Freescale Semiconductor
User's Guide

Document Number: KT34708UG
Rev. 2.0, 10/2011

KIT34708VMEVBE Evaluation Board

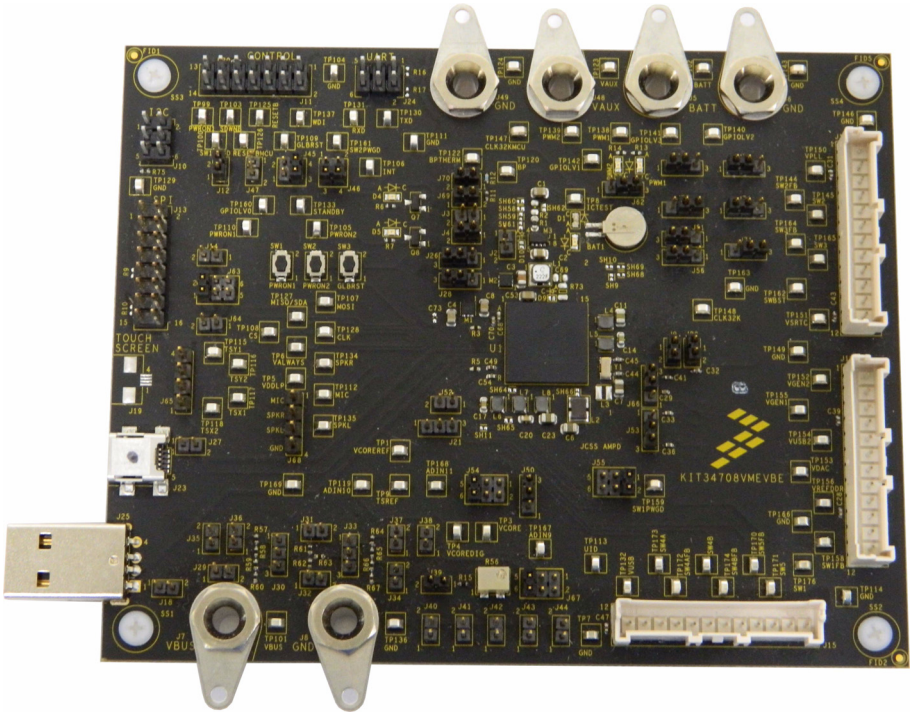

Figure 1. MC34708VMEVBE (Rev. B)

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1 Kit Contents / Packing List

- KIT34708VMEVBE
- KITUSBCOMDGLEVME
- Seven Cables
  - 7x2 Flat Ribbon Cable (GPIO) (Qty. 1)
  - 8x2 Flat Ribbon Cable (SPI) (Qty. 1)
  - 3x2 Flat Ribbon Cable (I^2C) (Qty. 1)
  - 1x12 Flat Ribbon Cable (Application Peripherals) (Qty. 3)
  - USB extension cable (Qty. 1)
- Freescale Warranty Card

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3 Introduction

KIT34708VMEVBE

KIT34708VMEVBE is the evaluation board for the MC34708 Power Management Integrated Circuit (PMIC), in a standalone environment. This board allows the user to evaluate the MC34708 device under specific operating parameters through the use of a dongle board and Graphical User Interface (GUI). A USB communication dongle board is included to easily enable communication between a user's PC and the MC34708 evaluation board. The GUI allows the user to program and control the power, battery charger, ADC, coulomb counter, RTC, GPIOs, PWM, and USB features directly through their PC. The board schematic and layout is Freescale's recommended solution to optimize the performance of the MC34708 PMIC.

KITUSBCOMDGLEVME

This KIT is a USB communication dongle that uses the MC9S08JM8CLC MCU to enable communication between a PC/laptop with a USB port, and the KIT34708VMEVBE, through SPI or I^2C terminals.

Beside communication, this board also provides two pins for quick "plug in" identification, as well as three GPIOs, four PWM signals, and two ADC. All of these pins can be configured and used as general purpose I/O pins, supplying a total of 11 GPIOs, if needed.

3.1 KIT34708VMEVBE Functional Blocks

3.1.1 Battery Charger

The charge path can be configured for single or serial path using jumpers J2 and J4 to enable/disable the M3 transistor. The PMIC charger can be supplied from:

- A wall / auxiliary charger at:
  - VAUX (J48 and J49)
  - Mini-USB J23 connector - Enabled by placing a jumper at J27
- A USB charger / port / hub at:
  - VBUS (J7 and J8)
  - USB-Type-A J25 connector - Enabled by placing a jumper at J18
  - Mini-USB J23 connector - Enabled by placing a jumper at J27

3.1.2 Charge LEDs

Two LEDs are provided on the board to verify the charging status of the Li-Ion battery attached to the board. When the red LED D1 is fully on, it is an indication that the charging is still in progress; when blinking, it is an indication of a charging fault. When the green LED D2 is lit, it is an indication that the charge is complete.

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3.1.3 Power

All the switching regulators and linear regulators signals have been connected to J15, J16, and J17, so they can be loaded and tested from there. They also have their respective test points on the board. Switching regulators have a cut trace that allows the output to be connected to the feedback signal on the board, i.e. SH6, SH9, SH10, SH11, SH12, and SH16, which are shorted by default. The feedback signals are also available on the load connectors (J15, J16, and J17), so the feedback point can be connected directly to the load by opening the former cut traces and shortening SH67, SH68, SH69, SH70, SH71, and SH72, respectively. VUSB2 and VGEN2 LDOs can be used with either internal or external pass devices by configuring J9-J53 and J20-J66 jumpers, respectively.

3.1.4 Programmability and Control

The MC34708 can be configured to be controlled by I^2C or SPI communication. In I^2C mode, J64 ties the CS pin to VCOREDIG, and J63 is intended to set the A0 address at the MOSI pin. The following pins are connected to the KITUSBCOMDGLEVME, so they can be controlled / monitored through the GUI: CS, CLK, MISO/SDA, MOSI, WDI, INT, RESETB, RESETBMCU, STANDBY, GLBRST, SDWNB, and PWRON1.

The SPIVCC pin can be supplied from the SW4A:

- Placing a J52 jumper from SW5,
- placing a jumper at J21(1-2),
- using VDAC, place a jumper at J21(2-3),
- or with the LDO on the KITUSBCOMDGLEVME, through the SPIVCC signals on the J10, J11, and J13 connectors.

The Power Up mode supply pins can be configured through the J57, J58, J59, J60, and J61 pin headers on the board. The GPIOs pins are accessible through test points labeled as GPIOLVx. The green D7 and D8 LEDs are provided on the board to verify the performance of the PWM pins, or if desired, at the test points labeled as PWMx.

3.1.5 LICELL

The BAT1 coin cell offers the possibility to keep the RTC running and save the contents of some registers, even if the device is in the Off mode.

3.1.6 USB/Audio

When an accessory is attached at either the Mini-B USB connector at J23, or the USB type A connector at J25, the PMIC enters in the active mode of the accessory identification process. The ID detection circuit determines what ID resistor is attached, and the power supply type identification circuit determines what type of power supply is connected. An Audio Type 1 or TTY accessory could be manually connected to the 4-pin J68 header along with the USB OTG transceiver ID (UID) test point, which can also be

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manually configured through the combination of the resistors attached to the J40, J41, J42, J43, and J44 headers.

3.1.7 ADC

The J65 header, or the J19 connector pads, contain all the necessary signals to connect a 4 wire resistive touch screen panel, equally accessible at test points TP115 to TP118, including TSREF at TP9. The R56 potentiometer is provided to separately test the ADIN9, ADIN10, and ADIN 11 inputs; otherwise, each ADINx input has their respective test point (TP167, TP119, and TP168, respectively), to connect a specific voltage and test their input.

3.1.8 Battery Thermistor

If the battery to be connected to the board comes along with a thermistor, the necessary bias voltage to read its value can be taken from NTCREF by placing a jumper J69, and connecting the thermistor to the TP122 test point. If the battery comes with no thermistor, a jumper must be placed on J70, so the voltage at the BPTHERM pin lies within the temperature window.

3.1.9 Coulomb Counter

The current in and out of the battery can be read out through the general purpose ADC as a voltage drop over the R1 sense resistor. Together with battery voltage reading, the battery capacity can be estimated. A more accurate battery capacity estimation can be obtained by using the integrated Coulomb Counter (CC). The Coulomb Counter monitors the current flowing in/out of the battery by integrating the voltage drop across the battery current sense resistor R1, followed by an A to D conversion. The CC is enabled by default with the SH58 and SH61 traces shorted.

3.2 KITUSBCOMDGLEVME Functional Blocks

Table 1. SPI Interface - Pin Header Configuration for SPI Interface at J9

Pin Number	Description	Pin Number	Description
1	GND - Ground	9	SPSCK - SPI Serial Clock
2	ADC1 - Analog-to-Digital Converter	10	PWM3 - Pulse Width Modulation Signal
3	COMM_V - Communication Voltage	11	MOSI - SPI Master Output Slave Input
4	ADC0 - Analog-to-Digital Converter	12	PWMSYNC - PWM Synchronization Signal
5	5.0 V - Voltage from USB Port	13	MISO - SPI Master Input Slave Output
6	PWM0 - Pulse Width Modulation Signal	14	ID1 - Board Identifier 1
7	PWM2 - Pulse Width Modulation Signal	15	SS - Slave Select
8	PWM1 - Pulse Width Modulation Signal	16	ID0 - Board Identifier 0

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Table 2. I²C Interface - Pin Header Configuration for I²C Interface at J7

Pin Number	Description	Pin Number	Description
1	ID0 - Board Identifier 0	4	GND - Ground
2	ID1 - Board Identifier 1	5	SCL - I²C Serial Clock
3	SDA - I²C Serial Data	6	COMM_V - Communication Voltage

Table 3. UART Interface - Pin Header Configuration for UART Interface at J6

Pin Number	Description	Pin Number	Description
1	ID0 - Board Identifier 0	4	GND - Ground
2	ID1 - Board Identifier 1	5	RXD - Receive Data
3	TXD - Transmit Data	6	GND - Ground

Table 4. GPIO Interface - Pin Header Configuration for GPIOs Interface at J8

Pin Number	Description	Pin Number	Description
1	ID0 - Board Identifier 0	8	PWM2 - Pulse Width Modulation Signal
2	ID0 - Board Identifier 1	9	PWM1 - Pulse Width Modulation Signal
3	GPIO2 - General Purpose I/O	10	PWM0 - Pulse Width Modulation Signal
4	GPIO1 - General Purpose I/O	11	ADC0 - Analog-to-Digital Converter
5	GPIO0 - General Purpose I/O	12	ADC1 - Analog-to-Digital Converter
6	PWMSYNC - PWM Synchronization Signal	13	GND - Ground
7	PWM3 - Pulse Width Modulation Signal	14	COMM_V - Communication Voltage

3.2.1 Communication Voltage Selection

This communication board allows the user to select one of the following three communication voltages through hardware, which are very common on most of the applications:

- 5.0 V - This voltage comes directly from the USB port and can be selected by connecting J3 (1-2). This selection ignores the voltage coming from the LDO, and sets the USB voltage as the maximum level for communication.
- 3.3 V - This voltage can be selected by connecting J5(1-2) and J3(2-3).This selection configures the LDO to supply 3.3 V, and set the voltage as the maximum voltage reference of communication.
- 1.8 V - This communication voltage is selected by connecting J5 (2-3) and J3 (2-3). By connecting these two jumpers, the LDO supplies 1.8 V, and set this voltage level as the maximum voltage reference of communication.

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3.3 Evaluation Board Operating Parameters

3.3.1 KIT34708VMEVBE Board

- Input voltages:
  - Battery: 3.7 V
  - USB/Wall charger: 5.0 V
- Default output voltages:
  - Switching regulators: SW1A/B = 1.1 V; SW2 = 1.2 V; SW3 = 1.2 V; SW4A = 3.15 V;
    SW4B = 1.2 V; SW5 = 1.8 V; SWBST = 5.0 V (when a charger is attached, otherwise 0 V)
  - Linear regulators: VUSB = 3.3 V; VUSB2 = 2.5 V; VPLL = 1.8 V; VGEN1 = 1.2 V; VGEN2 = 2.5 V; VDAC = 2.5 V; VREFDDR = 1.57 V
- Reference generation regulators:
  - VALWAYS = 4.08 V; VDDLP = 1.5 V; VCOREDIG = 1.5 V; VCORE = 2.776 V; VCOREREF = 1.18 V
- Switching frequency in switching regulators:
  - 2.0 MHz
- Communication interfaces:
  - SPI - Frequency up to 26 MHz; I^2C - Frequency at 400 kHz
- Power control signals:
  - RESETB, RESETBMCU, WDI, INT, STANDBY, GLBRST, CS, PWRON1, and PWRON2

3.3.2 KITUSBCOMDGLEVME Board

- Power supply:
  - 5.0 V (supplied by computer USB port)
- Communication Interfaces:
  - I^2C - Frequency up to 1.0 MHz (100 kHz, 400 kHz, or 1 MHz);
    Voltage Level = Selectable (5.0 V, 3.3 V, or 1.8 V)
  - SPI - Frequency up to 4.0 MHz; Voltage Level = Selectable (5.0 V, 3.3 V, or 1.8 V)
  - UART - Frequency from 2400 bps to 115200 bps; Voltage Level = 12 V (Typ.)
  - USB - Frequency fixed at 12 Mbps; Voltage Level = 5.0 V (Typ.)
- Other Signals:
  - Four PWM signals (Adjustable frequency up to 4.0 MHz)
  - Open Drain signals with selectable voltage Level (5.0 V, 3.3 V, or 1.8 V)
  - Three GPIOs (General Purpose I/O pins), Open Drain signals with selectable voltage Level (5.0 V, 3.3 V, or 1.8 V)
  - Two ADCs (10-bits)

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- Identifiers - Two ADC signals pulled up to 5.0 V through 10 kohm resistors. These inputs are designated to identify the Slave device and automatically open its corresponding Graphical User Interface (GUI). This feature only applies if a slave board was designed for it.

3.4 Evaluation Board Features

3.4.1 KIT34708VMEVBE Board

- Four Layer Board
- Low Noise Design
- Top and bottom layer component placement
- Three 12 pin connectors for switching regulators and linear regulators
- Banana jack connectors for battery, USB charger and auxiliary / wall charger attachment
- Li-Ion coin cell
- Mini B-USB connector for charger, OTG, or audio accessory attachment
- USB type-A connector for USB charger/port/hub, OTG, or audio accessory attachment
- Several jumper configurations for PMIC mode of operation
- Scattered test points for different measurements
- I^2C, SPI, and UART communication interface headers
- Power control interface connector
- Two green LEDs for RESETB and RESETBMCU signaling
- Two green LEDs for PWM1 and PWM2 signaling
- Two LEDs for charging status signaling
- Four-wire resistive touch screen interface connector pads
- Three push buttons for Power On and Global reset events

3.4.2 KITUSBCOMDGLEVME Board

- Four Layer Board
- Low Noise Design
- Top Layer Placement
- UART, I^2C, and SPI communication interface connectors (J6, J7, and J9)
- USB type A connector
- Communication Voltage Level Shifting configuration (J3 and J5)
- BDM connector for MCU programming (J2)
- Pull-up resistors for I^2C and SPI line communication voltage jumper configurations (J4)

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3.5 MC34708VM Features

Battery Management

- Buck Switching Charger for Single Cell Li-Ion Batteries
  - Wall/USB Charger Input
  - Coulomb Counter for Main Battery Charge Monitoring
  - OV/UV Protection And Short-circuit Detection
  - Dual LED Driver for Charge/Fault Indication
  - Coin Cell Charger

Power Generation

- Six Buck Switching Regulators
  - Two Single/Dual Phase Buck Regulators
  - Three Single Phase Buck Regulators
  - PFM/Auto Pulse Skip/PWM Operation Mode
  - Dynamic Voltage Scaling
- 5V Boost Regulator
  - USB On-the-go Support
- Eight LDO Regulators
  - Two with Selectable Internal or External Pass Devices
  - Five with Embedded Pass Devices
  - One with an External PNP Device

Analog to Digital Converter

- Seven General Purpose Channels
- Eight Dedicated Channels for Monitoring the Charger
- Resistive Touchscreen Interface

Auxiliary Circuits

- Mini/Micro USB Switch
  - Bidirectional Audio/Data/UART
  - Accessory Identification Circuit
- General Purpose I/Os
- PWM Outputs

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Clocking and Oscillators

- Real Time clock
  - Time and day Counters
  - Time of day Alarm
- 32.768 kHz Crystal Oscillator
- Coin Cell Battery Backup

Serial Interface

- SPI
- I^2C

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4 Required Equipment

- 3.7 V Li-Ion battery to be connected at J5-J6
- 5.0 V, 5.0 A, adjustable power source to be connected at J48-J49, or at J7-J8
- Computer Central Processing Unit (CPU) System Requirements:
  - Windows eXPerience (XP), 7, or Vista, 32-bit or 64-bit version
    (Note: The USB drivers for the KITUSBCOMDGLEVME MCU were developed under the Windows XP operating system)
  - 1.0 Gigabyte Random Access Memory
  - 100 Megabyte Hard Disc Drive Available Memory

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5 Setup Configuration

Refer to the following figures to set up the connections between the USBCOMDGL and the KIT34708VMEVBE, by either I^2C or SPI communication.

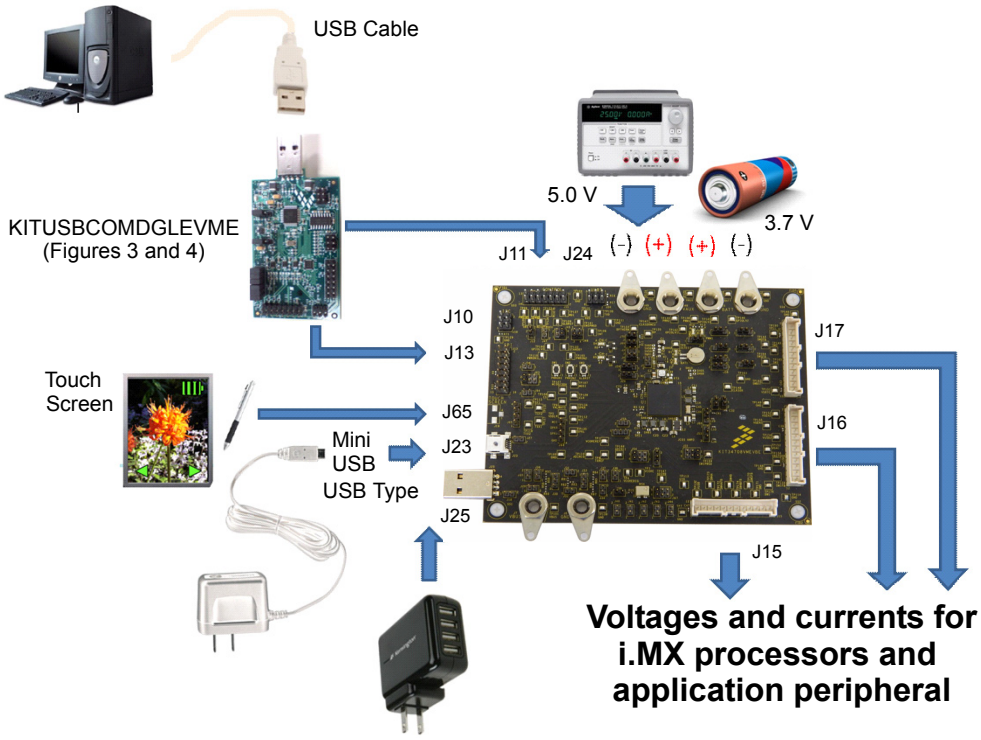

Figure 2. MC34708 Basic Hardware Setup (Rev. B)

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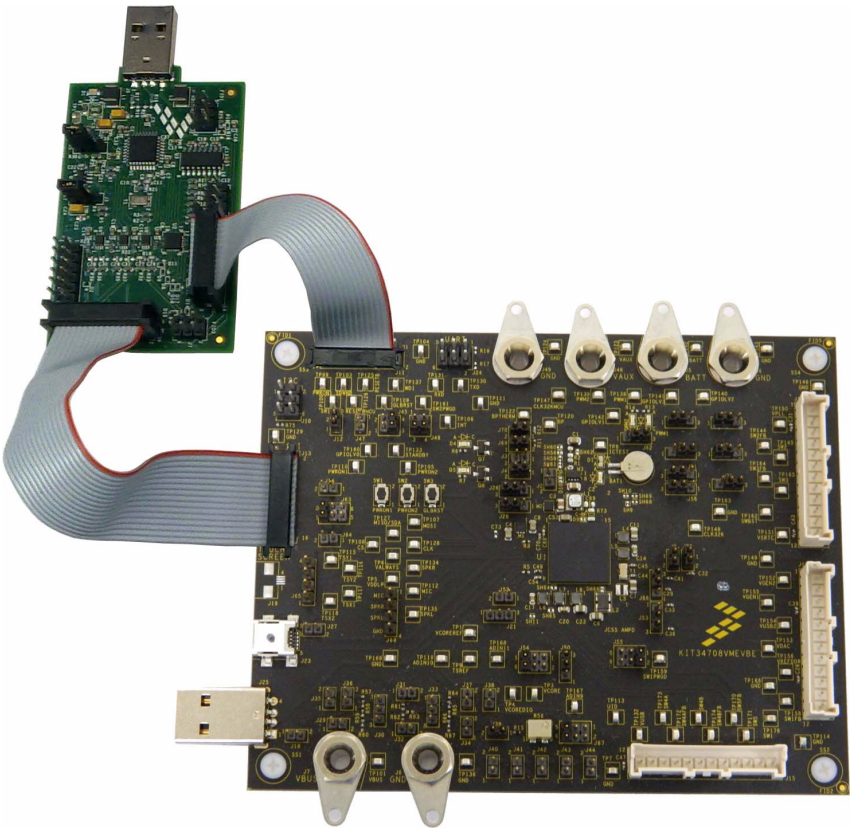

Figure 3. SPI Configuration for the MC34708 (Rev. B) Board Alongside the USB Dongle

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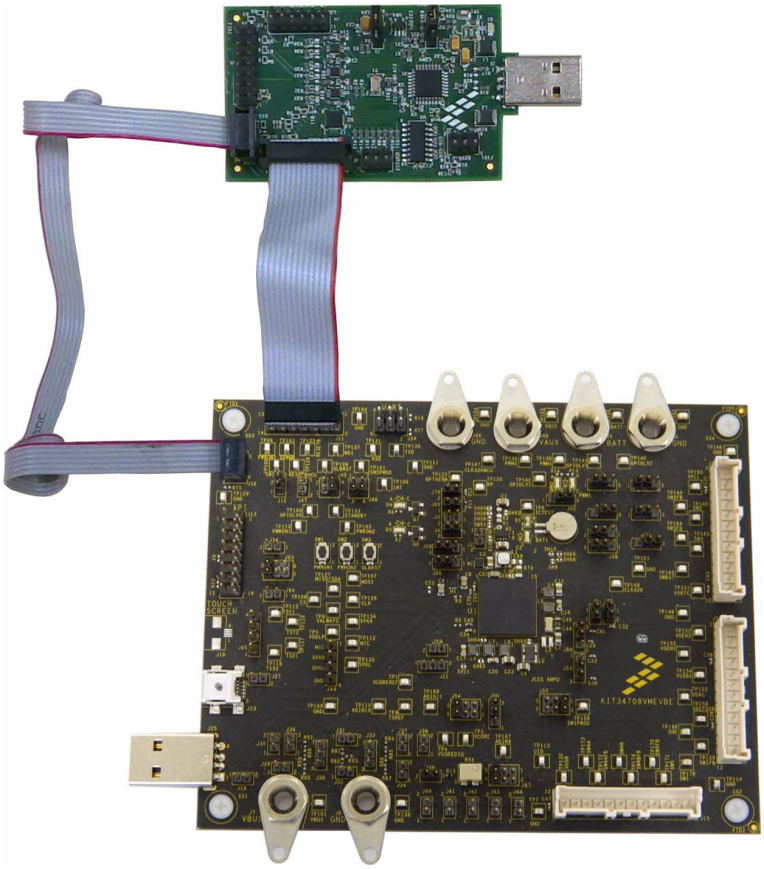

