МΛXIΛM
Teridian Smart Grid Solutions

78M6631 Evaluation Board
User Manual

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1   Introduction

The Teridian™ 78M6631 Evaluation Board is an electrical measurement unit for performing measurements on a 3-phase AC system. It incorporates the 78M6631 power and energy measurement device and connects to a PC through a USB cable such as the one provided in the demo kit. The Evaluation Board demonstrates the capability of the 78M6631 energy meter controller chip for measurement accuracy and overall system use.

The on-board 78M6631 is pre-programmed with the Firmware Demo Code.

The 78M6631 energy measurement data and status is read back over the serial UART interface using a text-based CLI command set (easy manual operation is performed using HyperTerminal) and through the serial peripheral interface (SPI).

Refer to the *78M6631 Firmware Description Document* for details about the firmware and the use of the CLI commands.

1.1   Package Contents

The 78M6631 Evaluation Board Demo Kit includes:

- 78M6631 Evaluation Board
- USB Cable Assembly USB A-B 28/24 1.8M (Tyco/Amp 1487588-3)
- In-Circuit Emulator (ICE) Adaptor
- Three CTs
- CD with documentation

1.2   System Requirements

The 78M6631 Evaluation Board requires use of a PC with the following features:

- PC (1 GHz, 1 GB) with Microsoft Windows XP®, Windows Vista®, or Windows 7 operating systems, equipped with USB port
- Minimum 1024 x 768 video display resolution
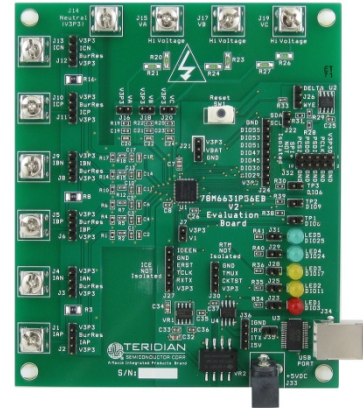
Teridian is a trademark of Maxim Integrated Products, Inc.
Windows XP and Windows Vista are registered trademarks of Microsoft Corp.

1.3   Safety and ESD Notes

EXERCISE CAUTION WHEN LIVE AC VOLTAGES ARE PRESENT!

Standard ESD precautions must be taken when handling electronic equipment. The 78M6631 contains ESD protected interfaces.

Do not connect test equipment, ICE emulators, or external development boards directly to the 78M6631 hardware. Damage to the 78M6631 and external equipment will occur due to the 78M6631's "high side" reference topology. The 78M6631's V3P3 (i.e., "high side") is connected directly to Neutral (Earth Ground) creating a ground reference disparity with any properly grounded external equipment.

The board components and firmware settings are designed to operate with the following nominal AC electrical ranges (per phase):

Voltage	Current	Line Frequency
110-240 V AC	10 mA – 20A	46-64 Hz

1.4   Firmware Demo Code Introduction

The Firmware Demo Code provides the following features:

- Measurement data such as Watts, Volts, current, VAR, VA, phase angle, power factor, frequency, date/time, and various alarm statuses. The measurements data of Voltage, current and power are also available as fundamental and harmonics.
- Control of alarm thresholds, calibration coefficients, temperature compensation, etc.

The following setup is used to facilitate performance evaluation between the user at the PC host and the firmware code in the board:

- The Command Line Interface (CLI) via HyperTerminal or comparable terminal emulator on a different operating system. For information about the CLI, see the applicable Firmware Description Document.

The 78M6631 is shipped with Firmware Demo Code Revision 1.0 or later loaded in the 78M6631 chip and included on the CD. The code revision can be verified by entering the command **>i** via the command line interface. Firmware for the Demo Unit can be updated using either the Teridian TFP2 or an in-circuit emulator such as the Signum Systems ADM51 (www.signum.com).

1.5   Testing the 78M6631 Evaluation Board Prior to Shipping

Before every 78M6631 Evaluation Board is shipped, the following procedures have been performed at the factory:

- Full Calibration – Precise energy source equipment is used to calibrate the current and voltage. The temperature is also calibrated at the same time.
- Accuracy Test – This "bench" level test ensures the energy accuracy is within ±0.5%.

2 Installation

2.1 USB Driver Installation

This evaluation kit includes an isolated USB interface for serial communications with a PC. The FTDI USB controller IC FT232R performs the USB functions. The FTDI Windows driver presents a virtual COM port for enabling serial communications. Control of the 78M6631 Evaluation Board can be managed using a terminal emulation program. The FTDI Windows driver is a certified driver for Windows XP, Windows Vista, or Windows 7 operating systems.

