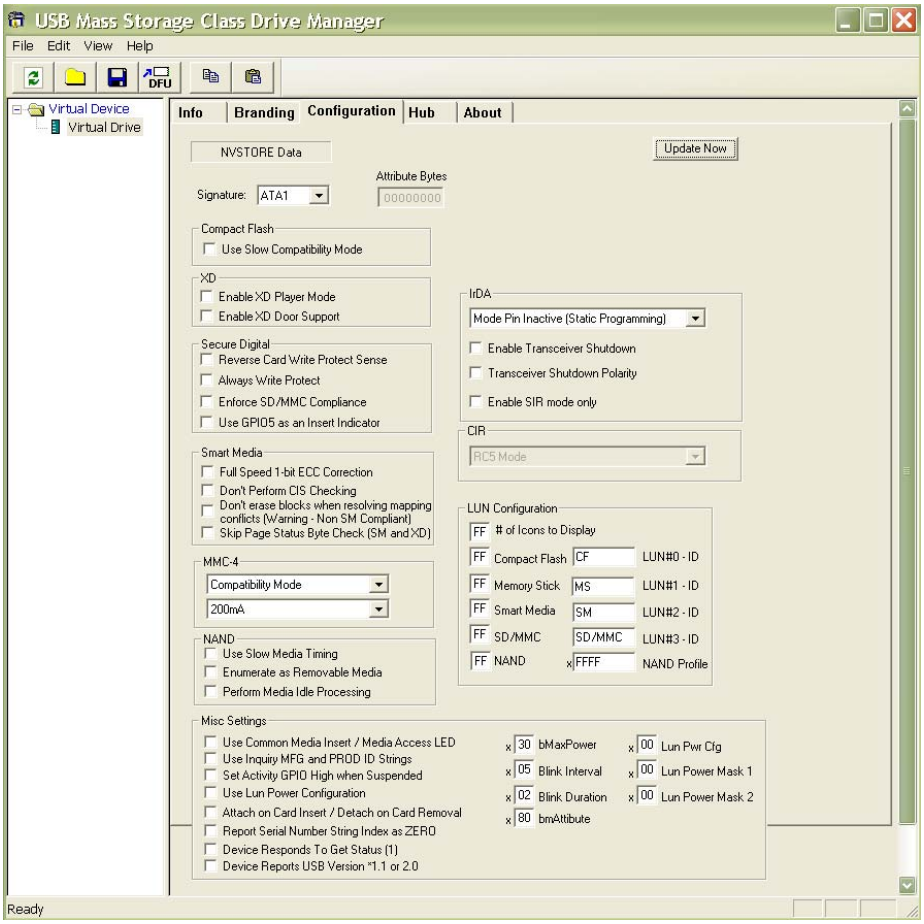

Figure 2.1 USBDM Configuration Interface

2.1.8 Layout Considerations

The EVB-USB2240-IND is designed on four PCB layers: two signal layers and two supply layers. The PCB layer stack is shown in Table 2.3. All signals are routed on top and bottom layers. The internal layers are ground and power. Note that the media I/F signals flow easily to their destination connectors simplifying routing of critical signals.

Table 2.3 PCB layer stack

Component Side	
Solder mask	
Layer 1	1.8 - 3.1 mil, finished
Pre-preg	4.25 mil, +/- 0.25 mil FR-4
Layer 2	1.3 mil (nominal)
Core	~28 mil FR-4
Layer 3	1.3 mil (nominal)
Pre-preg	4.25 mil, +/- 0.25 mil FR-4
Layer 4	1.8 - 3.1 mil, finished
Solder mask	
Solder Side	

The component side top layer is shown in Figure 2.2 with silk screen information to identify component locations. Solder side and bottom layer is shown in Figure 2.3.