Figure 4. I²C Configuration for the MC34708 (Rev. B) Board Alongside the USB Dongle

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5.1 KIT34708VMEVBE Configuration

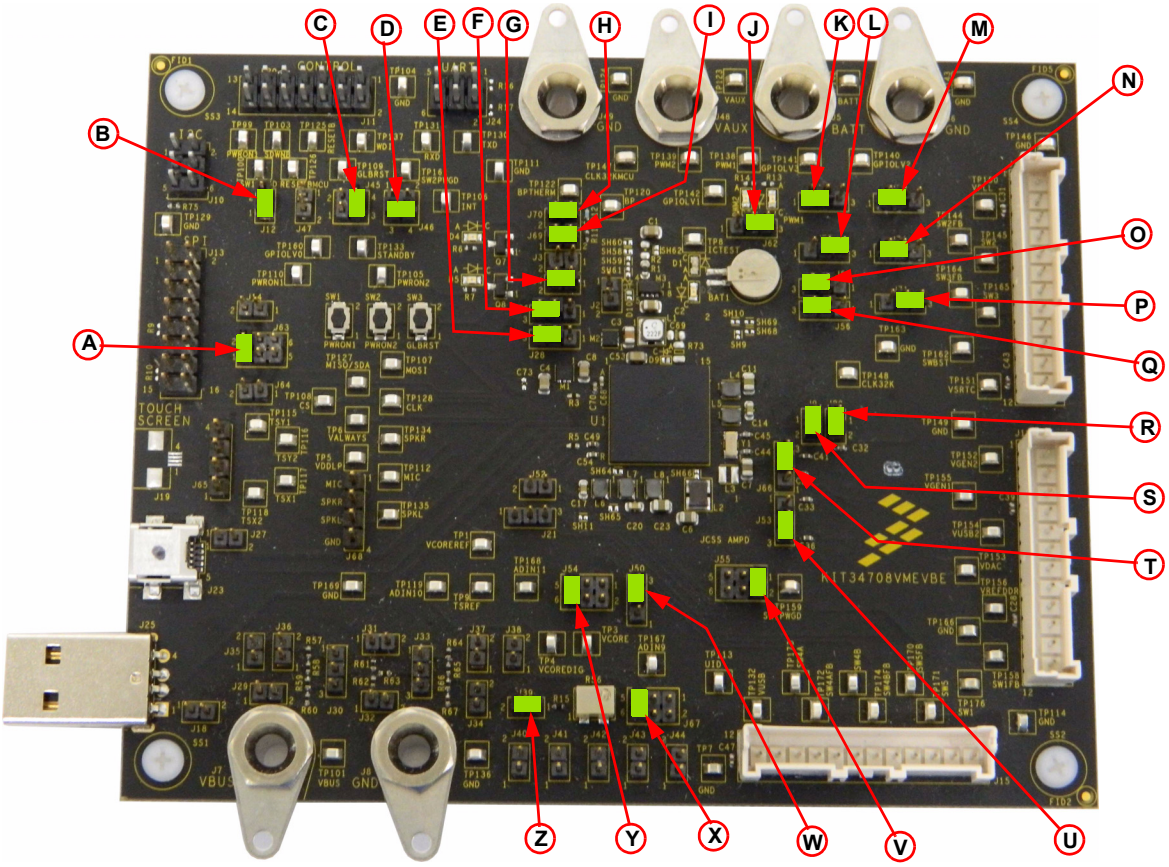

Figure 5. KIT34708VMEVBE (Rev. B) Default (pre-populated) Jumper Location and Configuration

The KIT34708VMEVBE evaluation board comes already configured with the jumpers in Table 5, and correspond to locations in Figure 5.

Table 5. KIT34708VMEVBE (Rev. B) Pre-populated Jumper Location Key

Location	Jumper Reference	Position	Location	Jumper Reference	Position	Location	Jumper Reference	Position	Location	Jumper Reference	Position
A	J63	1-2	I	J69	Shorted	Q	J56	2-3	Y	J54	5-6
B	J12	Shorted	J	J62	2-3	R	J20	Shorted	Z	J39	Shorted
C	J45	3-4	K	J72	1-2	S	J9	Shorted			
D	J46	3-4	L	J75	2-3	T	J66	2-3			
E	J28	2-3	M	J73	1-2	U	J53	2-3			
F	J26	2-3	N	J74	1-2	V	J55	1-2			
G	J4	Shorted	O	J51	2-3	W	J50	2-3			
H	J70	Shorted	P	J71	2-3	X	J67	5-6			

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The jumpers in Table 6 are unpopulated, user configurable locations.

Table 6. KIT34708VMEVBE (Rev. B) Unpopulated Jumper Description Key

Jumper Reference	General Description	Position	Function
J2	Battery FET path configuration	Open	Charge path configured as Serial Path (J4 needs to be shorted and J3 open)
		Shorted	Charge path configured as Single path (J3 needs to be shorted and J4 open)
J3	Battery FET control 1	Open	Battery FET controlled by the GBAT pin
		Shorted	GBAT grounded when the charge path is configured as Single. J4 must be open
J4	Battery FET control 2	Open	Battery FET not controlled by GBAT. J3 must be shorted
		Shorted	Battery FET controlled by GBAT pin. Charge path configured as Serial
J9	VUSB2 external PNP to BP	Open	No external PNP is connected to BP
		Shorted	Connects external PNP to BP to avoid excess on-chip power dissipation at high loads and large differentials between BP and VUSB2 output settings
J12	PWRON1 enablement	Open	PWRON1 pin can be controlled thru switch SW1 only
		Shorted	PWRON1 pin can be externally controlled by an MCU (e.g. USBCOMDGL board) connected to the J11 connector
J14	VBUS enablement	Open	VBUS disconnected from J13 connector
		Shorted	VBUS pin is connected to the J13 connector to be supplied from the USB cable connected to an MCU board (e.g. USBCOMDGL board), or to supply a USB cable in OTG mode
J18	VBUS enablement at USB Type A	Open	VBUS is disconnected from the J25 connector
		Shorted	VBUS voltage supplied from a USB cable connected to the J25 connector (e.g. USB port/hub/charger), or to supply 5.0 V in USB OTG mode
J20	VGEN2 external PNP to BP	Open	No external PNP is connected to BP
		Shorted	Connects external PNP to BP to avoid excess on-chip power dissipation at high loads and large differentials between BP and VGEN2 output settings
J21	SPIVCC supply	1-2	SPIVCC is supplied by SW5. J52 must be open
		2-3	SPIVCC is supplied by VDAC. J52 must be open
		Open	SPIVCC is supplied by either SW4A or the MCU board (e.g. USBCOMDGLEVME board)
J26	Trickle current configuration	1-2	TRICKLESEL pin is connected to VCOREDIG. The switching charger is enabled in CC mode for trickle charging at 325 mA
		2-3	TRICKLESEL pin is connected to ground. The Itrickle2 current uses the internal trickle charge path
		Open	TRICKLESEL pin floating. The switching charger is enabled in CC mode for trickle charging at 550 mA
J27	VBUS enablement at Mini USB B	Open	VBUS is disconnected from the J23 connector
		Shorted	VBUS voltage is supplied from a mini B USB cable connected to the J23 connector (e.g. USB port/hub/charger), or to supply 5.0 V in USB OTG mode
J28	Precharge timer configuration	1-2	PRETMR pin is connected to VCOREDIG. Trickle pre-charge timer is preset to 5.5 hrs
		2-3	PRETMR pin is connected to ground. Trickle pre-charge timer is preset to 4.5 hrs
		Open	PRETMR pin is floating. Trickle pre-charge timer is preset to 6.5 hrs
J29 - J38	Touch screen reading configuration	Open	Different jumper configurations to simulate the readout of an attached 4-wire resistive touch screen

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Table 6. KIT34708VMEVBE (Rev. B) Unpopulated Jumper Description Key

Jumper Reference	General Description	Position	Function
J39	SWBST enablement	Open	No 5.0 V power reference to the resistor divider for ADIN9, ADIN10, ADIN11 voltage measurements
		Shorted	5.0 V power reference to the resistor divider for ADIN9, ADIN10, ADIN11 voltage measurements
J40 - J44	UID resistance	Open	Different jumper configurations for manually testing the ID resistance value assignments
J45	GPIOLV0/STANDBY selection	1-2	Connects the GPIOLV0 pin to the J11 connector for monitor/control
		3-4	Connects the STANDBY pin to the J11 connector for monitor/control
J46	Power good signal for SW2 /INT selection	1-2	Connects the SW2PWGD pin to the J11 connector for monitoring
		3-4	Connects the INT pin to the J11 connector for monitoring
J47	Power good signal for SW1 enablement	Open	No connection of the SW1PWGD pin to the J11 connector for monitoring
		Shorted	Connects the SW1PWGD pin to the J11 connector for monitoring
J50	SW1 configuration	1-2	Connects SW1CFG to VCOREDIG for single phase
		2-3	Connects SW1CFD to ground for dual phase
J51	GPIOVDD supply configuration	1-2	GPIOVDD is supplied by SW3
		2-3	GPIOVDD is supplied by SW5
J52	SW4A to SPIVCC	Open	SPIVCC not supplied by SW4A
		Shorted	SPIVCC is supplied by SW4A
J53	VUSB2 external PNP enablement	1-2	Input to the integrated PMOS pass FET for lower current requirements on VUSB2
		2-3	Base current drive pin for the external PNP when higher currents are required from VUSB2
J54	SW4 configuration	1-2	Connects SW4CFG to VCOREDIG for single phase mode
		3-4	Connects SW4CFD to VCORE for dual phase mode
		5-6	Connects SW4CFD to ground for separate independent output mode
J55	VINREFDDR input voltage selection	1-2	VINREFDDR is supplied by SW4A
		3-4	VINREFDDR is supplied by SW4B
		5-6	VINREFDDR is supplied by SW5
J56	CLK32KVCC supply configuration	1-2	CLK32KVCC is supplied by SW3
		2-3	CLK32KVCC is supplied by SW5
J75	PUMS 1 configuration	1-2	Tied to VCOREDIG (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
		2-3	Tied to ground (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
J74	PUMS 2 configuration	1-2	Tied to VCOREDIG (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
		2-3	Tied to ground (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
J73	PUMS 3 configuration	1-2	Tied to VCOREDIG (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
		2-3	Tied to ground (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)

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Table 6. KIT34708VMEVBE (Rev. B) Unpopulated Jumper Description Key

Jumper Reference	General Description	Position	Function
J72	PUMS 4 configuration	1-2	Tied to VCOREDIG (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
		2-3	Tied to ground (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
J71	PUMS 5 configuration	1-2	Tied to VCOREDIG (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
		2-3	Tied to ground (Check the MC34708 Data Sheet for further reference on the power up sequence and default values)
J62	ICTEST configuration	1-2	Tied to VCORE for test mode and Freescale use only
		2-3	Tied to ground for normal operation and product applications
J63	MOSI configuration	1-2	MOSI pin enabled for SPI communication
		3-4	Tied to VCOREDIG for I^2C communication address 0001001
		5-6	Tied to ground for I^2C communication address 0001000
J64	CS pull-up	Open	CS pin is allowed to be controlled by connector J11. The device will be configured for SPI mode
		Shorted	Tied to VCOREDIG. If connected at startup, the device will be configured for I^2C mode
J66	VGEN2 external PNP enablement	1-2	Input to the linear regulator and the integrated PMOS for lower current requirements on VGEN2
		2-3	Base current drive pin for the external PNP when higher currents are required from VGEN2
J67	ADIN9/ ADIN10 / ADIN11 selection	1-2	Connects the 5.0 V powered resistor-potentiometer divider to ADIN9 for voltage measurements
		3-4	Connects the 5.0 V powered resistor-potentiometer divider to ADIN11 for voltage measurements
		5-6	Connects the 5.0 V powered resistor-potentiometer divider to ADIN10 for voltage measurements
J69	BPTHERM supply	Open	No battery thermistor supply from PMIC
		Shorted	Battery thermistor divider supply, NTCREF, through a pull resistor
J70	Thermistor pull-down	Open	When using a battery with a thermistor
		Shorted	Compulsory connection when using a battery without a thermistor

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5.2 KITUSBCOMDGLEVME Configuration

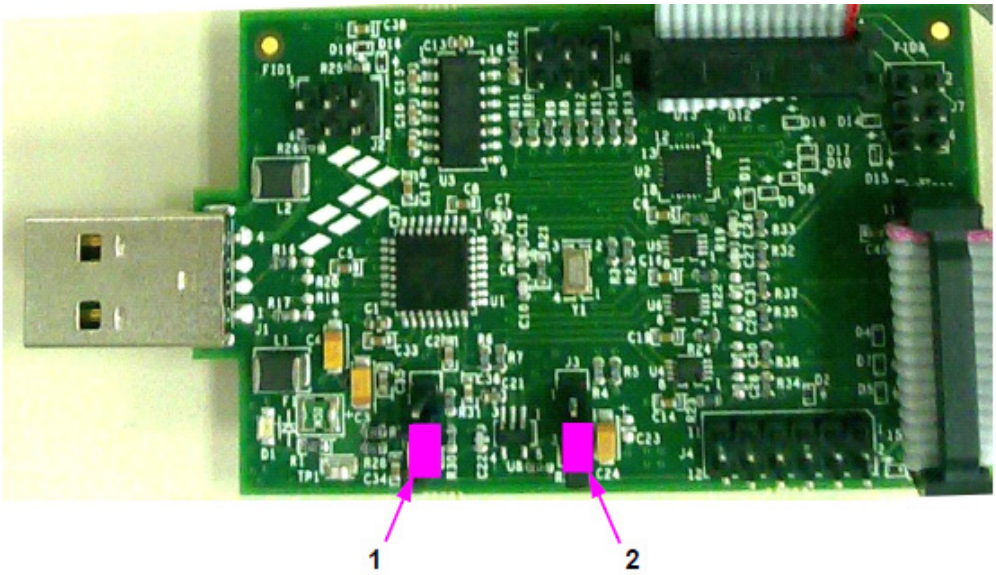

Figure 6. KITUSBCOMDGLEVME Default (pre-populated) Jumper Location and Configuration

The KITUSBCOMDGLEVME evaluation board comes already configured with the jumpers in Table 7, and correspond to locations in Figure 6.

Table 7. KITUSBCOMDGLEVME Pre-populated Jumper Location Key

Location	Jumper Reference	Position
1	J5	2-3
2	J3	2-3

The jumpers in Table 8 are unpopulated, user configurable locations.

Table 8. KITUSBCOMDGLEVME Unpopulated Jumper Description Key

Jumper Reference	General Description	Position	Function
J5	Level shifted communication voltage	1-2	Adjusts the LDO voltage to 3.3 V
		2-3 (default)	Adjusts the LDO voltage to 1.8 V
J3	Level shifting communication voltage enablement	1-2	Sets communication voltage to 5.0 V
		2-3 (default)	Sets communication voltage to LDO voltage
J4	Pull-up resistor enablement for low voltage side	1-2	SDA pull-up resistor enable
		3-4	SCL pull-up resistor enable
		5-6	MISO pull-up resistor enable
		7-8	SS pull-up resistor enable
		9-10	SPSCK pull-up resistor enable
		11-12	MOSI pull-up resistor enable

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6 Software

Important: In order to install the GUI, the computer must be connected to the internet. When installing the GUI for the first time, the installer will verify that the user has the latest service pack and .NET Framework files needed. If newer software files are needed, the installer will download these from the Microsoft web site automatically.

Similarly, note that in order to correlate the results/data in the GUI, along with the user guide, the board must be connected and powered as indicated in this document. Otherwise, the user can ONLY open the GUI to get familiarized with the tool, and cannot properly modify registers, and all the fields will be left empty. A dialog box will pop up indicating that the USBCOMDLG board needs to be connected.

6.1 Installing the MC34708 GUI

The Setup installer will be provided as the MC34708 Installer.exe file.

1. Double-click the executable file. The installer shall run immediately and will look as shown in Figure 7.

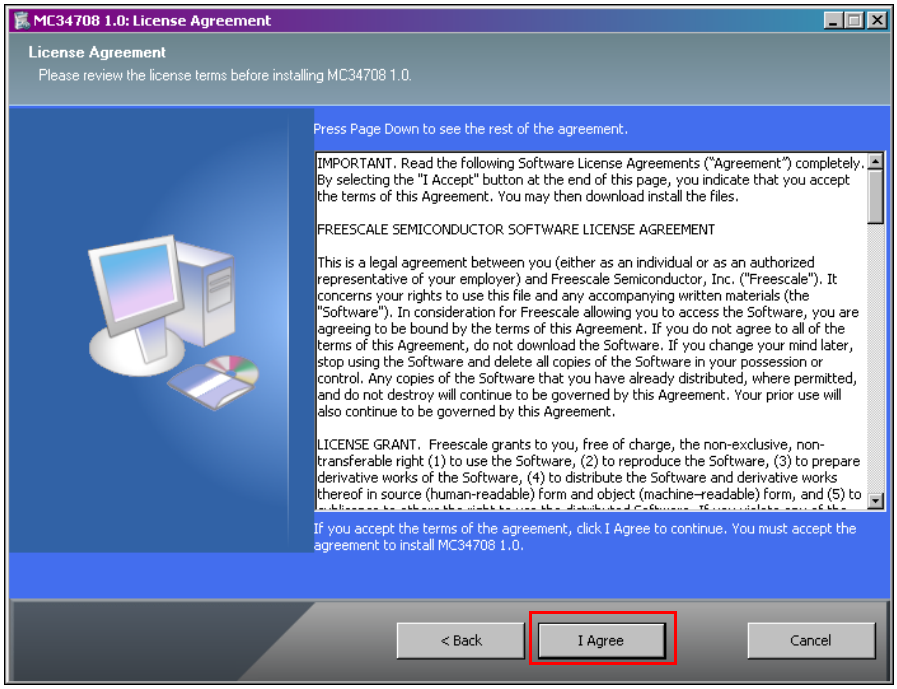

Figure 7. License Agreement

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2. Click the **I Agree** button to continue the installation process.
3. The **Select Components** window (Figure 8) displays the application components and the device drivers for the USB Dongle. All these files need to be installed for the proper run of the MC34708 Installer.exe application.

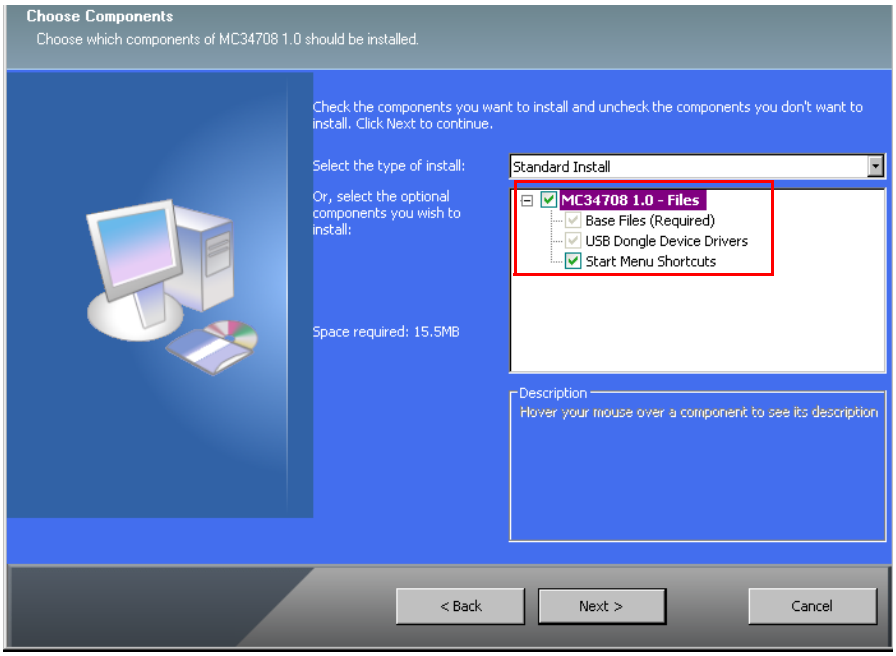

Figure 8. Select Components

4. Select the desired path for installation or use the default path **C:/Program Files/MC34708** folder. Once the destination folder is selected, click **Install**.

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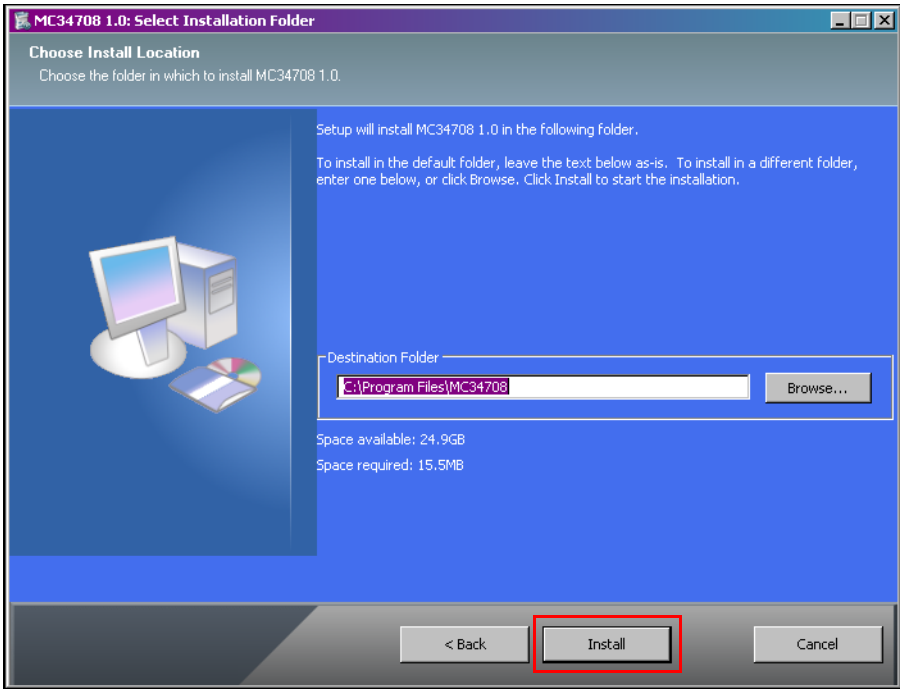

Figure 9. Select Installation Folder

5. Clicking the **Install** button, as shown in Figure 9, initiates the installation of the necessary drivers, as shown in Figure 10.