1. Upon attaching the 78M6631 Evaluation Board to the PC, the Found New Hardware Wizard automatically launches and installs the appropriate driver files. If your PC does not find the FTDI driver files on its local hard disk drive, locate and reference the FTDI USB Driver and Utilities subdirectory on the CD. The FT232R controller is powered from the USB cable and is active even when no AC power is applied to the 78M6631 Evaluation Board.
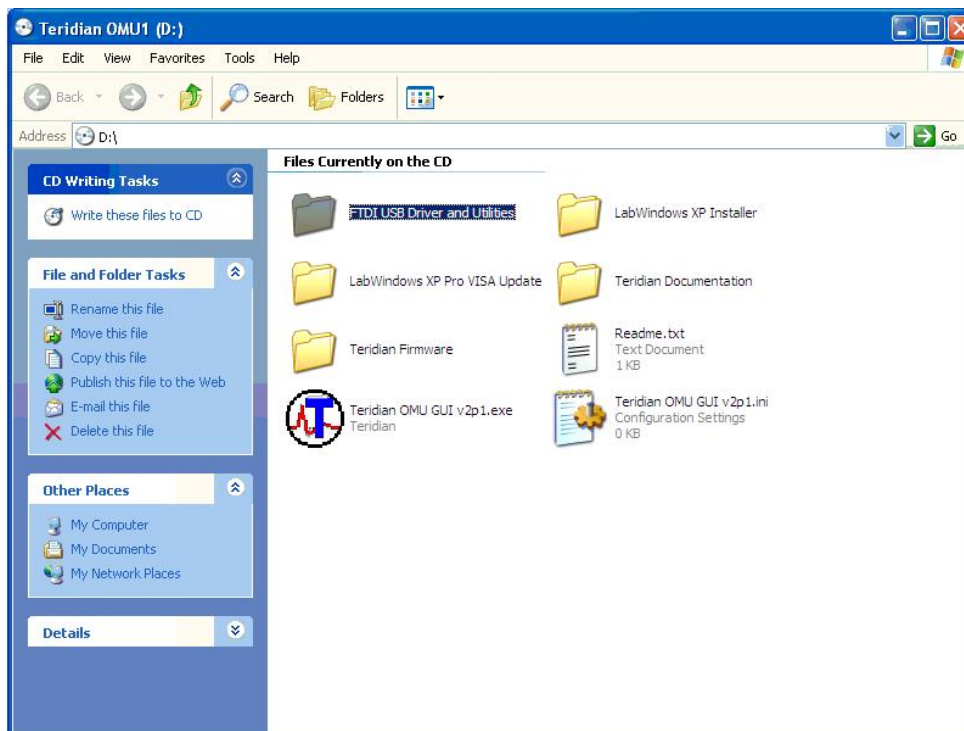
Notes: If an older FTDI driver has been previously installed, it is recommended to remove the older version before installing this newer FTDI driver. Execute the **ftdiClean.exe** utility from the FTDI USB Driver and Utilities subdirectory.

For FTDI driver support on other operating systems, please check FTDI's website at (http://www.ftdichip.com/FTDrivers.htm).