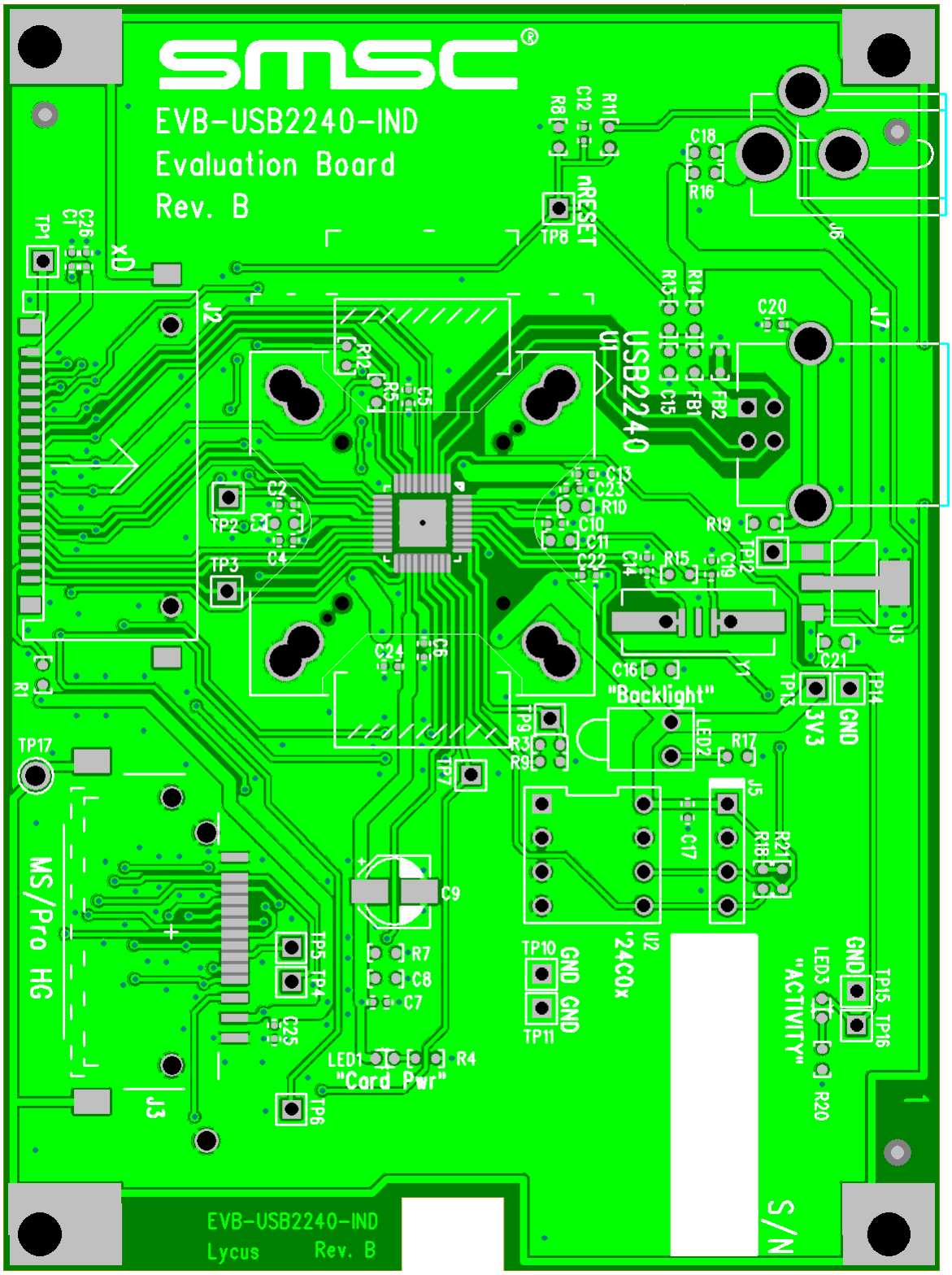

Figure 2.2 Top level silk screen and copper layer

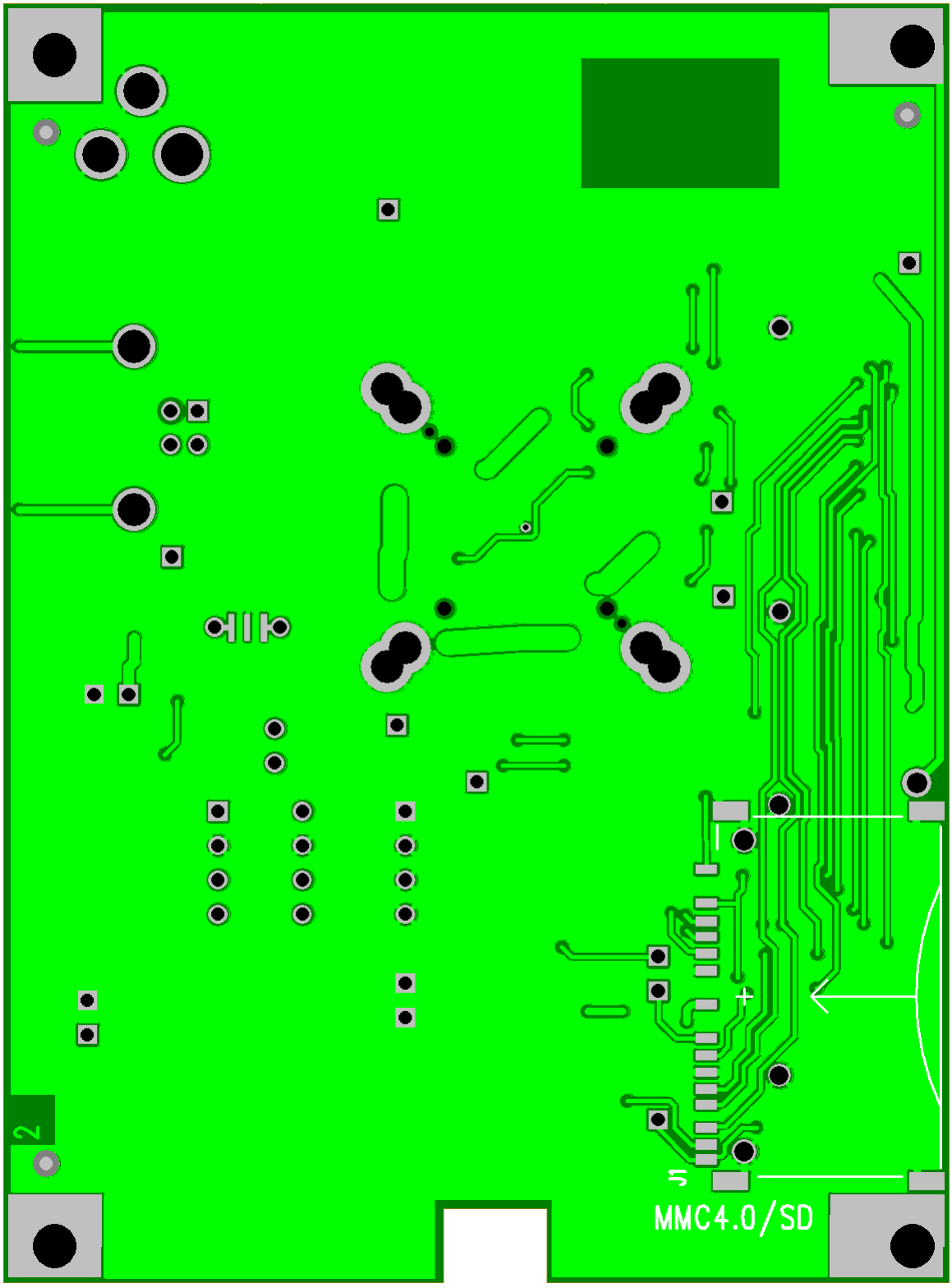

Figure 2.3 Bottom level solder side and copper layer

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