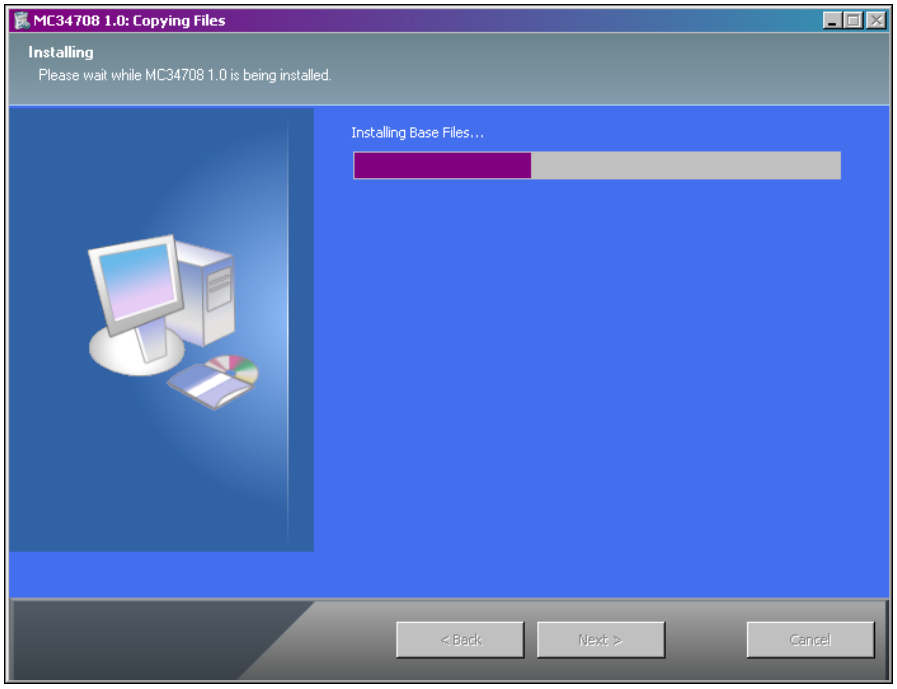

Figure 10. Copying Files

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6. Following the correct installation of the GUI and device drivers, the KIT34708VMEVBE board is ready to send and receive commands to the MC34708 Installer.exe application through the KITUSBCOMDGLEVME board. To finish the installation process, click the **Close** button (Figure 11).

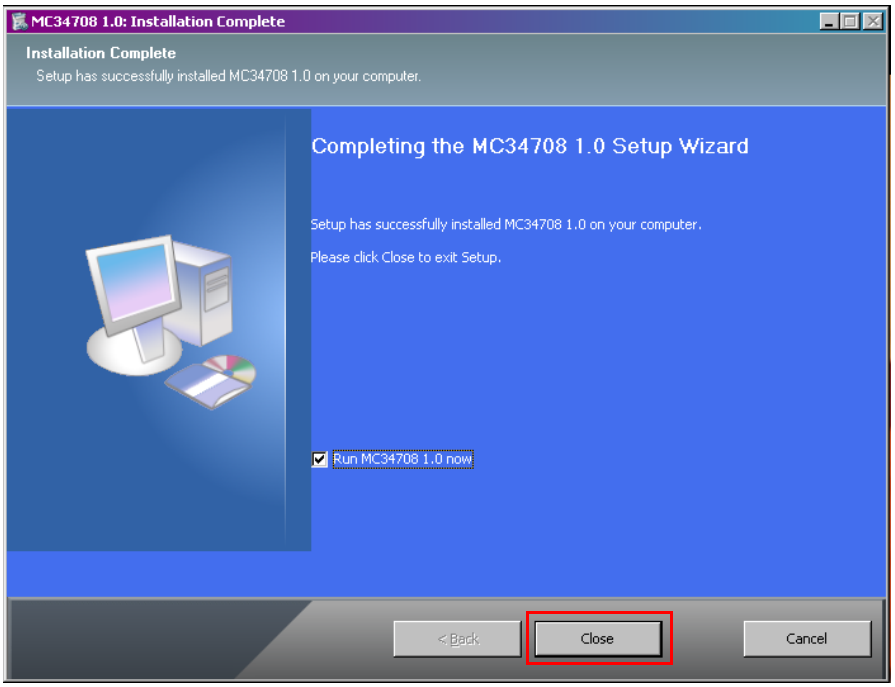

Figure 11. Installation Complete

6.2 Controlling the Hardware from the Graphical User Interface

To interface the KITUSBCOMDGLEVME with the KIT34708VMEVBE, the following connections should be made:

KITUSBCOMDGLEVME connector	KIT34708VMEVBE connector	Function
J8	J11	For control signals: WDI, INT, RESETB, RESETBMCU, STANDBY, GLBRST, CS, PWRON1, and SDWB.
J9	J13	If SPI communication is desired.
J7	J10	If I^2C communication is desired.

Steps to interface the KITUSBCOMDGLEVME with the KIT34708VMEVBE:

1. Plug the KITUSBCOMDGLEVME into the USB port of the PC/Laptop.
2. Open the MC34708 Graphical User Interface program.
3. Click **Open USB Communications** on the main window of the MC34708 Graphical User Interface Program (See Figure 12).

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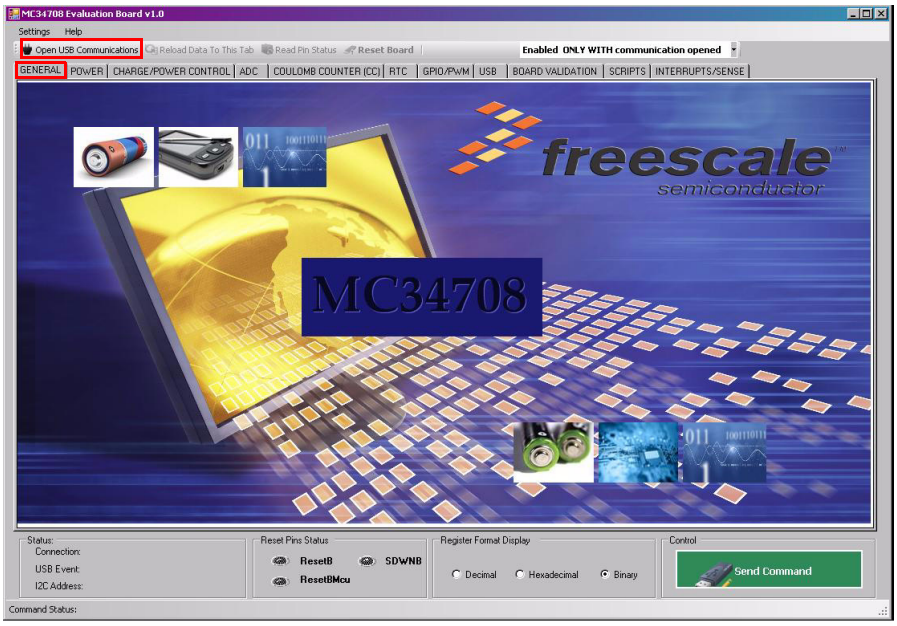

Figure 12. Main Window of the MC34708 Graphical User Interface Program

4. In the **General** tab, a **Communication Type** dialog box is displayed which allows you to select a type of communication protocol (**SCI** or **I²C**) from the list. (See Figure 13 and Figure 14). Click **OK**.

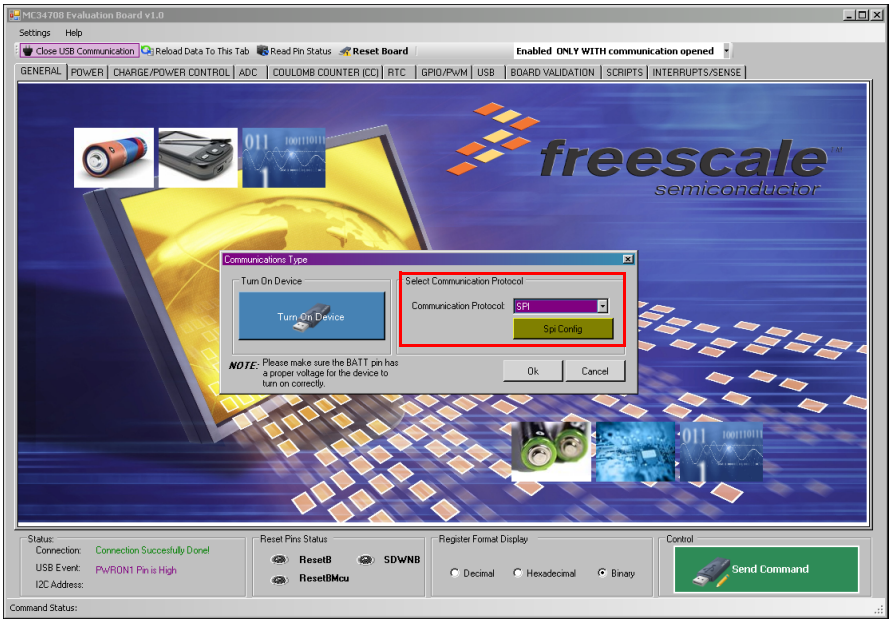

Figure 13. Communication Type Selection Window for SPI

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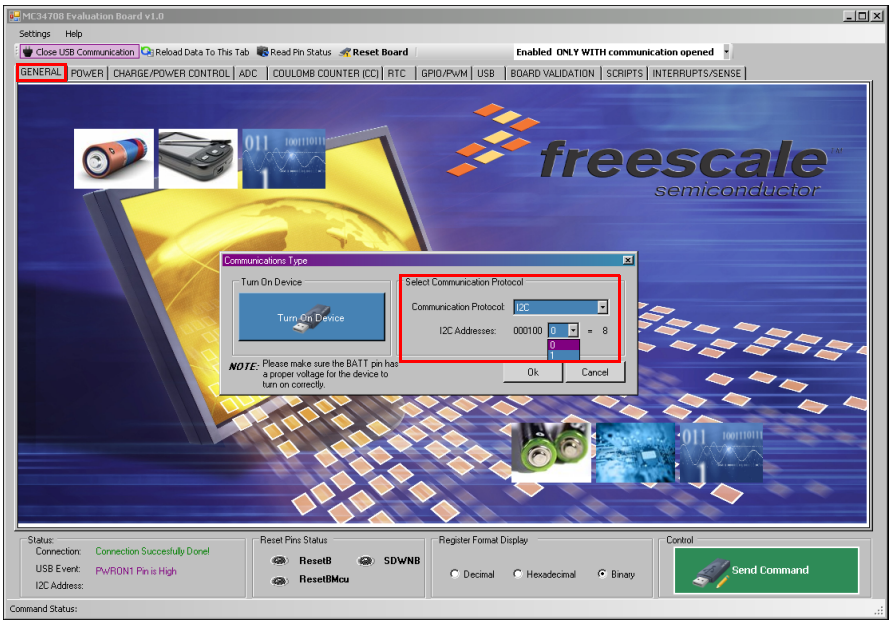

Figure 14. Communication Type Selection Window for I²C

5. After selecting the communication type, click the **Board Validation** tab. (See Figure 15), and then set the **WDI** pin high, toggle the **PWRON1** button to **ON**, and the MC34708 will turn on.

Figure 15. Board Validation Configuration Window

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The user can now begin configuring the rest of the tabs to test all the MC34708 features.

The structure of the GUI is divided in different tabs, which control different blocks of the MC34708. Each one of these tabs controls a specific register and block of the device.

Note: The steps listed in this document are not sequential steps in a process.

6.3 POWER Tab

1. In the main window of the MC34708 Graphical User Interface Program (Figure 16), click the **POWER** tab to control the registers for the Linear Regulators and Switching Regulators.

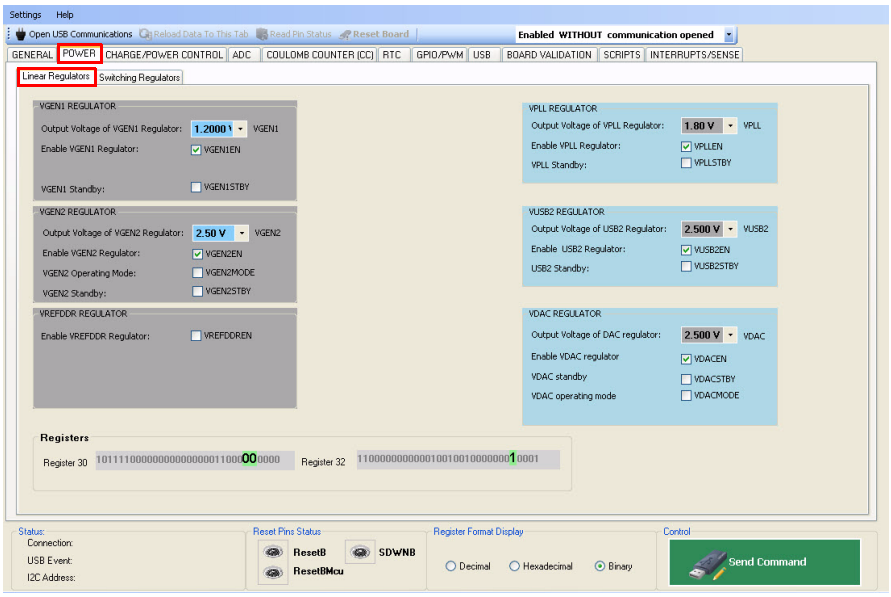

Figure 16. Linear Regulator Configuration Window

The following two sub-tabs are displayed:

- Linear Regulators
- Switching Regulators

2. Click **Switching Regulators** sub-tab (Figure 17), to change the settings of the switching regulators as well as the PLL configuration.

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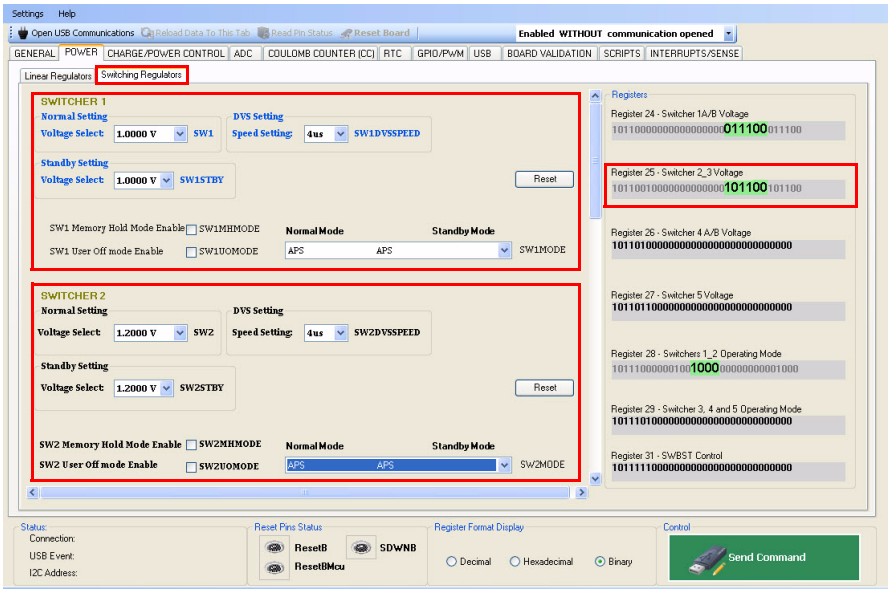

Figure 17. Writing and Reading Commands Using the Software Program

3. The **Switching Regulators** window displays the value of the register and how it changes, depending on the command.

Note: A SPI command consists of a Read/Write bit, six Address bits, and 24 Data bits. See Figure 18.

Figure 18. Register Value Changes with Commands

4. Once registers are configured, click the **Send Command** button for the information to be sent, and the registers to be written (see Figure 19).

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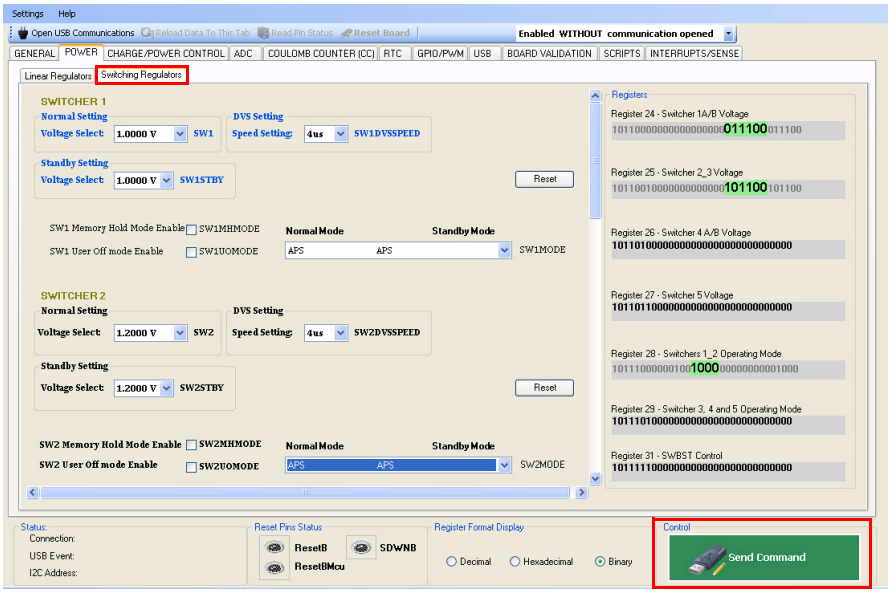

Figure 19. Send Command

This button will send commands only when an open USB communication has being established. In the current operation mode proposed earlier (Enabled Without communication opened), these bytes will not be sent to the board.

5. When the command has been sent, the **Command Status** bar will display **Done!,** as shown in Figure 20. At this point, the next command can be assembled.

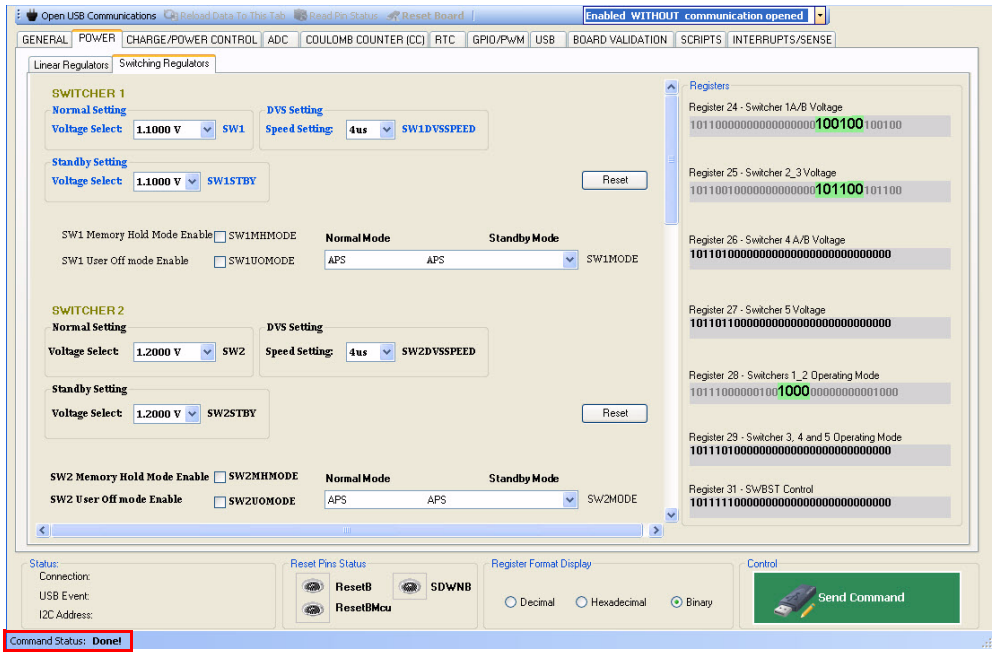

Figure 20. Command Delivery/Validation

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When a USB communication is being established, every time a tab is being selected, the GUI will request data from the MC34708 device and update the current tab with the received data from the board.

6. Click **Linear Regulators** sub-tab to enable or disable the linear regulators, configure the Standby mode and in the case of VGEN2 and VDAC, configure them to work with their internal or external pass device (see Figure 21).

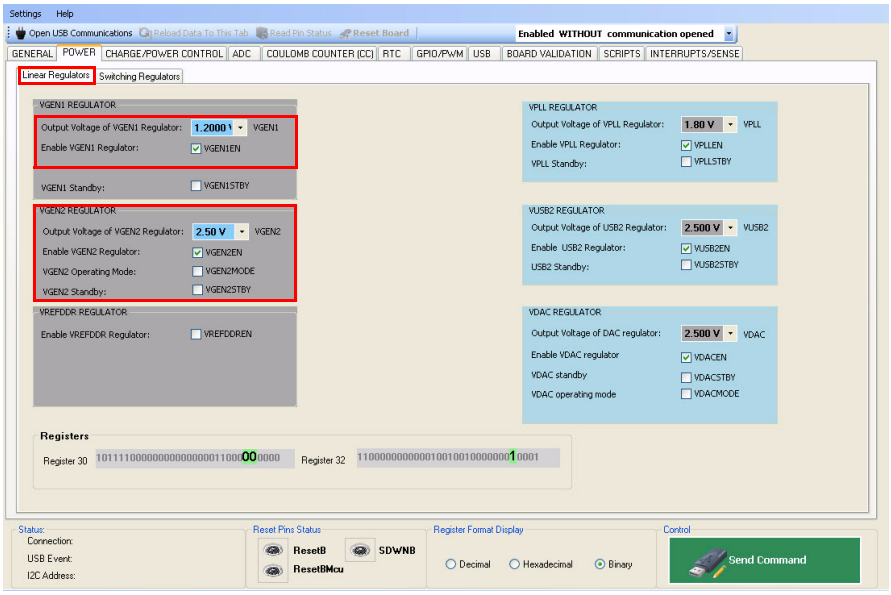

Figure 21. Linear Regulator Configuration Window

7. Enable the Linear Regulators and select the output voltage from the list.
8. Configure the Standby mode and in the case of VGEN2 and VDAC, configure them to work with their internal or external pass device.
9. Click the **Switching Regulators** sub-tab to view the switching regulators configuration features as shown in Figure 22.
10. Select a value for the normal and standby set point, the operating mode normal and standby modes, Memory Hold and User Off modes enable and disable, and the Dynamic Voltage Scaling (DVS) settings for the switching regulators.