2.2 Confirm COM Port Mapping

1. Launch the **Control Panel** and click on the **System** icon.
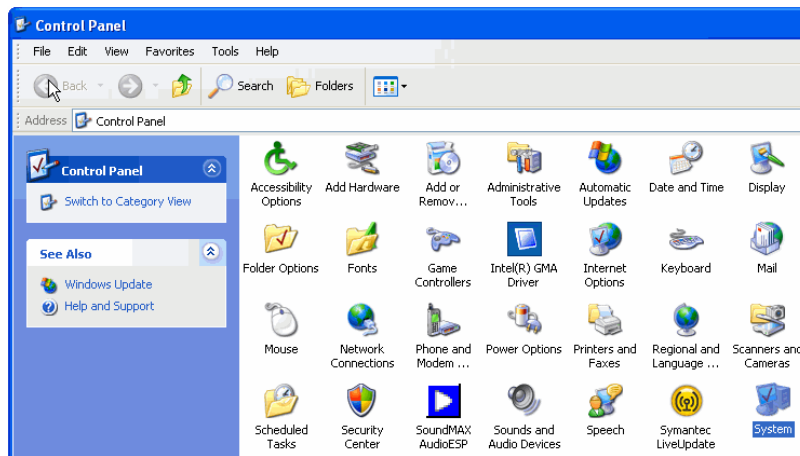
2. The **System Properties** screen appears. Click on the **Hardware** tab. Click on **Device Manager**. Under **Ports (COM & LPT)**, look for the **USB Serial Port** assignment.
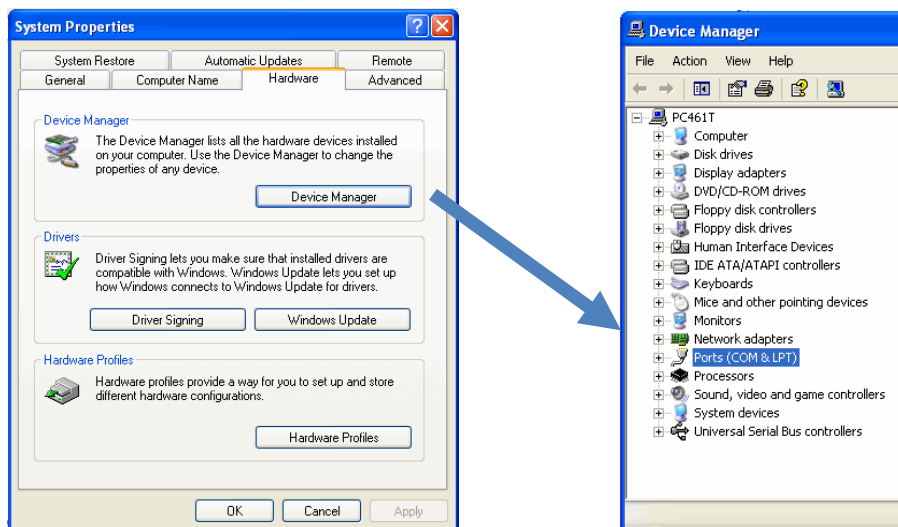
3. Take note of the COM port assignment for the USB Serial Port.
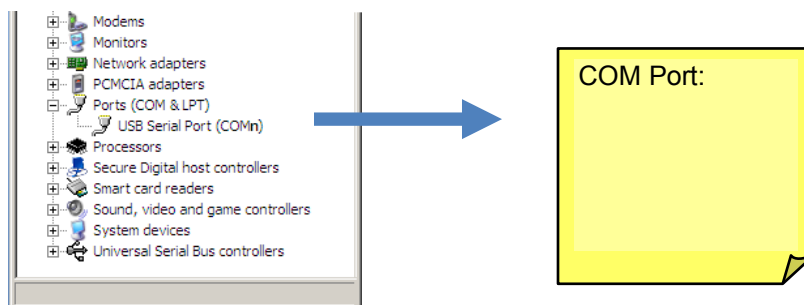
2.3 Basic Connection Setup

Figure 1 shows the basic connections of the 78M6631 Evaluation Board for use with external equipment. The 78M6631 Evaluation Board is powered through the USB cable. The same USB cable provides the communications link between the host PC and the 78M6631 Evaluation Board.

The 78M6631 Evaluation Board accepts 120 VAC and 240 VAC (nominal) up to 300 VAC (max) referenced to neutral.
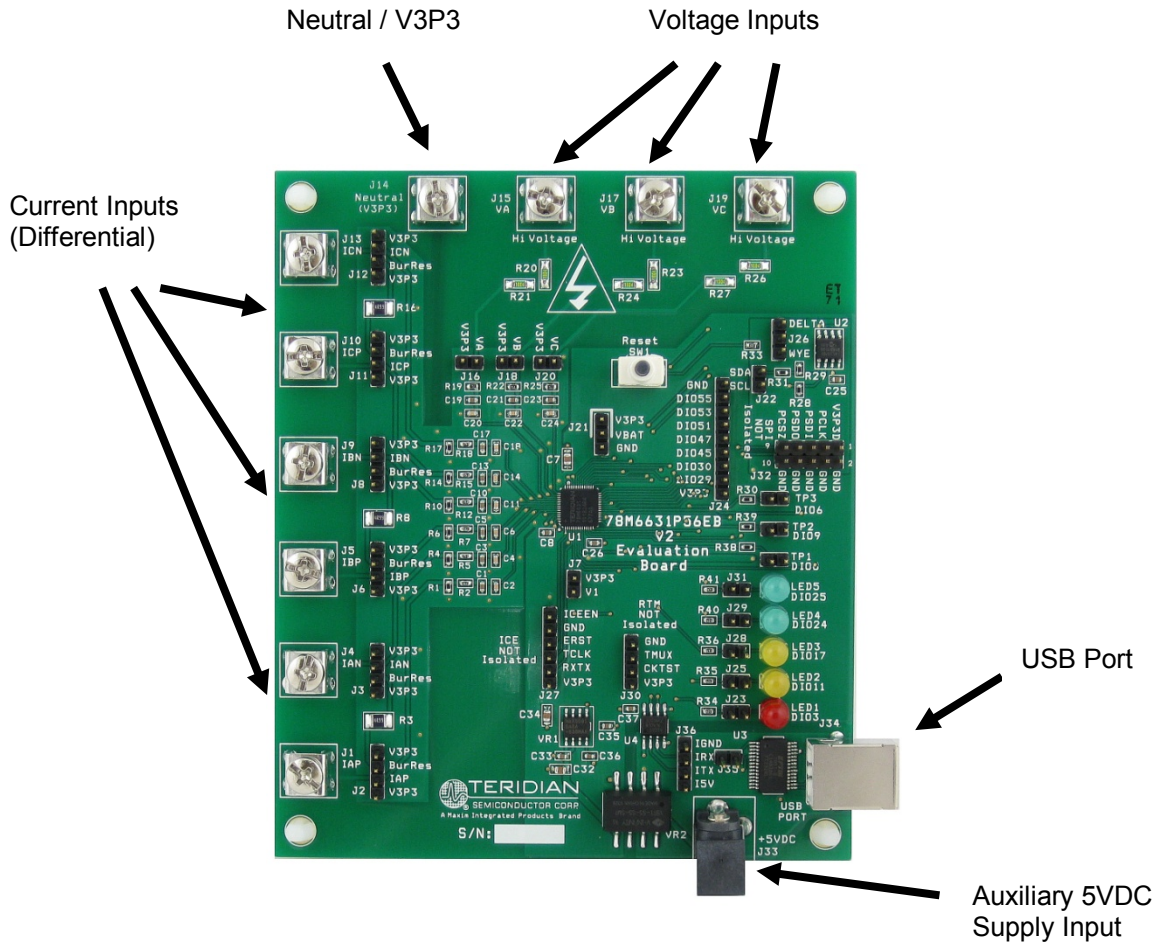
Figure 1: 78M6631 Evaluation Board Connections