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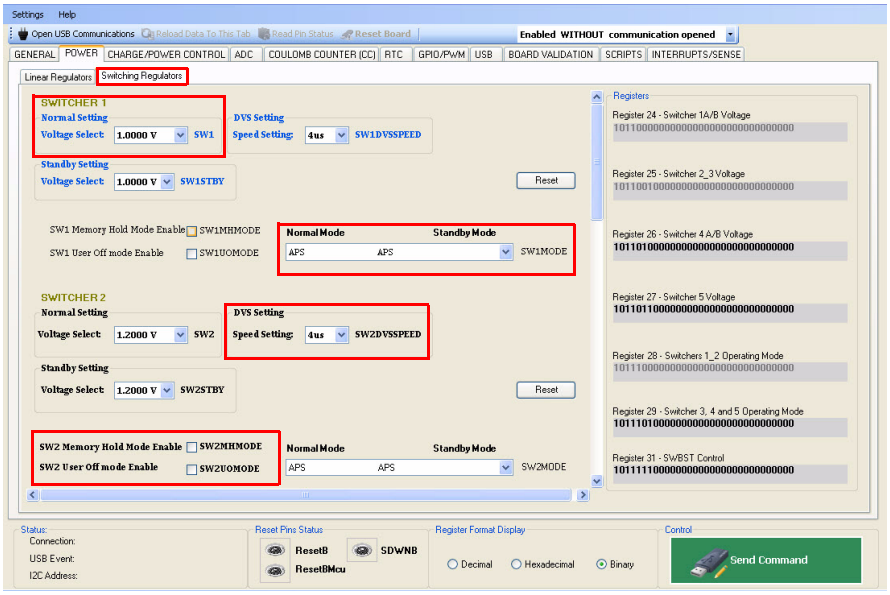

Figure 22. Switching Regulators Sub-tab Configuration Window 1

11. The switching regulators configuration features in Figure 23 include: the output voltage range selection for switching regulators **SW4A** and **SW4B**.

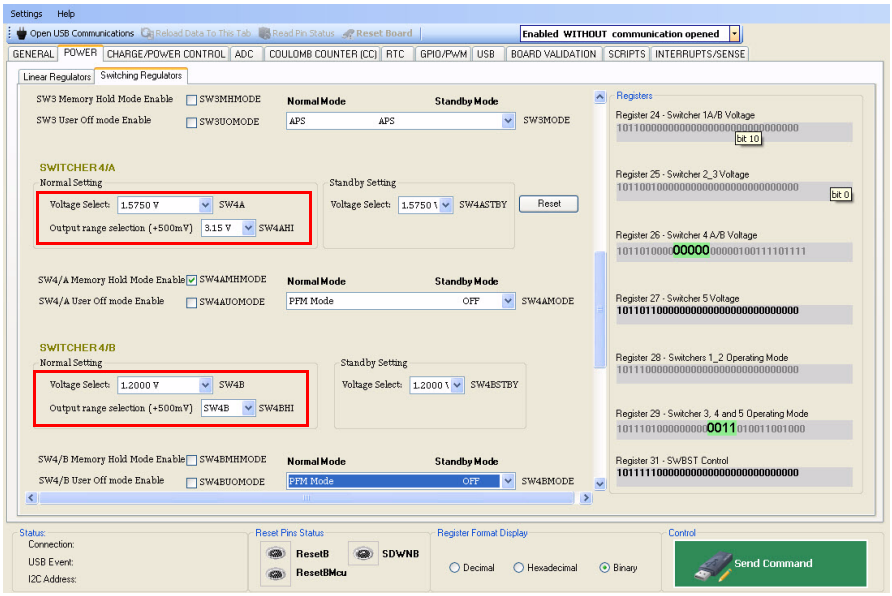

Figure 23. Switching Regulators Sub-tab Configuration Window 2

12. Enable the **Force PLL ON** option to configure the PLL frequency as shown in Figure 24.

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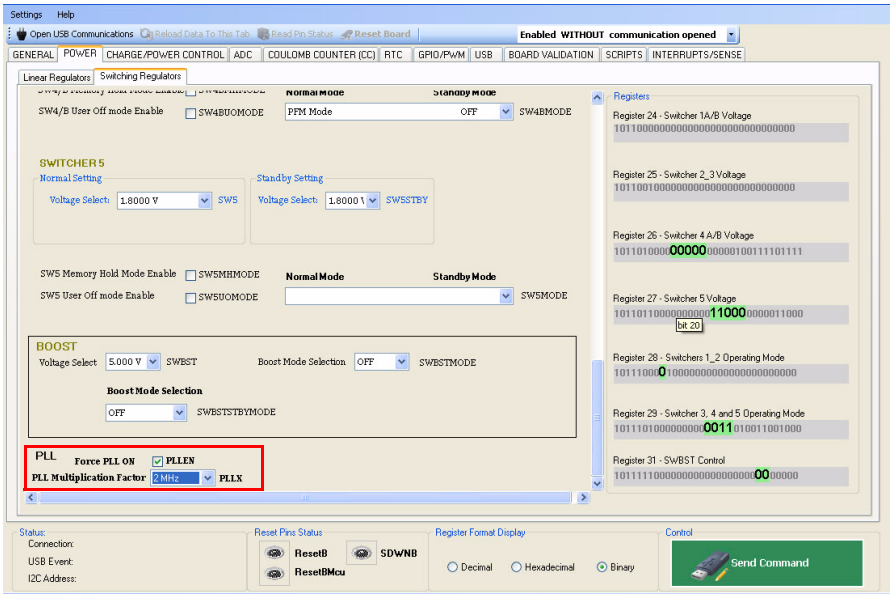

Figure 24. Switching Regulators Sub-tab Configuration Window 3

6.4 CHARGE/POWER CONTROL Tab

1. Click the **CHARGE/POWER CONTROL** tab to display the charger settings.

The following two sub-tabs are displayed:

- Charger
- Power Control

2. In the **Charger** tab, select the charger voltage and current (see Figure 25), AUX/VBUS input current limit settings, thermal settings, VBUS/VAUX charger detect thresholds and battery thermistor thresholds from the list.

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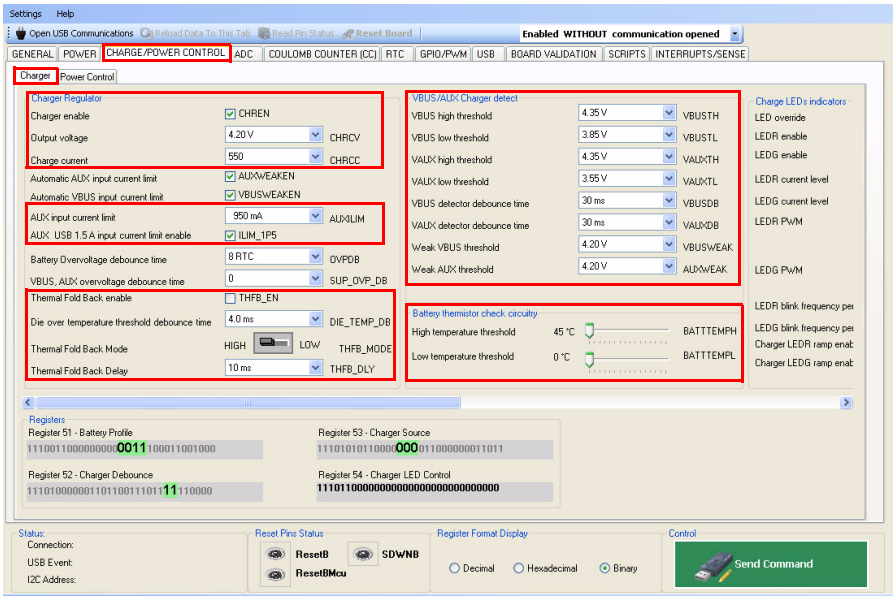

Figure 25. Battery Charger Configuration Tab Window 1

3. Enable or disable the Charge LEDs indicator settings and select the standalone and trickle charging configuration from the list as shown in Figure 26.

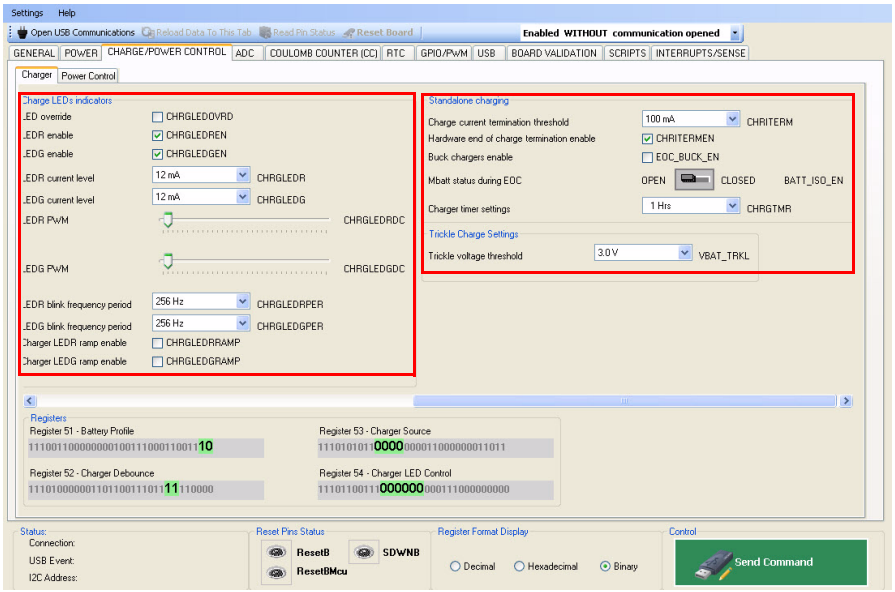

Figure 26. Battery Charger Configuration Tab Window 2

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6.5 ADC Tab

The MC34708 GUI can control the ADC module for dedicated and touch screen readings. In the ADC Settings area (see Figure 27), it is possible to:

- configure the conversion startup between conversions, and after final conversion delays
- assign the variables to be measured in different channels
- the number of the ADC channels to use
- and enable the continuous conversion and hold results.

For the touchscreen readings, a similar configuration can be made using the Touchscreen Settings.

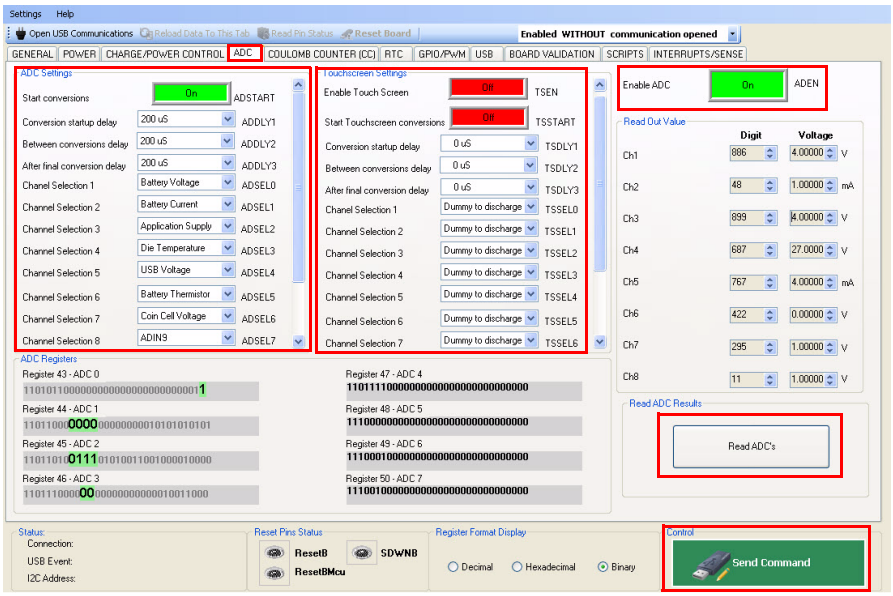

Figure 27. ADC Configuration Window

After the ADC is enabled and all settings have been configured into the MC34708 by clicking the **Send Command** button, click the **Read ADCs** button, and the results configured in each channel will be displayed.

As an example, follow these steps:

1. Set the **Start conversions** button to **ON**.
2. Set the Conversion startup between conversions and after final conversion delays to 200 μsec each.
3. Select the different parameters to be read on each channel from Channel Selection 1 to 8 through the combo boxes, then set the Stop Channel as Channel 8.

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4. Set the **Continuously conversion enable** and the **Battery detection enable** bits to 1 by ticking the corresponding boxes.
5. Set the **Enable ADC** button to ON.
6. Click the **Send Command** button.
7. The results of each of the conversions can be read at the **ReadOut Value** fields by clicking the **Read ADCs** button (see Figure 28).

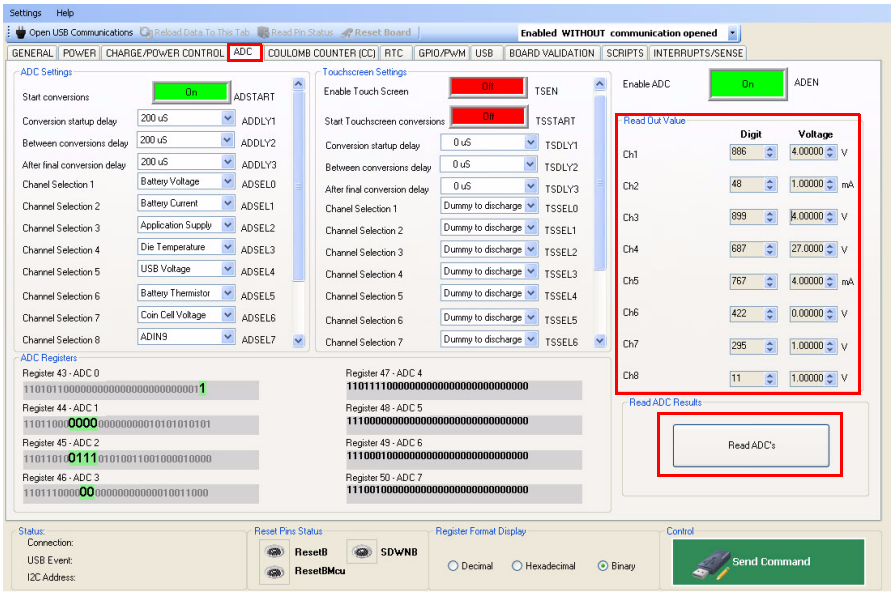

Figure 28. ADC Configuration Window

6.6 COULOMB COUNTER (CC) Tab

On the **COULOMB COUNTER (CC)** tab (shown in Figure 29), a function called **Initialize CC Counter Automatically** performs the following sequence of commands:

- Starts the Coulomb Counter
- Resets the Coulomb Counter
- Sets the CCDITHER bit, which applies a dithering to the A to D converter, to avoid any error in the measurement due to repetitive events
- Sets the CCCALA bit, which calibrates the Coulomb Counter
- Sets the ONEC Value for Coulomb Counter accuracy
- Clears the CCCALA bit

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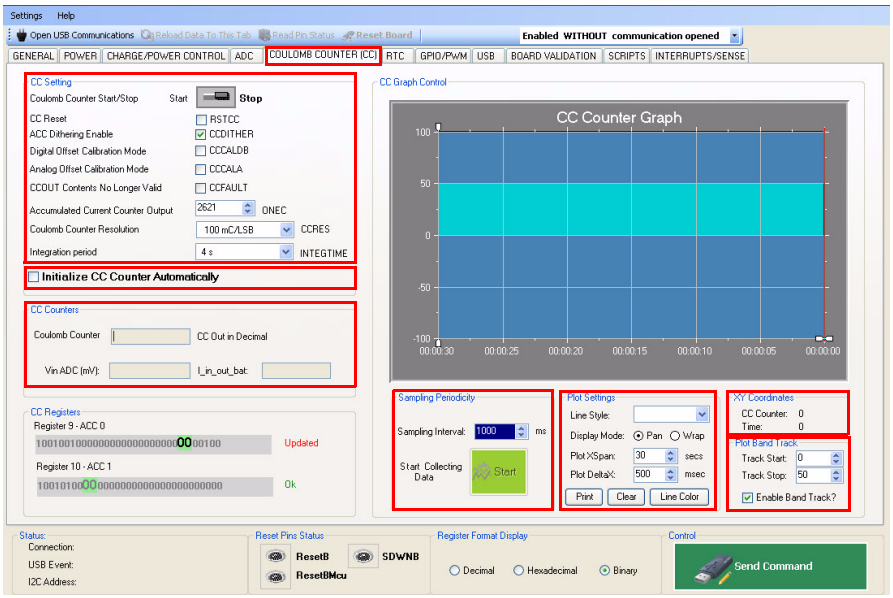

Figure 29. Coulomb Counter Configuration Tab Window

1. This module can also be manually controlled through the **CC Setting** section bits.
2. The **CC Counters** section displays the value in decimal of the module counter in the MC34708 device. Every time the user reads the counter value, this section will display the current value in the MC34708 register.
3. The **Sampling Periodicity** section allows the user to retrieve the CC counter value from the MC34708 device at given rate. The field called **Sampling Interval** allows the user to request data from the Coulomb Counter in milliseconds.
4. Once the **Start button** is selected, the application automatically starts collecting data from the CC Counter and displays it in the **CC Counter Graph** section.
5. The **Plot Settings** section manages the general settings of the graphical section in the CC Counter tab.
   - The **Line Style** option tells the graph to display data using different painting styles, such as solid, dash, and dot type lines.
   - The **Display Mode** has two different options indicating how data will be displayed and saved into the graph tool. The **Pan mode** will scroll the data continuously across the screen like a standard strip chart. The **Wrap Mode** allows the data to remain static on the screen, while a line moves across the plot area, and everything behind the line is repainted with the new data.
   - The **Plot XSpan** option sets the viewable extents of the X-axis. When you are using the X-axis to display Time, setting XSpan = 1 is equivalent to setting it to 24 hours. For instance, if you want to display five seconds of data on the viewable area, you would set XSpan = 0.00005787037037037 (1/24/60/60*5).
   - Click the **Line Color** button to change the color of the printing line in the graph.

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- Click the **Print** button to print the currently displayed data in the graph.

6. The **XY Coordinates** section shows the exact position of the cursor in the graph area. The user is able to select any point in the graph, and the XY Coordinates box will display the coordinates of the selected point.
7. The **Plot Band Track** section lets the user create a bound area between the delimited high and low sections in the graph. For instance, if the user needs to check a specific area in the graph between 0 and 50 (shown in Figure 29), they need to set the boundaries in the **Track Start** and **Track Stop** components accordingly, to create a delimited band.

6.7 RTC Tab

1. In the main window of the MC34708 Graphical User Interface Program, click the **RTC** tab.

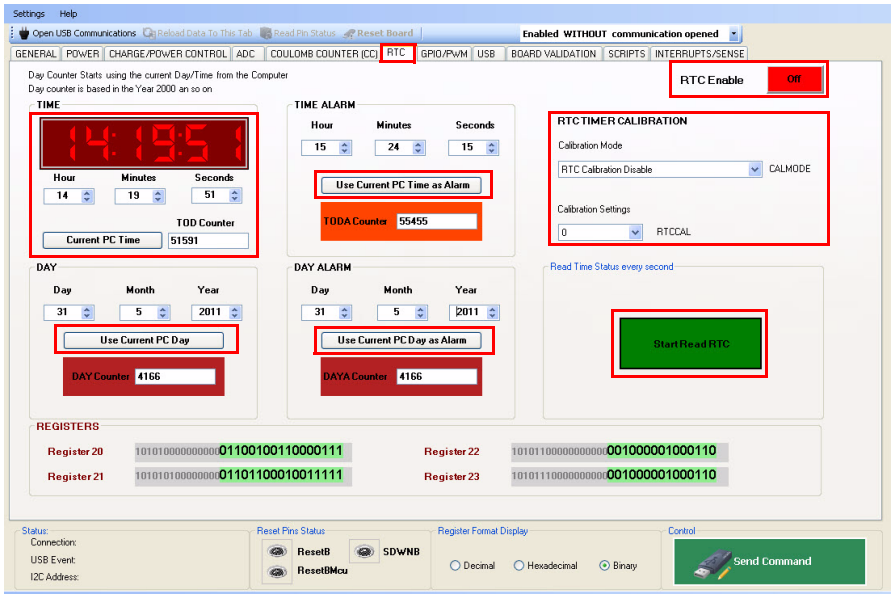

Figure 30. Real Time Clock Configuration Window

2. The digital clock control in Figure 30 shows the current time of the RTC register for MC34708.
3. Set the **RTC Enable** option to On and then click the **Send Command** button to begin the process.
4. The time can be changed at any moment using the control text boxes in the **Time** section.
5. In the **RTC Timer Calibration** section, select the calibration mode and settings from the list.

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6. If the **Start Read RTC** button is enabled, the RTC will automatically refresh every second. This way its accuracy can be corroborated. It is important to mention that while the RTC is being automatically refreshed, the rest of the commands will be disabled.
7. As a special feature, a **Current PC Time** button is available. This button reads the value of the computer clock, which can be sent later to the RTC time register by clicking the **Send Command** button.
8. The **Use Current PC Day**, **Use Current PC Time as Alarm**, and **Use Current PC Day as Alarm** buttons will similarly set the corresponding time or day on their respective blocks.

6.8 GPIO/PWM Tab

1. Clicking the **GPIO/PWM** tab in the main window displays the **GPIO** sub-tab as shown in Figure 31.

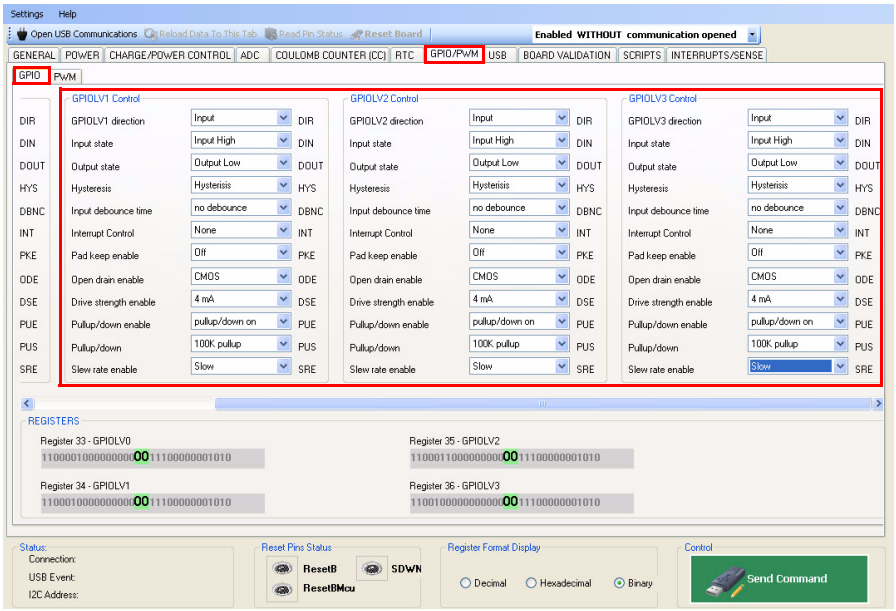

Figure 31. GPIO Tab Configuration Window

2. The **GPIO** sub-tab contains all the configuration controls for each of the GPIOLV pins:
   - GPIOLV1 direction
   - Input and output state
   - Hysteresis
   - Debounce time
   - Pad keep enable
   - Open drain enable

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- Drive strength enable
- Interrupt control
- Pull-up/down enable
- Pull-up/down
- Slew rate enable

3. Click the **PWM** sub-tab. This tab contains all the controls of the bits that configure the PWM pins of the MC34708 as shown in Figure 32.