2.4 3-Phase System Connection

The 78M6631 Evaluation board supports both Wye (3-phase 4-wire) and Delta (3-phase, 3 wires) configurations. The current transformers are not provided with the evaluation board and must be selected by the customer. A burden resistor (12.4 Ω – value dependent on CT) can be connected on each phase through dedicated jumpers. Particular attention must be placed in configuring the burden resistors as the current transformers can generate high voltage if no burden resistor is present (or if its value is too high). Figure 2 and 3 shows a connection diagram using external burden resistor, in this case the external burden resistor can replace the on-board or used in parallel.
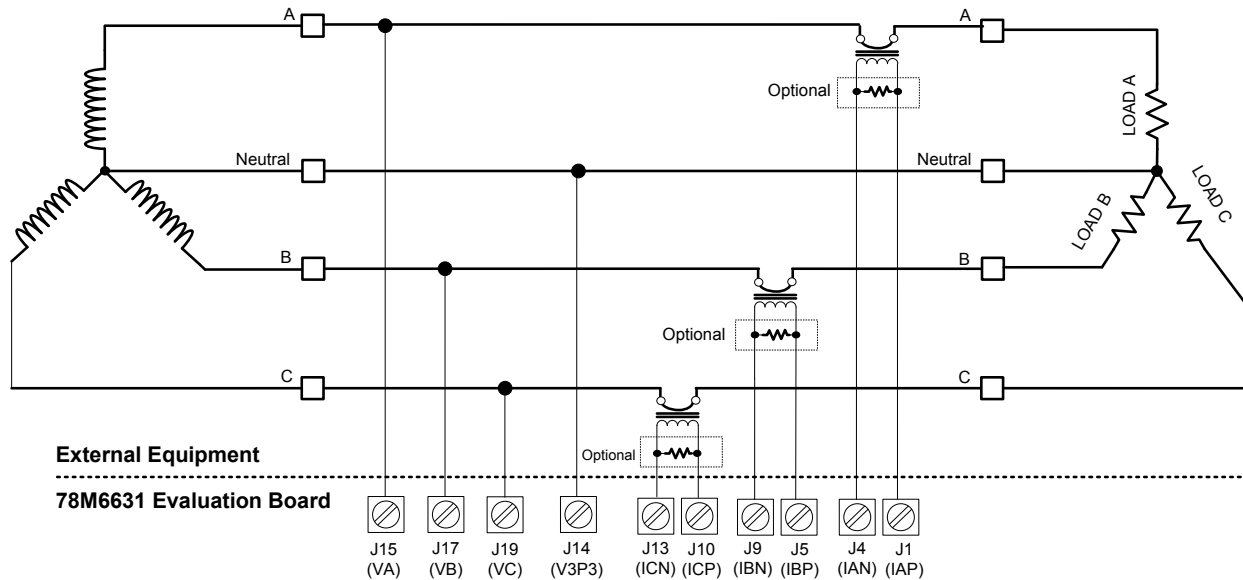
Figure 2: 78M6631 Evaluation Board Application Diagram (Wye 3-phase 4-wires)
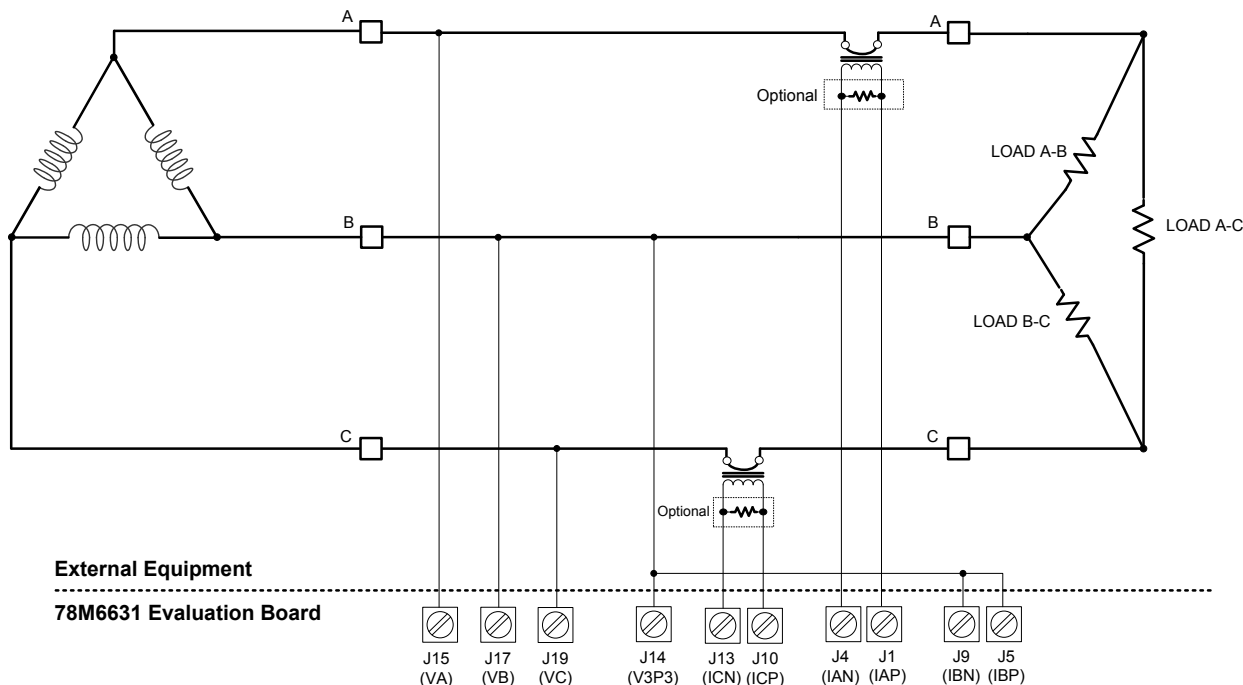
Figure 3: 78M6631 Evaluation Board Application Diagram (Delta 3-phase 3-wires)

2.5 Burden Resistor Selection

The 78M6613 Evaluation Board does not include surface-mount current transformers (CTs). The CTs included with the kit are externally attached to the evaluation board which has the correct value of burden resistor on board..If using different CTs with the evaluation board, it is important to either disable the on-board burden resistor or change the burden resistor value for optimum signal magnitude in order to utilize the full range of the ADC inputs ($\pm$250mV$_{P-P}$).

The 78M6631 Evaluation Board provides a 4.99Ω burden resistor that can be inserted or excluded using jumpers J2, J3, J6, J8, J11, and J12. Use the equation below to determine if the onboard burden resistor can be used with the selected CT or if another value should be used.

At maximum load current (IMAX), the voltage built up across the burden resistor should not exceed 176 mVrms (±250mV$_{P-P}$). It is useful to provide a voltage margin to accommodate transients above IMAX. For various systems considerations, it may be necessary to select a burden resistor value lower than the manufacturer's recommended value. For most CTs, this will not pose a problem.