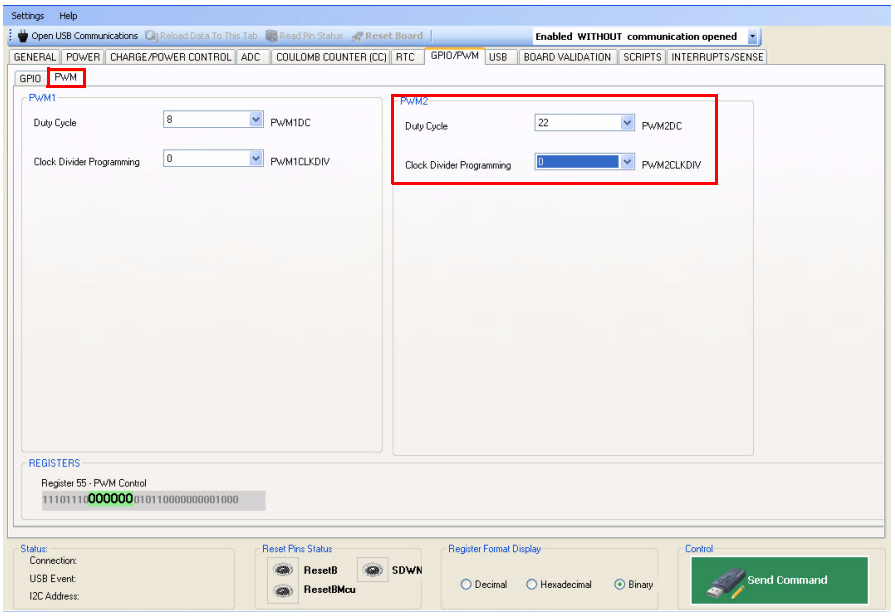

Figure 32. PWM Tab Configuration Window

4. In the **PWM2** section, select the duty cycle and clock divide settings from the list.

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6.9 USB Tab

The **USB** tab in Figure 33 contains all the controls of the bits that configure the USB block of the MC34708.

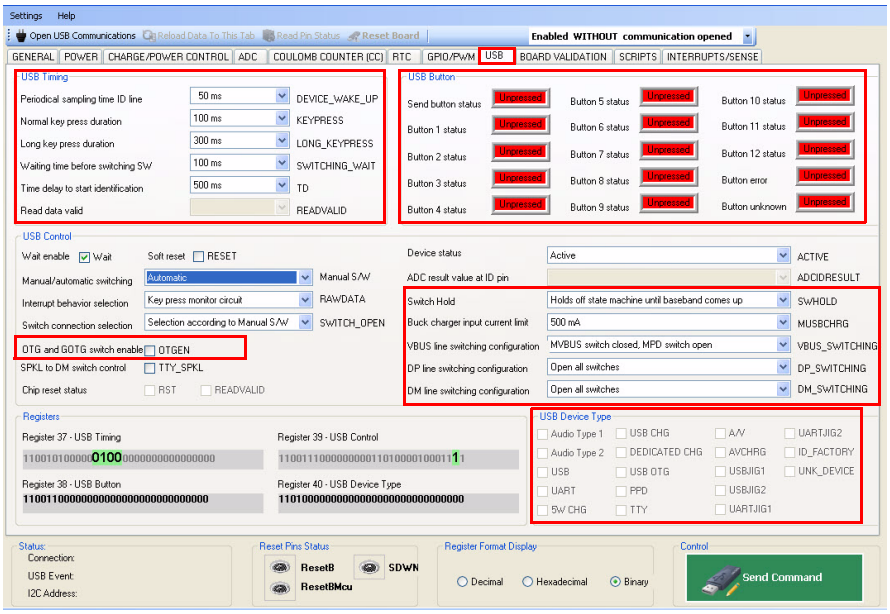

Figure 33. USB Configuration Window

1. In the **USB Control** section, enable the OTG mode.
2. Select the line switching configuration when controlled by the device type.
3. In the **USB Button** section, click the appropriate button to change the audio type operation mode.
4. Select the USB Timing from the list.
5. Select the USB device accessory identification in the USB Device Type section.

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6.10 INTERRUPTS/SENSE Tab

The **INTERRUPTS/SENSE** tab (seen in Figure 34) contains a list of all the interrupt bits of the MC34708, their masks, and sense bits.

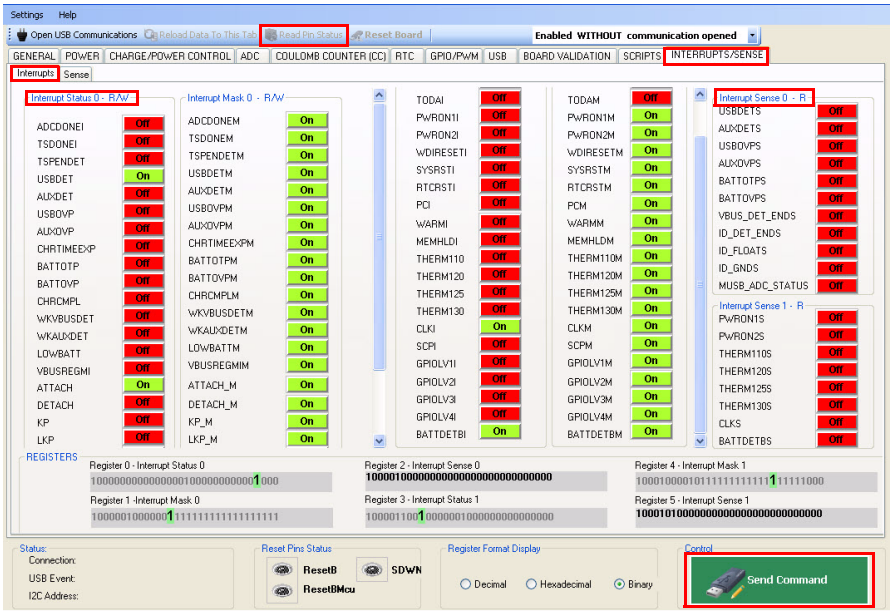

Figure 34. Interrupts/Sense Status Tab Window

1. For an interrupt bit to be reflected on the **INT** pin, its corresponding mask must be set to Off, and the **Send Command** button must be selected.
2. The **INT** pin status can be read in the bottom right section of the **Board Validation** tab (Figure 35). Its status can be refreshed by clicking the **Read Pin Status** button on the very top of the window.
3. The **Interrupts** tab indicates if the bits contained in each column are Read or Read/Write, signaling that the read only bits cannot be modified through the interrupt status tab.

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6.11 BOARD VALIDATION and SCRIPTS Tabs

The **BOARD VALIDATION** and **SCRIPTS** tab control the overall functionality of the device, instead of a specific block like other tabs.

1. The **Register** list as shown in Figure 35 contains a list of all the MC34708 registers.

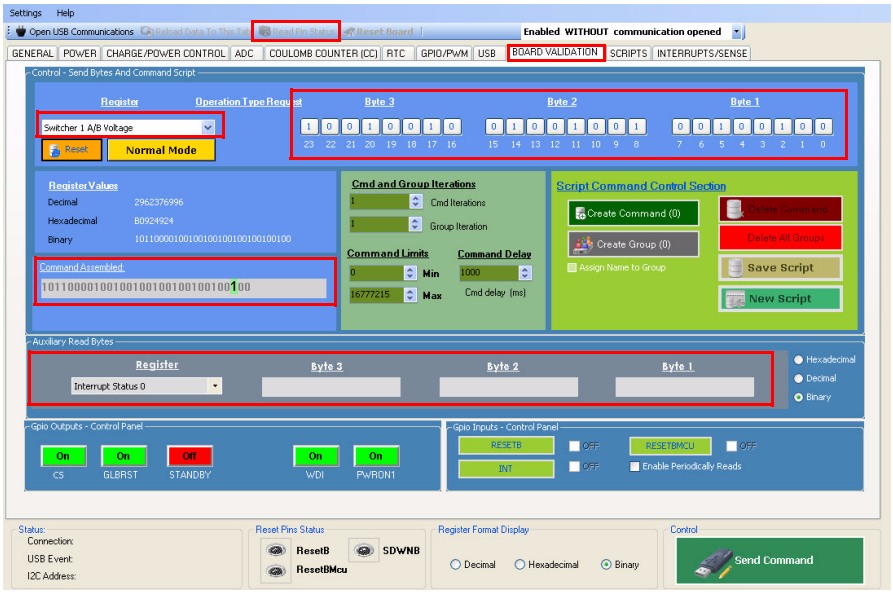

Figure 35. Board Validation Configuration Window

2. The register contents will be shown on the **Byte**s buttons when selected in the register list. The user can manually modify the contents of the registers by clicking on the buttons and sending the command by clicking the **Send Command** button.
3. The command to be sent will be displayed in the **Command Assembled** box.
4. A specific register can be read in the **Auxiliary Read Bytes** section using the value from the **Register** list. The value of the register to be read will be shown in the **Bytes** text box. This way, the user can (for example) check the result of an ADC conversion on the ADC 2 register. They configure and trigger the ADC on the rest of the ADC registers using the **Register** and **Byte**s sections. The main purpose of the **Auxiliary Read Bytes** section is to read the contents from the MC34708, but not write to the registers.
5. In the **Gpio Outputs - Control Panel** section, the **CS**, **GLBRST**, **STANDBY**, **WDI**, and **PWRON1** pins can be controlled by clicking their respective buttons.

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6.11.1 Writing and Running a Script

A complete list of commands can be saved in a file to be run in series as a script. This is done with the **BOARD VALIDATION** and **SCRIPTS** tabs.

1. Click the **Normal Mode** button as shown in Figure 36. After clicking it, it will show that the tab is working in **Script Mode**, in which the **Send Command** button is disabled and the commands assembled are only intended to be saved into a file.

Figure 36. Board Validation Configuration Window

2. A **Read/Write** button will appear. This button is to indicate if the assembled command is to read or write to a specific register.
3. Select the command iterations, limits, and delay in the **Cmd and Group Iterations** section.
4. The **Script Command Control** section allows the user to save the characteristics specified in the **Cmd and Group Iterations** section.

The script writing steps are listed as follows:

1. Click the **Normal Mode** button to go into **Script Mode**.
2. Select the register to be read/written in the **Register** right above the Normal Mode button.
3. Specify if it will be a Read or Write command with the **Read/Write** button.
4. Configure the data bits using the **Bytes** buttons on the right of the **Read/Write** button.
5. Select the Command Iterations, Limits, and Delay in the **Cmd and Group Iterations** section.

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- **Command Iterations** indicates the number of times the command will be repeated
- **Command Limits** is for Read commands. The user can set the limits that indicate if the read of a register is valid or not (as a decimal number). When the script runs, a write command will compare the read value with these limits and show if the command passed or failed. This is useful for example, for ADC readings.
- The **Command Delay** box is to specify a determined delay after the command is executed. It is given in milliseconds.

6. Click the **Create Command** button in the **Cmd and Group Iterations** section. The command will be saved with the characteristics specified in the **Cmd and Group Iterations** section.
7. The software gives the possibility to iterate a bunch of commands that are saved in a group. To do this, after creating a bunch of commands and selecting the number of group iterations, click the **Create Group** button, and all the commands will be saved under that specific group. After saving the commands into a group, they will be removed from the command list and a new group will begin. Select the **Assign Name to Group** check box to assign a specific name to a group. All scripts must have at least one group in order to save them and all the commands must belong to a group, even if the group consists of a single command.
8. After all the commands and groups have been created and saved, click the **Save Script** button to save the file.
   - The **Delete Command** button shows a list of all the created commands. The user can select a specific one and delete it.
   - The **Delete All Groups** button deletes all the created groups from the RAM memory.
   - The **New Script** button removes all the commands and groups from the RAM memory, after they have been saved to disk to start a new script file.

6.11.2 Special RTC Commands and GPIO Commands

When running in Script mode, special commands are added at the end of the list in the **Register** section. These commands are:

- **RTC Set Time of Computer Clock**: Takes the value of the computer clock and writes it in the RTC time register.
- **RTC Time Compare Between Computer Clock and the MC34708**: Compares the value of the MC34708 RTC with the time of the computer clock.
- **GPIO “x” Write High/Low State**: Where “x” represents CS, GLBRST, STANDBY, WDI and PWRON1. These commands simply configure the state of the listed pins.
- **GPIO “x” Read State**: Where “x” represents CS, GLBRST, STANDBY, WDI, PWRON1, RESETB, RESETBMCU, SDWNB, PWRON1 and INT. These commands read the state of the listed pins.

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6.11.3 Running a Script

Once the script has been saved, the **SCRIPTS** tab has all the controls to run it, as shown in Figure 37.

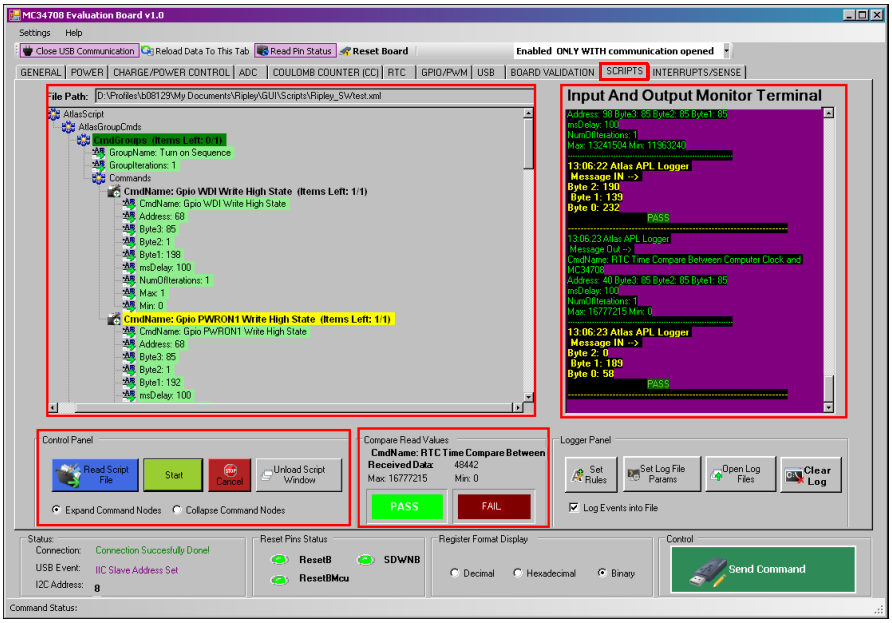

Figure 37. Script Configuration Tab Window

1. In the **Control Panel** section, click the **Read Script File** button and load the script.
2. A list of all the commands of the loaded script will appear in the **Command** section. A summarized view of the script can be selected with the **Collapse Command Nodes** option on the **Control Panel**. After the script has been loaded, click the **Start** button on the **Control Panel**, and all the commands will be executed.
3. The **Input and Output Monitor Terminal** will display a detailed list of all the commands sent and received, and whether they passed or failed, according to the limits set when created. The log on this window can be saved after the script has finished by going to the Script – **Save Log Into RTF File** menu at the top of the screen.
4. The **Compare Read Values** also shows if the command currently being executed passes or fails a comparison to the limits.

6.11.4 Brief Example: Writing a Quick Script

The following example shows the steps to write a script to turn on the MC34708, then turn on and off the RGB LEDs:

1. Go to the **Board Validation** tab and then click the **Normal Mode** button to select **Script Mode**.

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2. In the **Register** list, select the **GPIO WDI Write High State** command.
3. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
4. Click the **Create Command** button.
5. In the **Register** list select the **GPIO PWRON1 Write High State** command.
6. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
7. Click the **Create Command** button.
8. Select the **Assign Name to Group** option, and enter **Turn on Sequence** in the group name text box.
9. Click the **Create Group** button.
10. In the **Register** list, select the **PWM Control** register, and with the Bytes buttons set the following value: 00000000 00000000 00011111. This will turn on the green LED D7 and turn off the green LED D8.
11. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
12. Click the **Create Command** button.
13. In the **Register** list, keep selecting the **PWM Control** register, and with the **Bytes** buttons set the following value: 00000001 11110000 00000000. This will turn off the green LED D7 and turn on the green LED D8.
14. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
15. Click the **Create Command** button.
16. Select the **Assign Name to Group** option, and enter **Loop** on the group name text box.
17. Set a group iterations value of 10.
18. Click the **Create Group** button.
19. Click the **Save Script** button and select a location and name for the script.
20. Load the script in the **SCRIPTS** tab using the **Read Script File** button.
21. Verify the connections of the KITUSBCOMDGLEVME and the KIT34708VMEVBE
22. Click the **Start** button of the **SCRIPTS** tab to run the script.

The following example shows a script that will read, and compare SW2, SW3, & SW5 voltages, and the RTC time. This is a more complex script with which the user can get acquainted with the read value comparator:

1. Go to the **Board Validation** tab and then click the **Normal Mode** button to select Script Mode.
2. In the **Register** list, select the **GPIO WDI Write High State** command.

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3. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
4. Click the **Create Command** button.
5. In the **Register** combo box, select the **GPIO PWRON1 Write High State** command.
6. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
7. Click the **Create Command** button.
8. Select the **Assign Name to Group** option and enter **Turn on Sequence** in the group name text box.
9. Click the **Create Group** button.
10. In the **Register** list, select the **RTC Set Time From Computer Clock** command.
11. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
12. Click the **Create Command** button.
13. In the **Register** list, select the **ADC 0** register, and with the **Bytes** buttons set the following value: 00000000 00000000 01010101. This will set the ADEN, ADCOUNT, and ADHOLD bits, and select the first six channels.
14. Ensure the Read/Write button says “Write” and set a command delay of 100 ms. The command iterations and limits can be left with the default values.
15. Click the **Create Command** button.
16. In the **Register** list, select the ADC 1 register, and with the Bytes buttons set the following value: 00000000 00000101 01010101. This will set 200 μsec as the delay: before the ADC readings, between each ADC reading and after the set of ADC readings.
17. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
18. Click the **Create Command** button.
19. In the Register list, select the **ADC 2** register, and with the “Bytes” buttons set the following value: 1011101110101010 10011001. This will select ADIN9, ADIN10, and ADIN11 results to be placed at ADRESULT0&1, ADRESULT2&3, and ADRESULT4&5, respectively.
20. Set a command delay of 100 ms. The command iterations and limits can be left with the default values.
21. Click the **Create Command** button.
22. Select the **Assign Name to Group** option and enter **Initialization** in the group name text box.
23. Click the **Create Group** button.

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24. In the **Register** list, select the **ADC 0** register, and with the **Bytes** buttons, set the following value: 00000000 00000000 01010111. This will trigger the ADC to start a conversion.
25. Set a command delay of 1000 ms. The command iterations and limits can be left with the default values.
26. Click the **Create Command** button.
27. In the **Register** list, select the **ADC 4** register. Ensure the **Read/Write** button displays **Read**. The GUI will disregard the value contained on the **Bytes** buttons, and since this is a read command, they can be left as zeroes.
28. Set a command delay of 100 ms. Set the commands limits as min = 7997344 and max = 8783968 (equivalent to a min of 1.14 V and a max of 1.26 V on the SW2 voltage).
29. Click the **Create Command** button.
30. In the **Register** list, select the **ADC 5** register. Ensure the **Read/Write** button displays **Read**. The GUI will disregard the value contained on the **Bytes** buttons, and since this is a read command, they can be left as zeroes.
31. Set a command delay of 100 ms. Set the commands limits as min = 9423100 and max = 10291664 (equivalent to a min of 1.33 V and a max of 1.47 V on SW3 voltage).
32. Click the **Create Command** button.
33. In the **Register** list, select the **ADC 6** register. Ensure the Read/Write button says “Read”. The GUI will disregard the value contained on the **Bytes** buttons, and since this is a read command, they can be left as zeroes.
34. Set a command delay of 100 ms. Set the commands limits as min = 11963240 and max = 13241504 (equivalent to a min of 1.71 V and a max of 1.89 V on SW5 voltage).
35. Click the **Create Command** button.
36. In the Registers list, select the **RTC Time Compare Between Computer Clock and MC34708** command. This command will ignore the Read/Write button and the values contained on the **Bytes** buttons.
37. Click the **Create Command** button.
38. Select the **Assign Name to Group** option and write **Measurement Loop** in the group name text box.
39. Set a group iterations value of 3.
40. Click the **Create Group** button.
41. Click the **Save Script** button and select a location and name for the script.
42. Load the script on the **Scripts** tab using the **Read Script File** button.
43. Verify the connections of the KITUSBCOMDGLEVME and the KIT34708VMEVBE.
44. Ensure the MC34708 has 3.7 V on the **BATT** pin.

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45. Hook up clip-clip cables as following: TP145-SW2 ➔ TP167-ADIN9; TP165-SW3 ➔ TP119-ADIN10; TP171-SW5 ➔ TP168-ADIN11.
46. Click the **Start** button of the **SCRIPTS** tab to run the script.

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7 KIT34708VMEVBE Board

7.1 Schematic

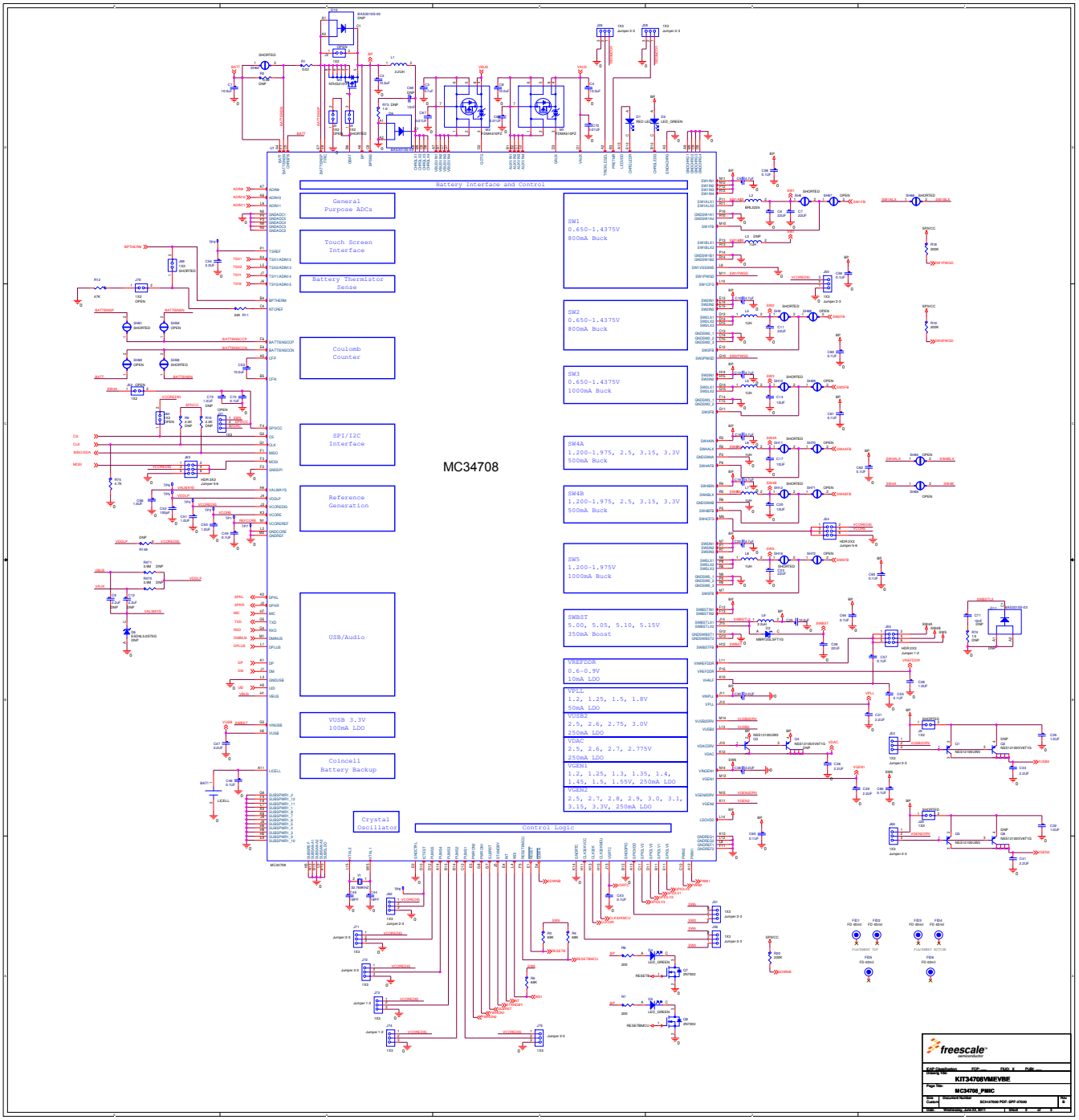

Figure 38. KIT34708VMEVBE (Rev. B) Schematic (13x13). Part 1

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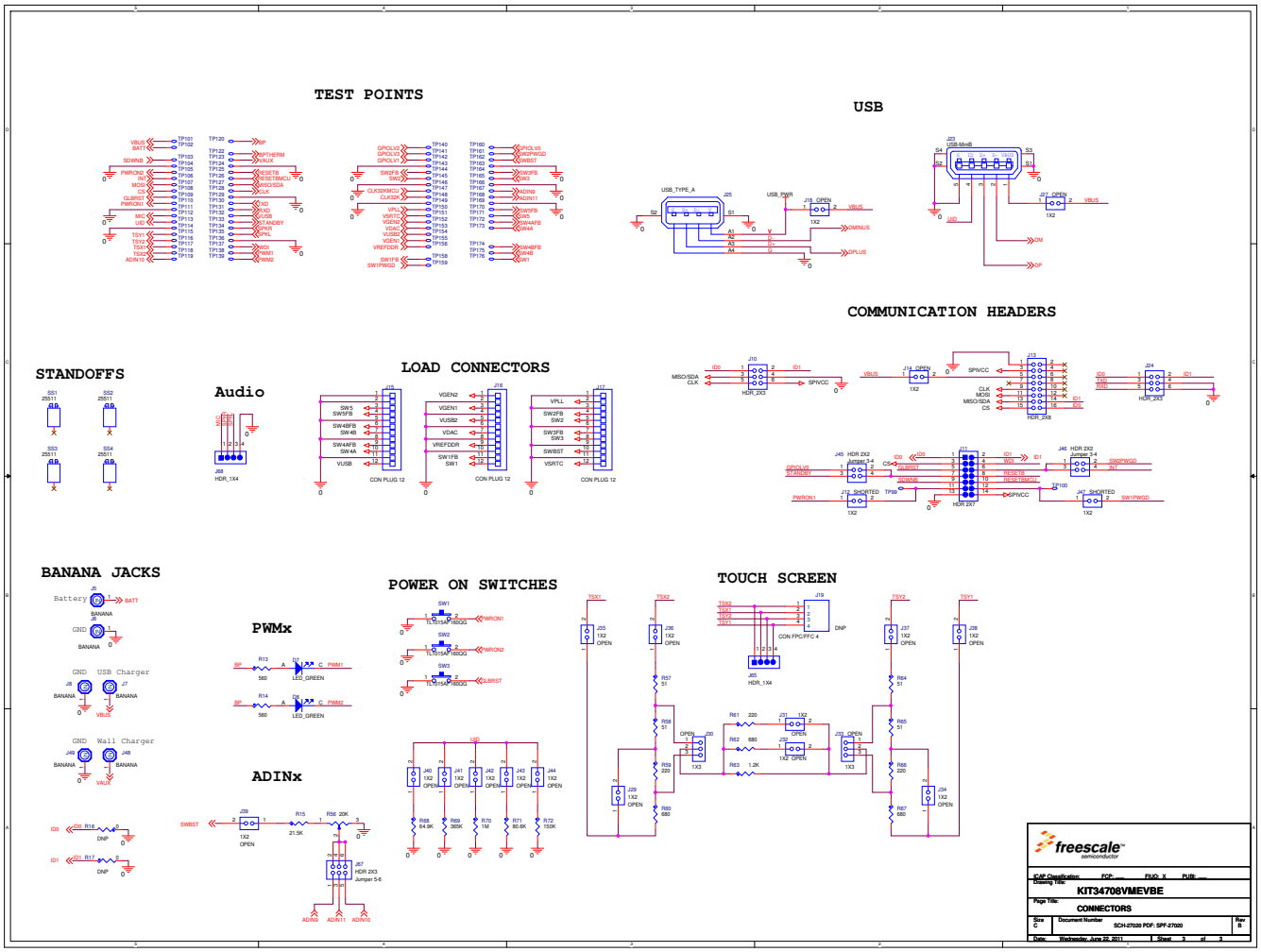

Figure 39. KIT34708VMEVBE (Rev. B) Schematic (13x13). Part 2

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7.2 Assembly and Silkscreen Top

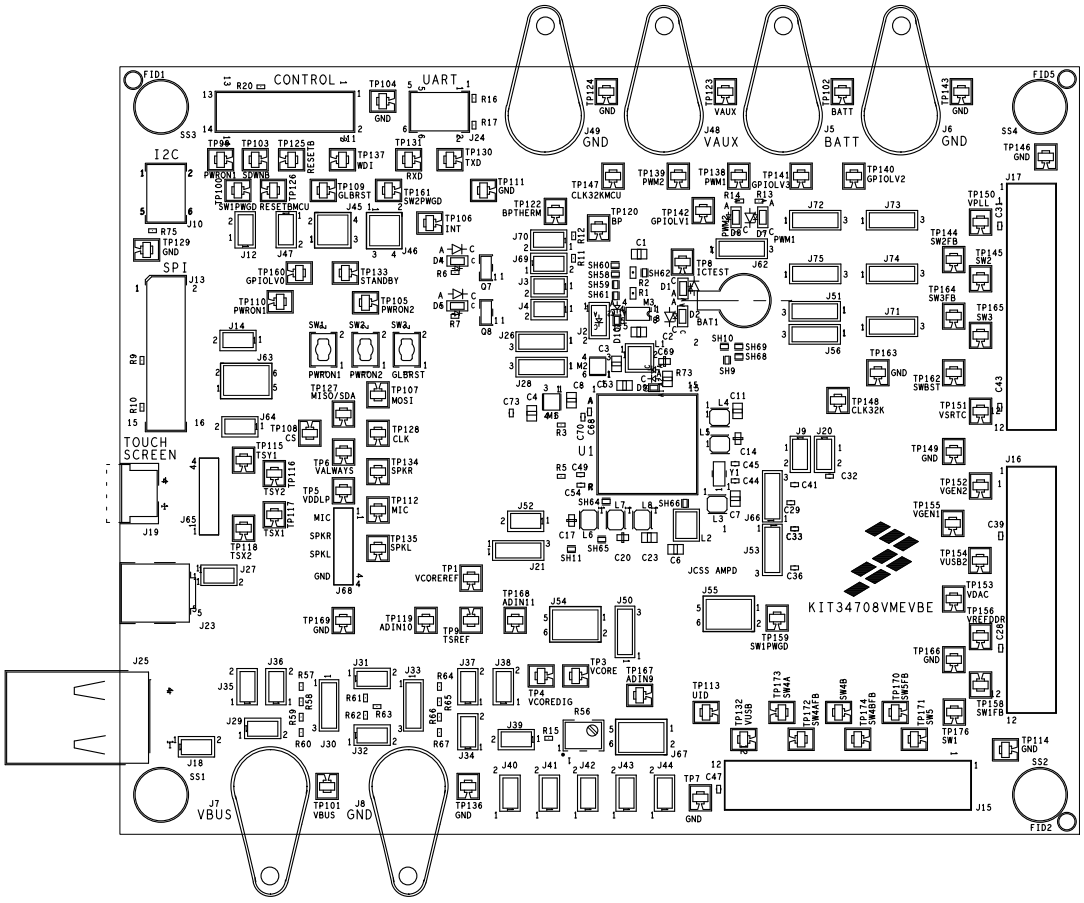

Figure 40. KIT34708VMEVBE (Rev. B) Assembly and Silkscreen Top Layer

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7.3 Top Layout

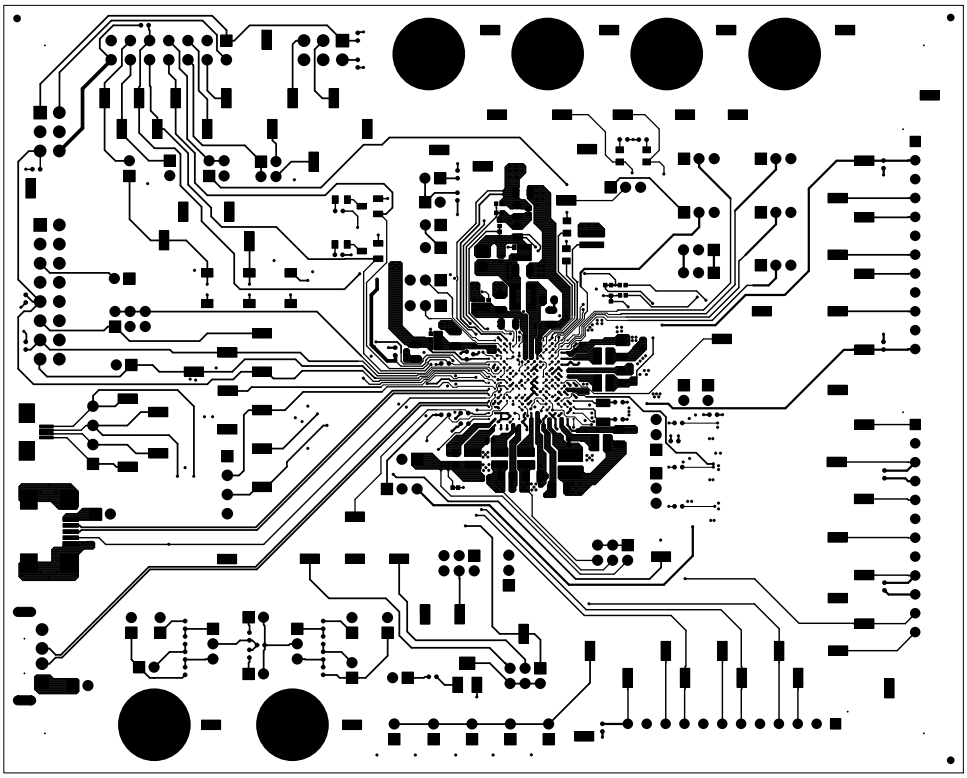

Figure 41. KIT34708VMEVBE (Rev. B) Top Layout Layer

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7.4 Inner 1 layer layout

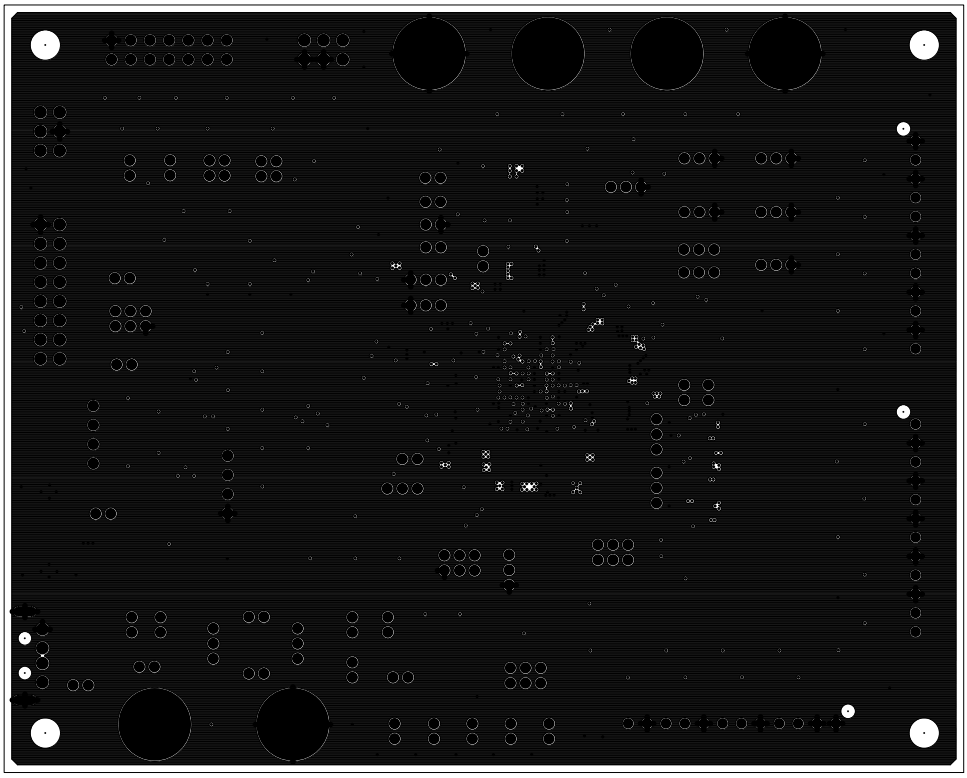

Figure 42. KIT34708VMEVBE (Rev. B) Inner 1 layer Layout

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7.5 Inner 2 layer Layout

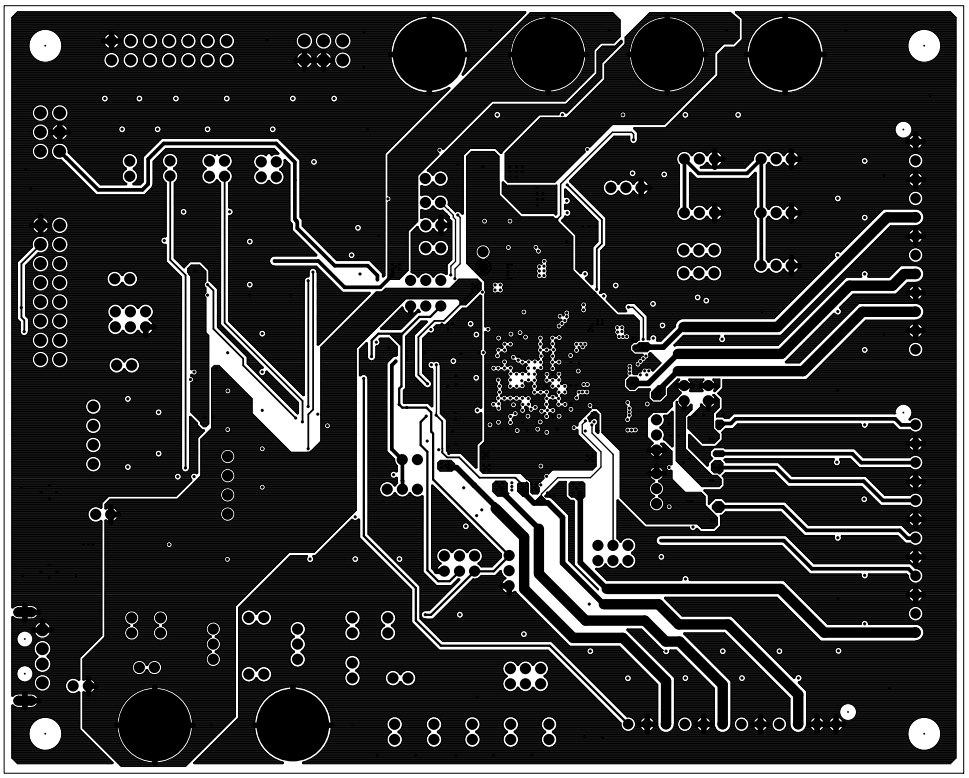

Figure 43. KIT34708VMEVBE (Rev. B) Inner 2 Layer Layout

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7.6 Assembly and Silkscreen Bottom Layer

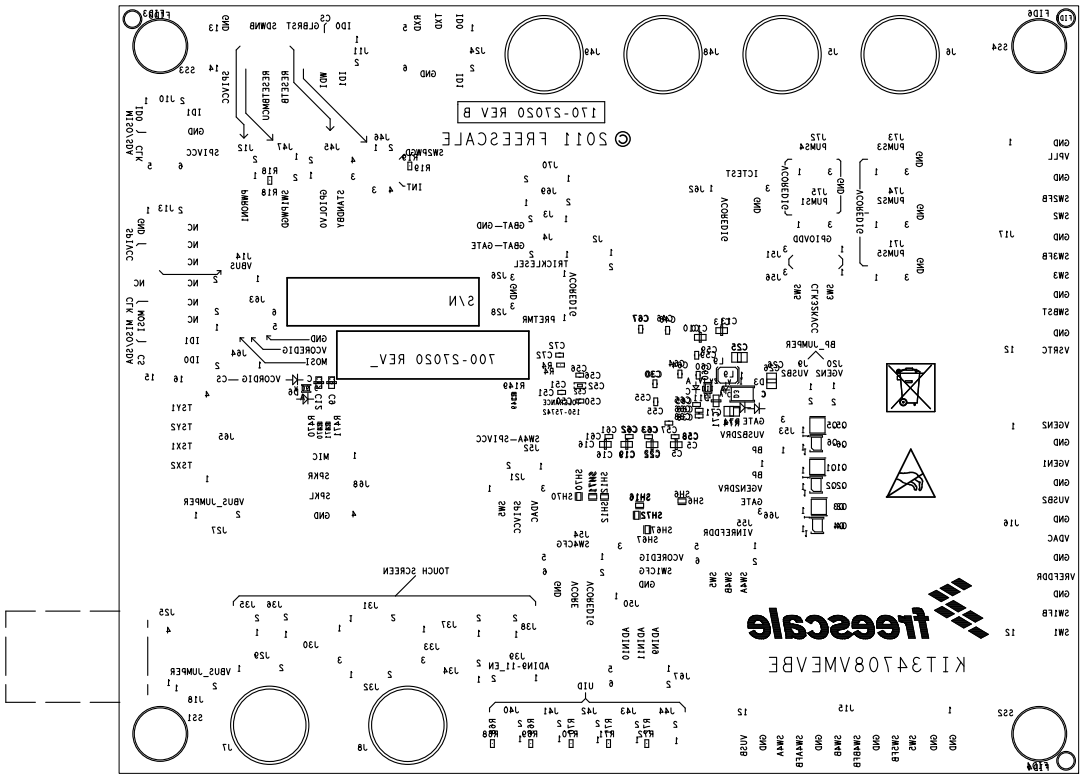

Figure 44. KIT34708VMEVBE (Rev. B) Assembly and Silkscreen Bottom Layer

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7.7 Bottom Layout

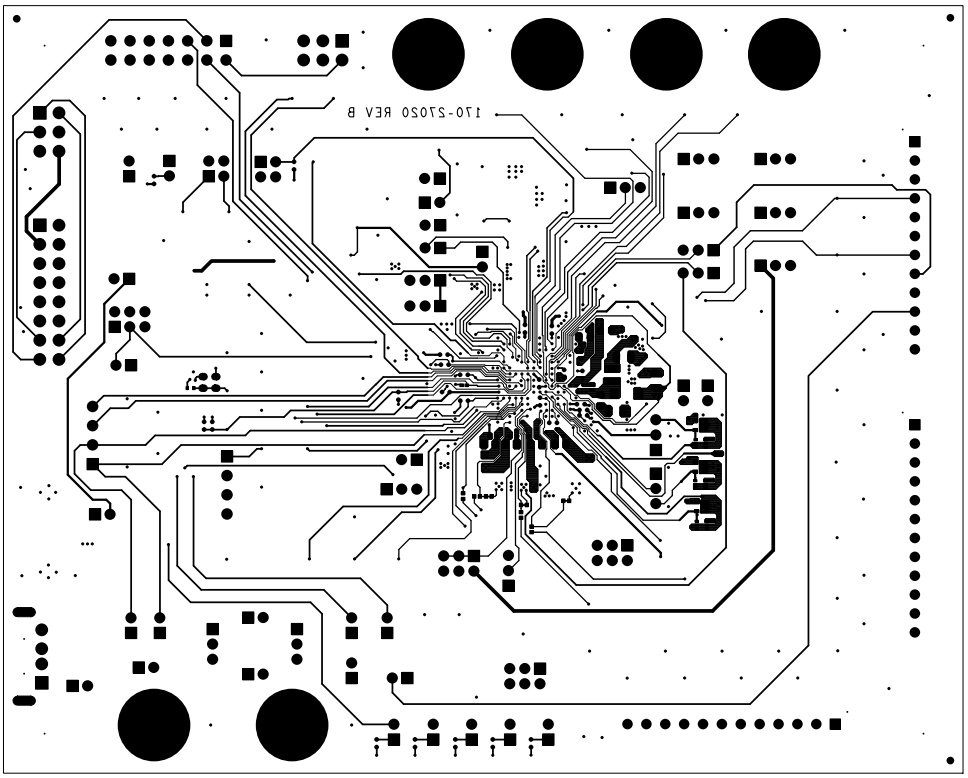

Figure 45. KIT34708VMEVBE (Rev. B) Bottom Layout Layer

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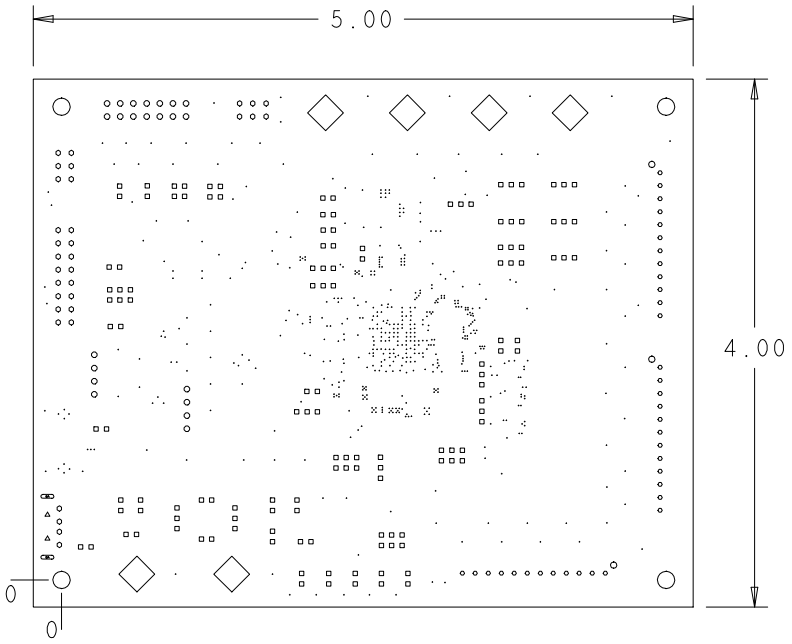
7.8 Fabrication Drawing