Example:

A CT with a turn ratio of 2000:1 yields a secondary current of 1/2000 of the primary current. Following Ohm's law, the resulting voltage V across the burden resistor R is:

$$Vout = \frac{ILoad}{N} * RBurden$$

where N is the turns ratio, ILoad is the primary load current and RBurden is the value of the burden resistor.

The proper IMAX value should then be set in the relevant register and the CT must be calibrated for optimal performance. The calibration includes gain adjustment and CT phase error adjustment. Refer to the appropriate Firmware Description Document for register addresses, calibration commands, and other information.

2.6 Jumpers and Switches Settings

Table 1 describes the 78M6631 Evaluation Board jumpers and switches and their settings for different configurations.

Table 1: Evaluation Board Jumpers and Terminal Blocks Description

Schematic and Silkscreen Reference	Default Setting	Description	Use
J14	N/A	Terminal Block	Neutral Connection (this terminal block is directly connected to the 3.3VDC supply (V3P3).
J1	N/A	Terminal Block	Current Input Phase A Positive (LNCINP1)
J4	N/A	Terminal Block	Current Input Phase A Negative (LNCINN1)
J5	N/A	Terminal Block	Current Input Phase B Positive (LNCINP2)
J9	N/A	Terminal Block	Current Input Phase B Negative (LNCINN2)
J10	N/A	Terminal Block	Current Input Phase C Positive (LNCINP3)
J13	N/A	Terminal Block	Current Input Phase C Negative (LNCINN3)
J2	2-3	Jumper	Current Input Phase A Configuration. Allows connection of the on-board burden resistor R3 (4.99Ω) or connect (reference) this input to 3.3V. See Section 2.5.
J3	2-3	Jumper	Current Input Phase A Configuration. Allows connection of the on-board burden resistor R3 (4.99Ω) or connect (reference) this input to 3.3V. See Section 2.5.
J6	2-3	Jumper	Current Input Phase B Configuration. Allows connection of the on-board burden resistor R3 (4.99Ω) or connect (reference) this input to 3.3V. See Section 2.5.
J8	2-3	Jumper	Current Input Phase B Configuration. Allows connection of the on-board burden resistor R3 (4.99Ω) or connect (reference) this input to 3.3V. See Section 2.5.
J11	2-3	Jumper	Current Input Phase C Configuration. Allows connection of the on-board burden resistor R3 (4.99Ω) or connect (reference) this input to 3.3V. See Section 2.5.
J12	2-3	Jumper	Current Input Phase C Configuration. Allows connection of the on-board burden resistor R3 (4.99Ω) or connect (reference) this input to 3.3V. See Section 2.5.
J15	N/A	Terminal Block	Voltage Input Phase A. (LNVIN1).
J17	N/A	Terminal Block	Voltage Input Phase B. (LNVIN2).
J19	N/A	Terminal Block	Voltage Input Phase C. (LNVIN3).
J16	Not Inserted	Jumper	Voltage Input Phase A Configuration. Allows connection of this input to 3.3VDC Supply (V3P3) if this Voltage Input in not connected/not used.
J18	Not Inserted	Jumper	Voltage Input Phase B Configuration. Allows connection of this input to 3.3VDC Supply (V3P3) if this Voltage Input in not connected/not used.

Schematic and Silkscreen Reference	Default Setting	Description	Use
J20	Not Inserted	Jumper	Voltage Input Phase C Configuration. Allows connection of this input to 3.3VDC Supply (V3P3) if this Voltage Input in not connected/not used.
J26	2-3	Jumper	Selection of Delta or Wye configuration. Position 1-2 Delta Configuration. Position 2-3 Wye Configuration.
J7	Not Inserted	Jumper	If not inserted the 78M6631 operates in normal condition, if inserted the input V1 comparator (supply under-voltage detection) is disabled, in this condition the WD Timer is also disabled.
J21	1-2	Jumper/Connector	VBAT input configuration. Use as connector for external battery or if battery not present set position 1-2.
J35	Inserted	Jumper	UART Rx Connection. Remove J35 if external transceiver is used. Insert J35 if the on-board USB/UART transceiver is used.
J22	Not Inserted	Test Point	I^2C bus test point. Pin 1 = SCDC (Serial Clock). Pin 2 = SDATA (Data).
J23	Inserted	Jumper	Connection of LED1 (Red) if inserted.
J25	Inserted	Jumper	Connection of LED2 (Yellow) if inserted.
J28	Inserted	Jumper	Connection of LED3 (Yellow) if inserted.
J29	Inserted	Jumper	Connection of LED4 (Green) if inserted.
J31	Inserted	Jumper	Connection of LED5 (Green) if inserted.
J32	N/A	Connector	SPI Port Connector – Refer to Table 2.
J27	N/A	Connector	In-Circuit Emulator Connector – Refer to Table 3.
J21	1-2	Jumper/Connector	External Battery Connector/Jumper – Refer to Table 4.
J36	N/A	Connector /Test Point	UART External Transceiver/Test Point – Refer to Table 5.
J33	N/A	Connector	External 5VDC supply – Refer to Table 6.
J24	N/A	Connector	Digital I/O Connector – Refer to Table 7.
J34	N/A	Connector	USB Connector – Refer to Table 11.