DRILL CHART: TOP to BOTTOM				
ALL UNITS ARE IN MILS				
FIGURE	SIZE	TOLERANCE	PLATED	QTY
·	8.0	+2.0/-2.0	PLATED	549
▫	35.0	+2.0/-2.0	PLATED	136
◦	35.0	+2.0/-2.0	PLATED	36
◦	40.0	+3.0/-3.0	PLATED	22
◦	40.0	+3.0/-3.0	PLATED	32
◇	271.7	+3.0/-3.0	PLATED	6
▵	43.0	+2.0/-2.0	NON-PLATED	2
◦	47.0	+2.0/-2.0	NON-PLATED	3
○	130.0	+2.0/-2.0	NON-PLATED	4
▭	98.0x28.0	+2.0/-2.0	PLATED	2

Figure 46. KIT34708VMEVBE (Rev. B) Fabrication Drawing

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7.9 KIT34708VMEVBE (Rev. B) Bill of Material

Table 9. KIT34708VMEVBE (Rev. B) Bill of Material Table (1)

Qty	Value	Part Reference	Description	Manufacturer	Part Number
1	LICELL	BAT1	BATTERY LITHIUM 3V 5.5MAH	SII MICRO PARTS LTD.	MS621F-FL11E
5	10.0 µF	C1, C2, C4, C8, C25, C53	CAP CER 10UF 16V 10% X7R 0805	CAPAX TECHNOLOGIES INC.	0805X106K160SNT
1	4.7 µF	C3	CAP CER 4.7UF 25V 10% X7R 0805	CAPAX TECHNOLOGIES INC.	0805X475K250SNT
6	4.7 µF	C5, C10, C13, C16, C19, C22	CAP CER 4.7UF 10V 10% X5R 0603	TAIYO YUDEN	LMK107BJ475KA-T
5	22 µF	C6,C7,C11,C23,C26	CAP CER 22UF 10V 20% X5R 0805	TAIYO YUDEN	LMK212BJ226MG-T
3	10 µF	C14,C17,C20	CAP CER 10UF 6.3V 20% X5R 0603	TDK	C1608X5R0J106M
6	1.0 µF	C28, C29, C32, C50, C51, C56	CAP CER 1.0UF 10V 10% X5R 0402	YAGEO AMERICA	CC0402KRX5R6BB105
9	2.2 µF	C30, C31, C33, C36, C38, C39, C41, C47, C54	CAP CER 2.2UF 6.3V 20% X5R 0402	KEMET	C0402C225M9PACTU
15	0.1 µF	C43, C46, C49, C55, C57-C66, C72	CAP CER 0.1UF 10V 10% X5R 0402	KEMET	C0402C104K8PAC
2	18 PF	C44,C45	CAP CER 18PF 50V 1% C0G 0402	CAPAX TECHNOLOGIES INC.	0402G180F500SNT
1	100 pF	C52	CAP CER 100PF 25V 5% COG CC0201	MURATA	GRM033C1E101JD01D
3	0.01 µF	C67, C68, C70	CAP CER 0.01UF 50V 10% X7R 0402	MURATA	GCM155R71H103KA55D
2	10 nF	C69, C71 (2)	CAP CER 0.01UF 50V 5% X7R 0603	AVX	06035C103JAT2A
1	1.0 µF	C73 (2)	CAP CER 1.0UF 10V 10% X5R 0402	YAGEO AMERICA	CC0402KRX5R6BB105
1	RED LED	D1	LED RED SGL 30MA SMT 0603	VISHAY INTERTECHNOLOGY	TLMS1100-GS08
5	LED_GREEN	D2, D4, D5, D7, D8	LED GRN SGL 30MA SMT 0603	KINGBRIGHT	AP1608MGC
1	MBR120LSFT1G	D3	DIODE SCH PWR RECT 1A 20V SMT	ON SEMICONDUCTOR	MBR120LSFT1G
1	ESD9L5.0ST5G	D6 (2)	DIODE TVS ESD PROT ULT LOW CAP 5.6V SOD-923	ON SEMICONDUCTOR	ESD9L5.0ST5G
1	BAS3010S-03	D9	DIODE SCH LOW VF 1A 30V TSLP-3-7	INFINEON TECHNOLOGIES	BAS3010S-03LRH
2	BAS3010S-03	D10, D11 (2)	DIODE SCH LOW VF 1A 30V TSLP-3-7	INFINEON TECHNOLOGIES	BAS3010S-03LRH
6	FD 40 mil	FID1-FID6	FIDUCIAL PLATED 40mil PAD 80mil SOLDERMASK SMD, NO PART TO ORDER	NO PART TO ORDER	Local fiducial

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Table 9. KIT34708VMEVBE (Rev. B) Bill of Material Table [(1)]

Qty	Value	Part Reference	Description	Manufacturer	Part Number
22	1X2	J2, J3, J14, J18, J27, J29, J31, J32, J34-J44, J52, J64, J70	HDR 1X2 TH 2MM SP 295H AU	SAMTEC	MTMM-102-07-G-S-236
6	1X2	J4, J9, J12, J20, J47, J69	HDR 1X2 TH 2MM SP 295H AU	SAMTEC	MTMM-102-07-G-S-236
6	BANANA	J5-J8, J48, J49	CON 1 BANANA UNINSULATED TH - 531H NI	JOHNSON COMPONENTS INC	108-0740-001
2	HDR_2X3	J10, J24	HDR 2X3 TH 100MIL CTR 330H SN 115L	SAMTEC	TSW-103-23-T-D
1	HDR 2X7	J11	HDR 2X7 TH 100MIL CTR 330H SN 115L	SAMTEC	TSW-107-23-T-D
1	HDR_2X8	J13	HDR 2X8 TH 100MIL CTR 330H AU	SAMTEC	TSW-108-07-G-D
3	CON PLUG 12	J15-J17	CON 1X12 PLUG SHRD TH 2.5MM SP 346H SN 110L	JST MFG. CO	B12B-XASK-1N-A
1	CON FPC/FFC 4	J19 [(2)]	CON 4 FPC/FFC SKT RA SMT 0.5MM SP 80H SN TOP CONTACT	CVILUX CORPORATION - HEADQUARTERS AND FACTORY	CF20041U0R0-LF
3	1X3	J21, J30, J33	HDR 1X3 TH 2MM SP 295H AU	SAMTEC	MTMM-103-07-G-S-236
1	USB-MiniB	J23	CON 5 USB2.0 MINI-B RA SHLD SKT SMT 0.8MM SP AU	HIROSE	UX60A-MB-5ST
1	USB_TYPE_A	J25	CON 1X4 USB_TYPE_A_MALE RA TH - 178H AU	SAMTEC	USB-AM-S-S-B-TH
11	1X3	J25, J26, J28, J50, J51, J53, J56, J62, J66, J71, J72	HDR 1X3 TH 2MM SP 295H AU	SAMTEC	MTMM-103-07-G-S-236
2	HDR 2X2	J45, J46	HDR 2X2 TH 2MM CTR 217H AU 110L	SAMTEC	TMM-102-02-G-D
3	HDR 2X3	J54, J63, J67	HDR 2X3 TH 2MM CTR 217H AU 110L	SAMTEC	TMM-103-02-G-D
1	HDR 2X3	J55	HDR 2X3 TH 2MM CTR 217H AU 110L	SAMTEC	TMM-103-02-G-D
2	HDR_1X4	J65, J68	HDR 1X4 TH 100MIL SP 336H AU 100L	SAMTEC	TSW-104-07-G-S
2	HDR_1X3	J73, J74	HDR 1X3 TH 2MM SP 295H AU	SAMTEC	MTMM-103-07-G-S-236
1	2.2 µH	L1	IND PWR 2.2UH@100KHZ 2.0A 20% SMT	COILCRAFT	LPS3015-222ML_
1	BRL3225	L2	IND 1.0UH@220MHZ 2.4A 20% 1210	TAIYO YUDEN	BRL3225T1R0M
1	1.0 µH	L3 [(2)]	IND PWR 1UH@1MHZ 2A 30% SMT	TDK	VLS252010T-1R0N
5	1.0 µH	L4-L8	IND PWR 1UH@1MHZ 2A 30% SMT	TDK	VLS252010T-1R0N

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Table 9. KIT34708VMEVBE (Rev. B) Bill of Material Table [(1)]

Qty	Value	Part Reference	Description	Manufacturer	Part Number
1	2.2 µH	L9	IND PWR 2.2UH@1MHZ 1.8A 20% SMT	TDK	VLS252012T-2R2M1R3
2	FDMA510PZ	M1, M2	TRAN PMOS PWR 20V 7.8A 6-MICROFET	FAIRCHILD	FDMA510PZ
1	NTHS4101	M3	TRAN MOSFET PWR SGL P-CHANNEL 20 V 4.8 A CHIPFET	ON SEMICONDUCTOR	NTHS4101
3	NSS12100UW3	Q1,Q3,Q5	TRAN PNP PWR 1A 12V WDFN3	ON SEMICONDUCTOR	NSS12100UW3TCG
3	NSS12100XV6T1G	Q2,Q4,Q6 [(2)]	TRAN PNP HIGH PWR LOW VCE 12V 1A SOT-563	ON SEMICONDUCTOR	NSS12100XV6T1G
2	2N7002	Q7,Q8	TRAN NMOS 60V 115MA SOT23	ON SEMICONDUCTOR	2N7002LT1G
1	0.02	R1	RES MF 0.02 OHM 1/5W 1% 0603	VISHAY INTERTECHNOLOGY	CRCW0603R020FKEAEL
1	0.02	R2 [(2)]	RES MF 0.02 OHM 1/5W 1% 0603	VISHAY INTERTECHNOLOGY	CRCW0603R020FKEAEL
3	68 k	R3-R5	RES MF 68K 1/16W 5% 0402	TYCO ELECTRONICS	CRG0402J68K
2	200	R6, R7	RES MF 200 OHM 1/16W 0.1% 0402	VISHAY INTERTECHNOLOGY	MCS04020D2000BE100
2	2.2 k	R9, R10 [(2)]	RES MF 2.2K 1/16W 5% 0402	VENKEL COMPANY	CR0402-16W-222JT
1	24 k	R11	RES MF 24K 1/16W 1% 0402	KOA SPEER	RK73H1ETTP2402F
1	47 k	R12	RES MF 47K 1/16W 1% 0402	KOA SPEER	RK73H1ETTP4702F
2	560	R13, R14	RES MF 560 OHM 1/16W 5% 0402	VENKEL COMPANY	CR0402-16W561JT
1	21.5 k	R15	RES MF 21.5K 1/16W 1% 0402	VISHAY INTERTECHNOLOGY	CRCW040221K5FKED
3	0	R16, R17, R149 [(2)]	RES MF ZERO OHM 1/16W 5% 0402	ROHM	MCR01MZPJ000
3	200 k	R18-R20	RES MF 200K 1/16W 5% 0402	YAGEO AMERICA	RC0402JR-07200KL
1	20 k	R56	RES POT 20K 1/4W 10% SMT	BOURNS	3224W-1-203E
4	51	R57, R58, R64, R65	RES MF 51 OHM 1/16W 1% 0402	VISHAY INTERTECHNOLOGY	CRCW040251R0FKED
3	220	R59, R61, R66	RES MF 220 OHM 1/16W 1% 0402	THYE MING TECH CO LTD	CR-02FL6---220R
3	680	R60, R62, R67	RES MF 680 OHM 1/16W 1% 0402	SMEC	RC73A2Z6800FTF
1	1.2 k	R63	RES MF 1.20K 1/16W 1% 0402	BOURNS	CR0402-FX-1201GLF
1	64.9 k	R68	RES MF 64.9K 1/16W 1% 0402	KOA SPEER	RK73H1ETTP6492F
1	365 k	R69	RES MF 365K 1/16W 1% 0402	KOA SPEER	RK73H1ETTP3653F

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Table 9. KIT34708VMEVBE (Rev. B) Bill of Material Table (1)

Qty	Value	Part Reference	Description	Manufacturer	Part Number
1	1.0 M	R70	RES MF 1.0M 1/16W 1% 0402	VISHAY INTERTECHNOLOGY	CRCW04021M00FKED
1	80.6 k	R71	RES MF 80.6K 1/16W 1% 0402	KOA SPEER	RK73H1ETTP8062F
1	150 k	R72	RES MF 150K 1/16W 1% 0402	KOA SPEER	RK73H1ETTP1503F
2	1.0	R73, R74 (2)	RES MF 1.0 OHM 1/8W 1% 0805	KOA SPEER	RK73H2ATTD1R00F
1	4.7 k	R75	RES MF 4.7K 1/16W 5% 0402	YAGEO AMERICA	RC0402JR-074K7L
2	3.9M	R470, R71 (2)	RES MF 3.9M 1/16W 1% 0402	KOA SPEER	RK73H1ETTP3904F
10	0	SH6, SH9-SH12, SH16, SH58, SH61, SH62, SH66	ZERO OHM CUT TRACE 0402 PADS; NO PART TO ORDER	LAYOUT ELEMENT ONLY	LAYOUT ELEMENT ONLY
10	0	SH59, SH60, SH64, SH65, SH67-SH72	ZERO OHM CUT TRACE 0402 PADS; NO PART TO ORDER	LAYOUT ELEMENT ONLY	LAYOUT ELEMENT ONLY
4	25511	SS1-SS4	FASTENER STANDOFF M3X12MM HEX FEMALE 5HEX NYLON		
3	TL1015AF160QG	SW1-SW3	SW SPST PB 50MA 12V SMT	E SWITCH	TL1015AF160QG
84	WHITE	TP1,TP3-TP9, TP99-TP120, TP122-TP156, TP158-TP176	TEST POINT WHITE PAD 2.5X1.25MM SMT SN	MAC8	HK-5-S-WHITE
1	MC34708VM	U1	Power Management Integrated Circuit (PMIC) for i.MX50/53 Families	FREESCALE SEMICONDUCTOR	MC34708VM
1	32.768 kHZ	Y1	XTAL 32.768KHZ RSN -- SMT	MICRO CRYSTAL	CC7V-T1A 32.768KHZ 9PF+/-30PPM

Notes

1. Freescale does not assume liability, endorse, or warrant components from external manufacturers that are referenced in circuit drawings or tables. While Freescale offers component recommendations in this configuration, it is the customer's responsibility to validate their application.
2. Do not populate these components.

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8 KITUSBCOMDGLEVME Board

8.1 Schematic

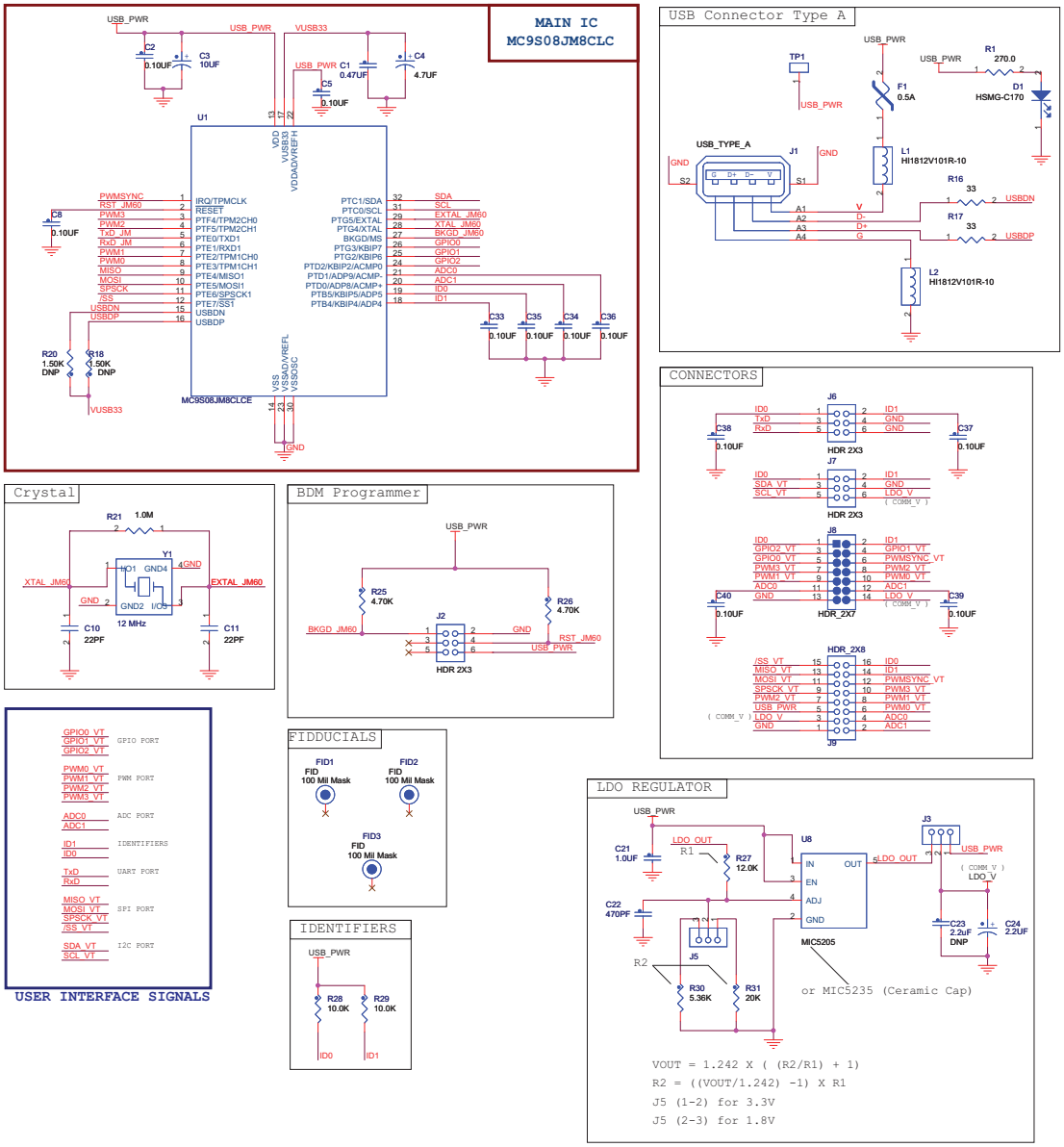

Figure 47. KITUSBCOMDGLEVME Schematic

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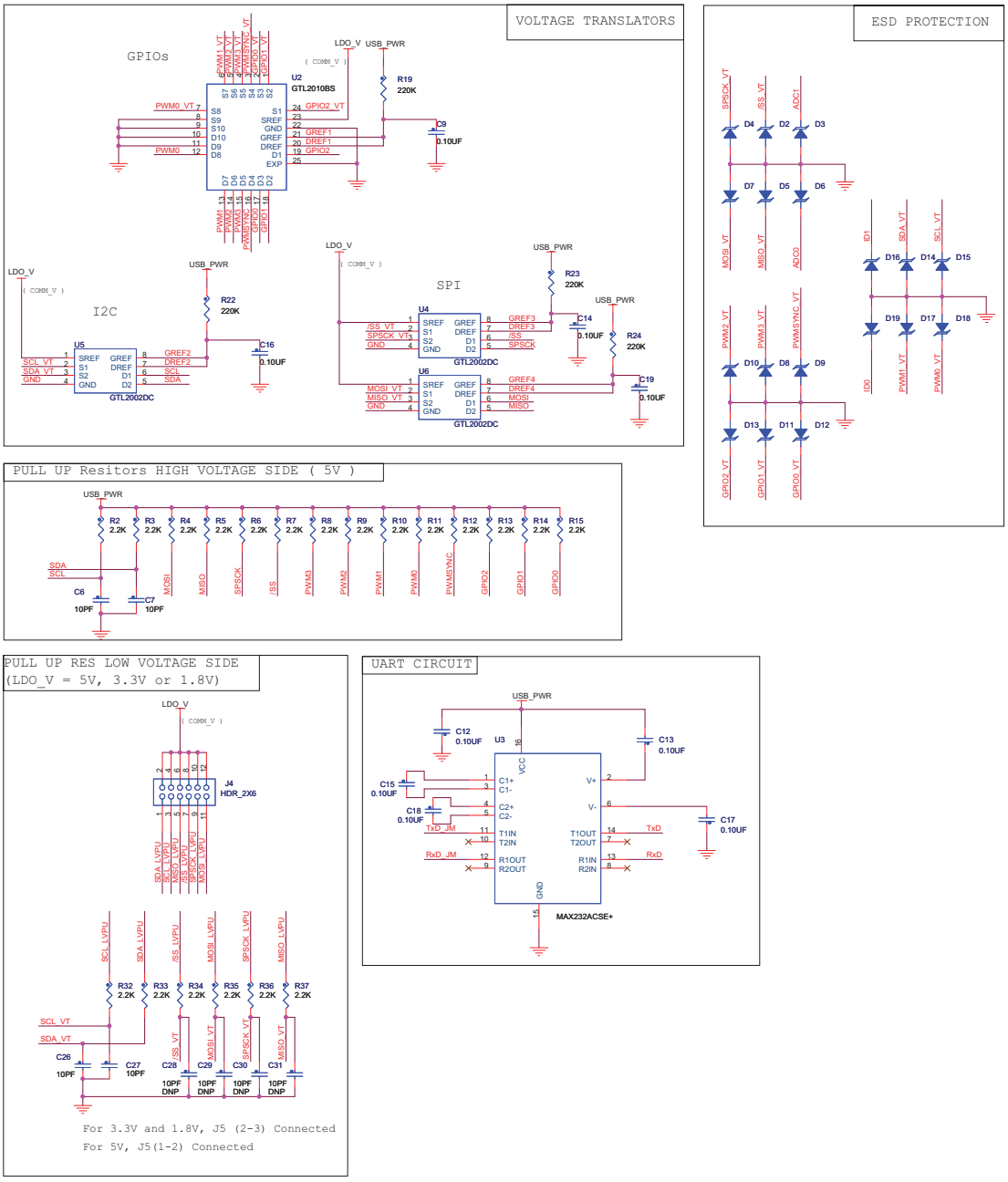