J32 SPI Connector

This connector allows the connection of the SPI interface. This connector is not isolated.

Table 2: J32 Evaluation Board SPI Connector

Position	Signal	Description
1	V3P3D	3.3VDC Supply
2,4,6,8,10	GND	Ground
3	PCLK	SPI CLOCK (Input)
5	PSDI	SPI Data In (Input)
7	PSDO	SPI Data Out(Output)
9	PCSZ	SPI Slave Select (Input)

J27 In-Circuit Emulator (ICE) Connector

This connector allows the connection of the In-Circuit Emulator. Refer to Section 2.6 for ICE connector adapters and ICE selection.

Table 3: J27 ICE Connector

Position	Signal	Description
1	V3P3D	3.3VDC Supply
2	RXTX	DATA (Input/Output)
3	ERST	Emulator Reset (Input)
5	GND	Ground
6	ICEEN	ICE Port Enable (Input)

J21 External Battery Connector/Jumper

This Jumper/Connector allows the connection of the VBAT (78M6631 Battery Supply Input) to an external battery backup. If an external battery in not required/not present, the jumper must be set in position 1-2 to connect the VBAT input to the on-board 3.3VDC (V3P3) supply.

Table 4: J21 External Battery Connector/Jumper

Position	Signal	Description
1	V3P3	3.3VDC Supply
2	VBAT	DATA (Input/Output)
3	GND	Ground

J36 Isolated UART Signal Connector

This connector allows an external transceiver to be connected or to provide test points to monitor the UART signals. These signals are galvanically isolated from the 78M6631 circuitry. Jumper R35 is used to disconnect the USBRX signal in case an external transceiver is used, in order to avoid contention.

Table 5: J36 Isolated UART signal Connector

Position	Signal	Description
1	ISO5V	Isolated 5VDC Supply
2	URX	UART Rx
3	UTX	UART Tx
4	USBGND	Isolated Ground

J33 Optional 5VDC External Supply

The 78M6631 Evaluation Board is powered through the USB port (5VDC), however in case the USB port is not connected, the evaluation board can be powered using an external 5VDC power supply, through the connector J33.

Table 6: J33 Optional 5VDC External Supply

Position	Signal	Description
1	USB5V	Isolated 5VDC Supply
2	ISOGND	Isolated Ground
3	USBGND	Isolated Ground

J24 Digital I/O Connection

The 78M6631 has several available general purpose digital I/O pins. The following tables show the connection and use of these I/O's in the 78M6631 Evaluation Board.

Table 7: J24 Digital I/O Connector

Position	Signal	Description
1	V3P3	3.3VDC Supply
2	DIO29	General Purpose Digital I/O
3	DIO30	General Purpose Digital I/O
4	DIO45	General Purpose Digital I/O
5	DIO47	General Purpose Digital I/O
6	DIO51	General Purpose Digital I/O
7	DIO53	General Purpose Digital I/O
8	DIO55	General Purpose Digital I/O
9	GND	Ground

TP1, TP2, TP3 Digital I/O Connections

The 78M6631 provides these additional general purpose digital I/O pins. The following tables show the connection and use of these I/O's in the 78M6631 Evaluation Board.

Table 8: TP1 Digital I/O Connector

Position	Signal	Description
1	V3P3	3.3VDC Supply
2	DIO8	General Purpose Digital I/O

Table 9: TP2 Digital I/O Connector

Position	Signal	Description
1	V3P3	3.3VDC Supply
2	DIO9	General Purpose Digital I/O

Table 10: TP3 Digital I/O Connector

Position	Signal	Description
1	V3P3	3.3VDC Supply
2	DIO6	General Purpose Digital I/O

J34 USB Port Connection

The 78M6631 Evaluation Board is equipped with an USB interface. The interface allows the communication to a host (PC etc.) and to provide supply power to the evaluation board.