Figure 48. KITUSBCOMDGLEVME Schematic

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8.2 Silk Screen Top

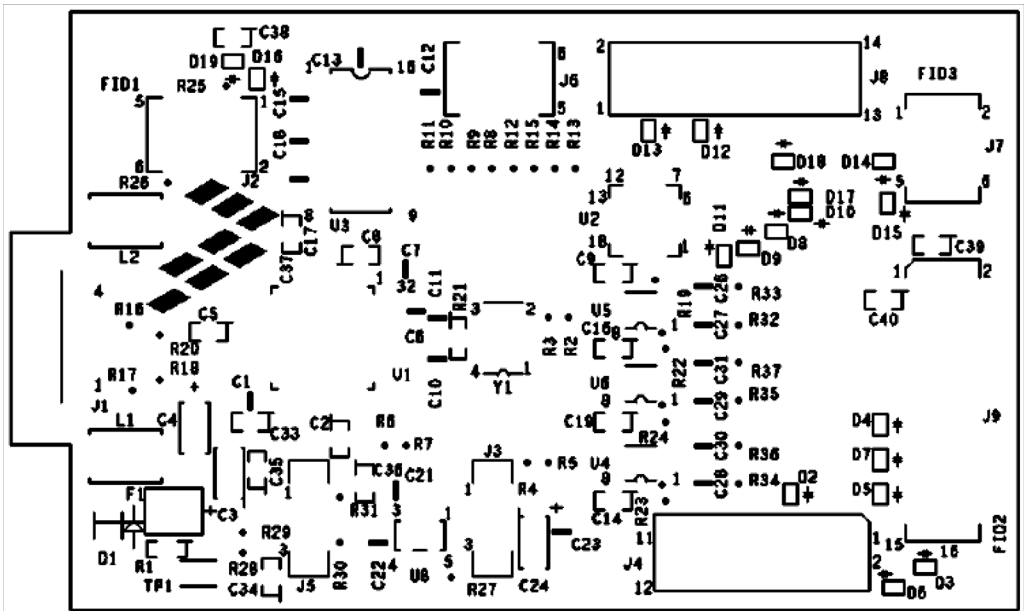

Figure 49. USBCOMDGLEVME Top Silk Screen Layer

8.3 Assembly Top

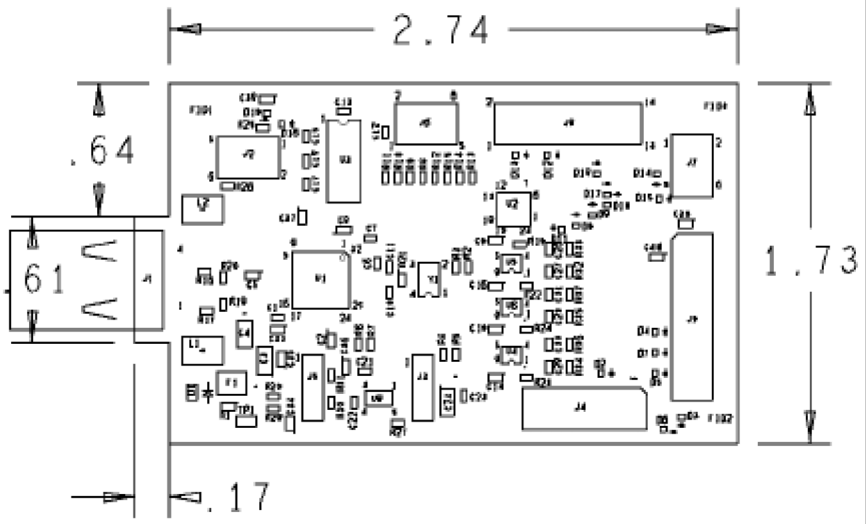

Figure 50. USBCONDGLEVME Top Assembly Layer

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8.4 Top Layout

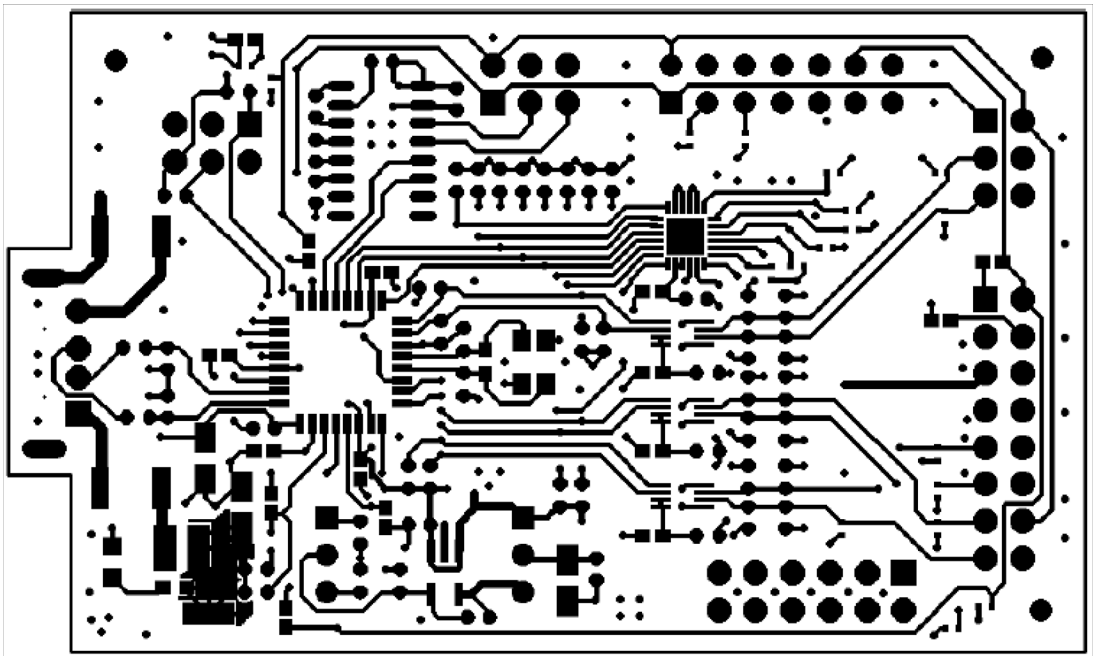

Figure 51. USBCONDGLEVME Top Layout Layer

8.5 Silk Screen Bottom

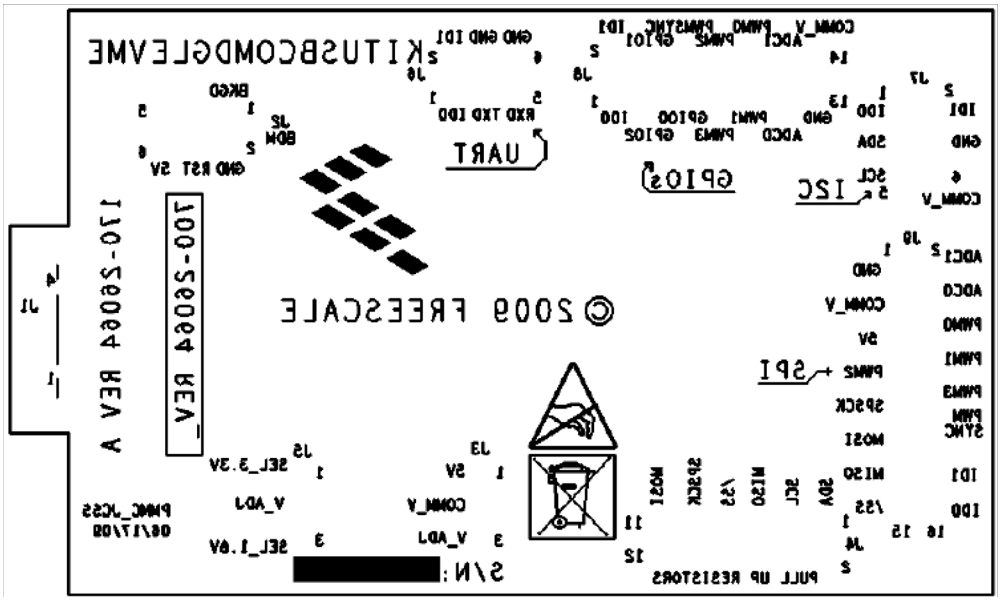

Figure 52. USBCOMDGLEVME Bottom Silk Screen Layer

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8.6 Bottom Layout

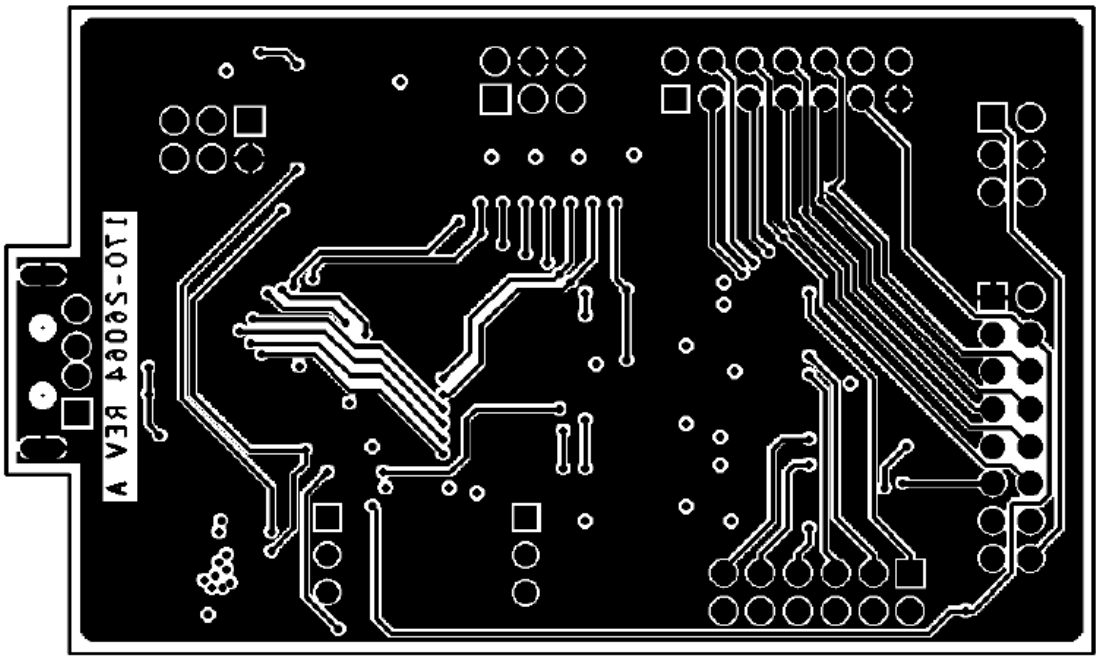

Figure 53. USBCONDGLEVME Bottom Layout Layer

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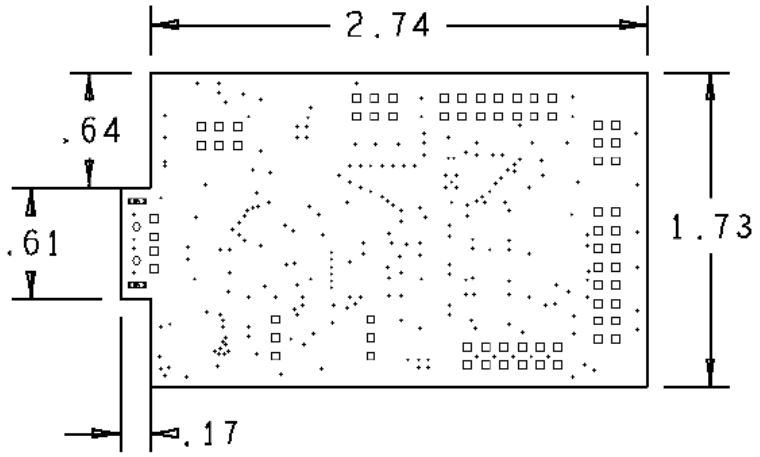
8.7 Fabrication Drawing



DRILL CHART: TOP to BOTTOM				
ALL UNITS ARE IN MILS				
FIGURE	SIZE	TOLERANCE	PLATED	QTY
·	13.0	+3.0/-3.0	PLATED	237
▫	40.0	+3.0/-3.0	PLATED	70
◦	43.0	+3.0/-3.0	NON-PLATED	2
▬	98.0x28.0	+3.0/-3.0	PLATED	2

Figure 54. USBCOMDGLEVME Fabrication Drawing

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8.8 KITUSBCOMDGLEVME Bill of Material

Table 10. KITUSBCOMDGLEVME Bill of Material Table [(3)]

Qty	Value	Part Reference	Description	Manufacturer	Part Number
1	MC9S08JM8CLCE	U1	IC MCU 8BIT FLASH 1K RAM 48MHZ 2.7-5.5 LQFP32	FREESCALE SEMICONDUCTOR	MC9S08JM8CLCE
1	4.7 µF	C1	CAP CER 0.47UF 10V 10% X7R 0603	KEMET	C0603C474K4RAC
15	0.10 µF	C2, C5, C8, C9, C14, C16, C19, C33, C36, C37, C39, C40	CAP CER 0.10UF 16V 5% X7R 0603	AVX	0603YC104JAT2A
1	10 µF	C3	CAP CER 10UF 16V 5% X7R 0603	AVX	TAJA106K016R
1	4.7 µF	C4	CAP TANT 4.7UF 10V 10% 3216-18	AVX	TAJA475K010R
4	10 pF	C6, C7, C26, C27	CAP CER 10PF 50V 1% COG0603	KEMET	C0603C100F5GAC
2	22 pF	C10, C11	CAP CER 22PF 16V 1% COG0603	KEMET	C0603C22F4GAC
5	0.10 µF	C12, C13, C15, C17, C18	CAP CER 0.10UF 16V 5% X7R 0603	AVX	0603YC104JAT2A
1	1.0 µF	C21	CAP CER 1.0UF 16V 10% X5R 0603	TDK	C1608X5R1C105K
1	470 pF	C22	CAP CER 470PF 50V 5% COG 0603	PANASONIC	ECJ1VC1H471J
1	2.2 µF	C23	CAP CER 2.2UF 16V 10% X5R 0603	MURATA	GRM188R61C225KE 15D
1	2.2 µF	C24	CAP TANT ESR=1.800 OHMS 2.2UF 10V 10% 3216-18	AVX	TPSA225K010R1800
4	10 pF	C28, C29, C30, C31	CAP CER 10PF 50V 1% COG 0603	KEMET	C0603C100F5GAC
1	HSMG-C170	D1	LED GREEN SGL 2.2V 20MA 0805	AVAGO TECHNOLOGIES	HSMG-C170
18	ESD9L5.0ST5G	D2-D19	DIODE TVS ESD PROT ULT LOW CAP 5-5.4V SOD-923	ON SEMICONDUCTOR	ESD9L5.0ST5G
3	FID	FID1, FID2, FID3	FUDICIAL	GENERIC	FID-040
1	0.5 A	F1	FUSE PLYSW 0.5A 13.2V SMT	RAYCHEM	MICROSMD050F-2
1	USB_TYPE_A	J1	CON 1X4 USB TYPE A MALE RA TH 178H AU	SAMTEC	USB-AM-S-S-B-TH
3	HDR 2X3	J2, J6, J7	HDR 2X3 TH 100MIL CTR 335H AU	SAMTEC	TSW-103-07-S-D
2	HDR 1X3	J3, J5	HDR 1X3 TH 100MIL SP 330H AU	SAMTEC	HTSW-103-07-S-S
2	HDR 2X6	J4, J8	HDR 2X6 TH 100MIL CTR 330H AU	SAMTEC	TSW-106-07-S-D
1	HDR 2X8	J9	HDR 2X8 TH 100MIL CTR 330H AU	SAMTEC	TSW-106-07-G-D

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Table 10. KITUSBCOMDGLEVME Bill of Material Table [3]

Qty	Value	Part Reference	Description	Manufacturer	Part Number
1	H1812V101R-10	L1	IND FER 100 OHM@ 100MHZ 8A 25% SMD/1812	LAIRD TECHNOLOGIES	H1812V101R-10
1	H1812V101R-10	L2	IND FER 100 OHM@ 100MHZ 8A 25% SMD/1812	LAIRD TECHNOLOGIES	H1812V101R-10
1	270	R1	RES MF 270.0 OHM 1/10W 1% 0603	HOA SPEER	RK73H1JTTD2700F
20	2.2 k	R2-R15, R32-R37	RES TF 2.20K 1/10W 1% RC0503	BOURNS	CRO603FX2201E
2	33	R16, R17	RES MF 33.0 OHM 1/10W 1% 0603	KOA SPEER	RK73H1JTTD33R0F
2	1.50 k	R18, R20	RES MF 1.50K 1/10W 1% 0603	KOA SPEER	RK73H1JTTD1501F
4	220 k	R19, R22, R23, R24	RES MF 220K 1/10W 5% 0603	VENKEL COMPANY	CR0603-10W-224JT
1	1.0 M	R21	RES MF 1.0M 1/10W 1% 0603	KOA SPEER	RK73H1JTTD1004F
2	4.70 k	R25, R26	RES MF 4.70K 1/10W 1% 0603	KOA SPEER	RK73H1JTTD4701F
1	12.0 k	R27	RES MF 12.0K 1/10W 1% 0603	KOA SPEER	RK73H1JTTD1202F
2	10.0 k	R28, R29	RES MF 10.0K 1/10W 1% 0603	KOA SPEER	RK73H1JTTD1002F
1	5.36 k	R30	RES MF 5.36K 1/10W 1% 0603	KOA SPEER	RK73H1JTTD5361F
1	20 k	R31	RES MF 20K 1/10W 5% 0603	BOURNS	CR0603-JW-203ELF
1	TEST POINT	TP1	TEST POINT PIN.138X.059 SMT	NICOMATIC	C12000B
1	GTL2010BS	U2	IC VXLTR BIDIR 10BIT GTL-TVC 1.0-5.0V HVQFN24	NXP SEMICONDUCTOR	GTL2010BS
1	MAX232A	U3	IC,L,MAX232A, RS232 S016	MAXIM	MAX232ACSE
3	GTL2002DC	U4, U5, U6	IC VXLTR BIDIR 2BIT GTL-TVC 1.0-5.0V VSSOP8	NXP SEMICONDUCTOR	GTL 2002DC
1	MIC5205	U8	IC LIN VREG LDO 1.5-15V 150MA 2-5-16V SOT23-5	MICREL	MIC5205YM5
2	JUMPER	QTY. 2	SHORTING JUMPER UNPLATED BLK	3M	929950-00
1	12 MHz	Y1	XTAL 12MHZ SER 9PF SMT	ECS INC. INTERNATIONAL	ECS-120-9-42X-CKM -TR

Notes

3. Freescale does not assume liability, endorse, or warrant components from external manufacturers that are referenced in circuit drawings or tables. While Freescale offers component recommendations in this configuration, it is the customer's responsibility to validate their application.

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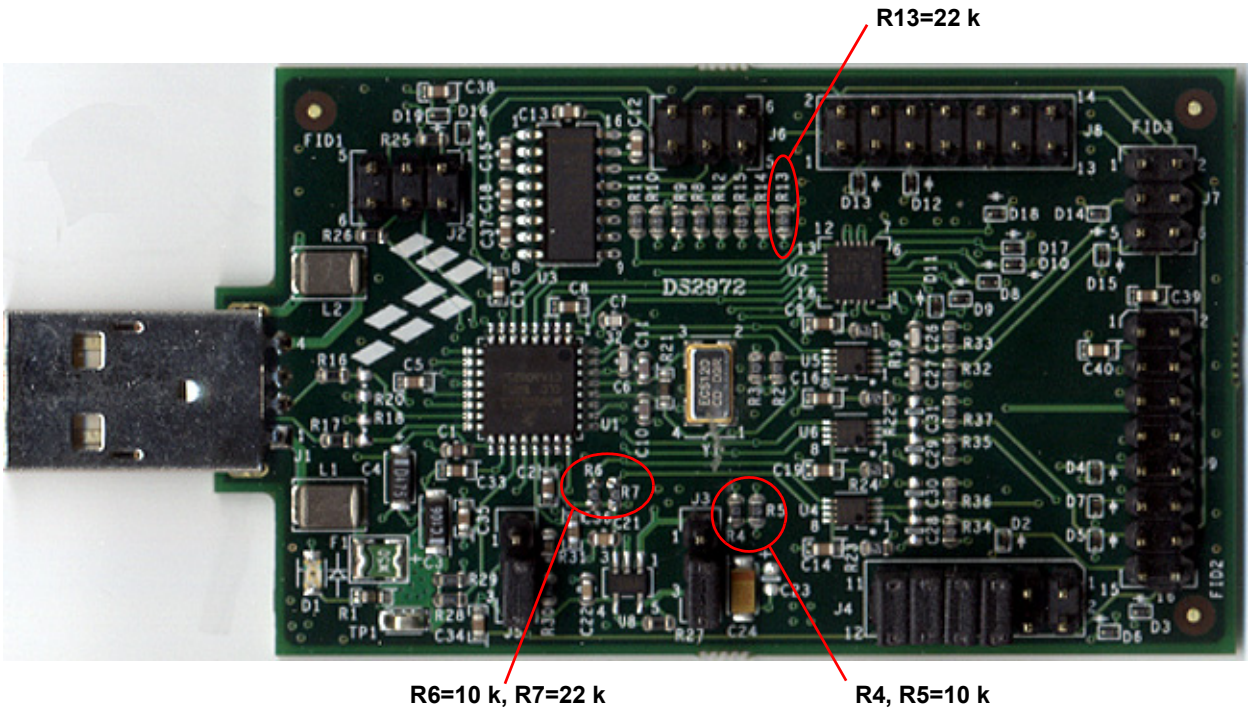
8.9 Errata

The KITUSBCOMDGLEVME was originally manufactured with resistors R4, R5, R6, R7, and R13, with a value of 2.2 kΩ. The board was modified by changing the resistor values of R4, R5, and R6, to 10 kΩ, and the resistor values of R7 and R13 to 22 kΩ, to work specifically with KIT34708VMEVBE (Rev B). Table 11 gives the corrected resistor values.

Table 11. KITUSBCOMDGLEVME Resistor Corrections

Schematic Designator	Device	Type	Description	Manufacturer	Manufacturer PN
Initial Board					
R4, R5, R6, R7, R13	2.2 k	RC0603_OV	RES TF 2.20k 1/10W 1% RC0603	BOURNS	CR0603FX2201E
Modified Board					
R4, R5, R6	10 k	RC0603_OV	RES TF 10.0k 1/10W 1% RC0603	BOURNS	CR0603FX1002E
R7, R13	22 k	RC0603_OV	RES TF 22.0k 1/10W 1% RC0603	BOURNS	CR0603FX2202E



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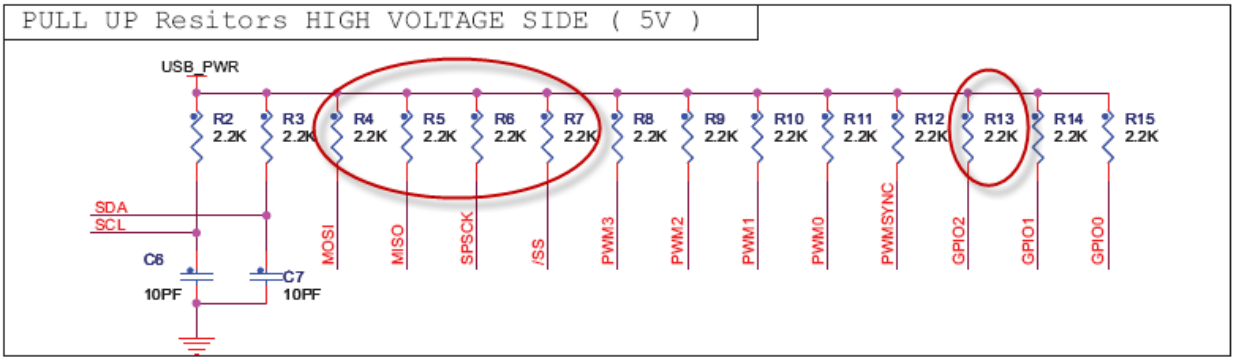

Figure 55. KITUSBCOMDGLEVME Schematic

Note: If your board has been reworked, it will be labeled on the back with a Revision B.

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9 References

The following list contains URLs where you can obtain information on other Freescale products and application solutions:

Description	URL
Reference Web Sites	**Reference URL Locations**
Freescale Web Site	http://www.freescale.com/
MC34708 Product Summary Page	http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=MC34708
MC34708 Datasheet	http://www.freescale.com/files/analog/doc/data_sheet/MC34708.pdf
KIT34708VMEVBE Tool Summary Page	http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=KIT34708VMEVBE

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KT34708UG
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