Table 11: J34 USB Connector

Position	Signal	Description
1	USB5V	3.3VDC Supply
2	USBDM	General Purpose Digital I/O
3	USBDP	General Purpose Digital I/O
4, 5,6	USBGND	General Purpose Digital I/O

CT Burden Resistor Configuration

The 78M6631 Evaluation Board requires use of external CTs. Terminal blocks J1/J4, J5/J9, J10/J13, provide the wiring connectors for these CTs. A burden resistor must be used with each CT. The CT's manufacturer provides the recommended burden resistor value. The 78M6631 Evaluation Board provides a 12.4 Ω burden resistor for each pair of terminal blocks. Jumpers are provided for each pair of terminal blocks for connection to these on-board burden resistors. Additionally, the jumpers provide connection to V3P3 to establish a reference point for the CT.

If external burden resistors are used, install the following jumpers:

    J3-1/J3-2
    J8-1/J8-2
    J12-1/J12-2
    J2, J6, J11 have no jumpers.

If the on-board resistors are used, install the following jumpers:

    J3-1/J3-2
    J3-3/J3-4
    J8-1/J8-2
    J8-3/J8-4
    J12-1/J12-2
    J12-3/J12-4
   J2-2/J2-3
    J6-2/J6-3
    J11-2/J11-3

2.7 Verify Serial Connection to the PC

After connecting the USB cable from the 78M6631 Evaluation Board to the host PC, start the HyperTerminal application (or another suitable communication program) and create a session using the communication parameters shown in Table 1.

Table 12: COM Port Setup Parameters

Setup Parameter	78M6631
Port speed (baud)	38400
Data bits	8
Parity	None
Stop bits	1
Flow control	None

HyperTerminal can be found in Windows by selecting **Start** →**All Programs** →**Accessories** → **Communications** →**HyperTerminal**. The connection parameters are configured by selecting **File** → **Properties**. The **New Connection Properties** menu appears.
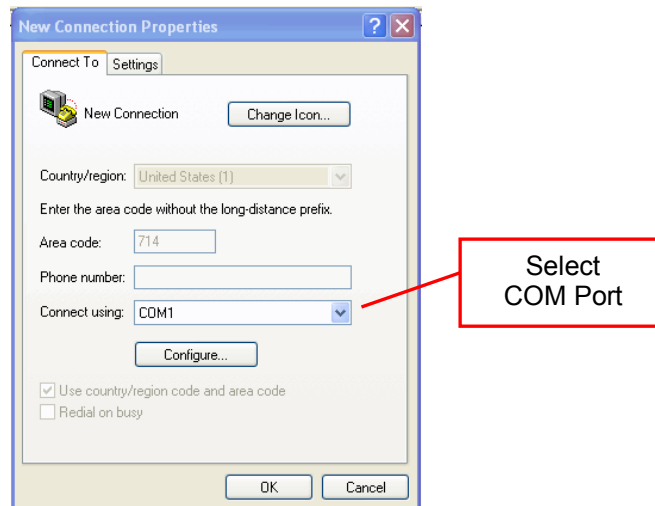
Select the appropriate COM port and click **Configure**. The **COMn Properties** menu appears.
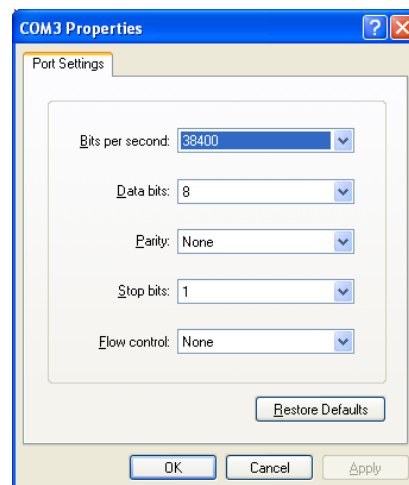

Note that port parameters can only be adjusted when the connection is not active. It may be necessary to click the Disconnect Button to disconnect the port.

FTDI COM Port Trouble-Shooting

If the FTDI device driver did not install properly, there would be no assigned COM port number for the FTDI controller. Repeat the USB Driver Installation, see Section 2.1.

Microsoft Windows may associate a Ball Point device to the FTDI USB controller.   When this occurs a FTDI device COM port assignment is available via HyperTerminal but there is no communications data. Verify if a Ball Point device has been added to the "Human Interface Devices" via the Device manager. Refer to Section 2.2 for access to the Device Manager. If a Ball Point device exists, delete it and unplug and replug the evaluation board's USB cable.

CLI measurement can be displayed in two different formats: decimal or hex. Both formats are returned as ASCII character strings. The following figure uses CLI commands to return the same data presented in the Auto-Reporting mode.
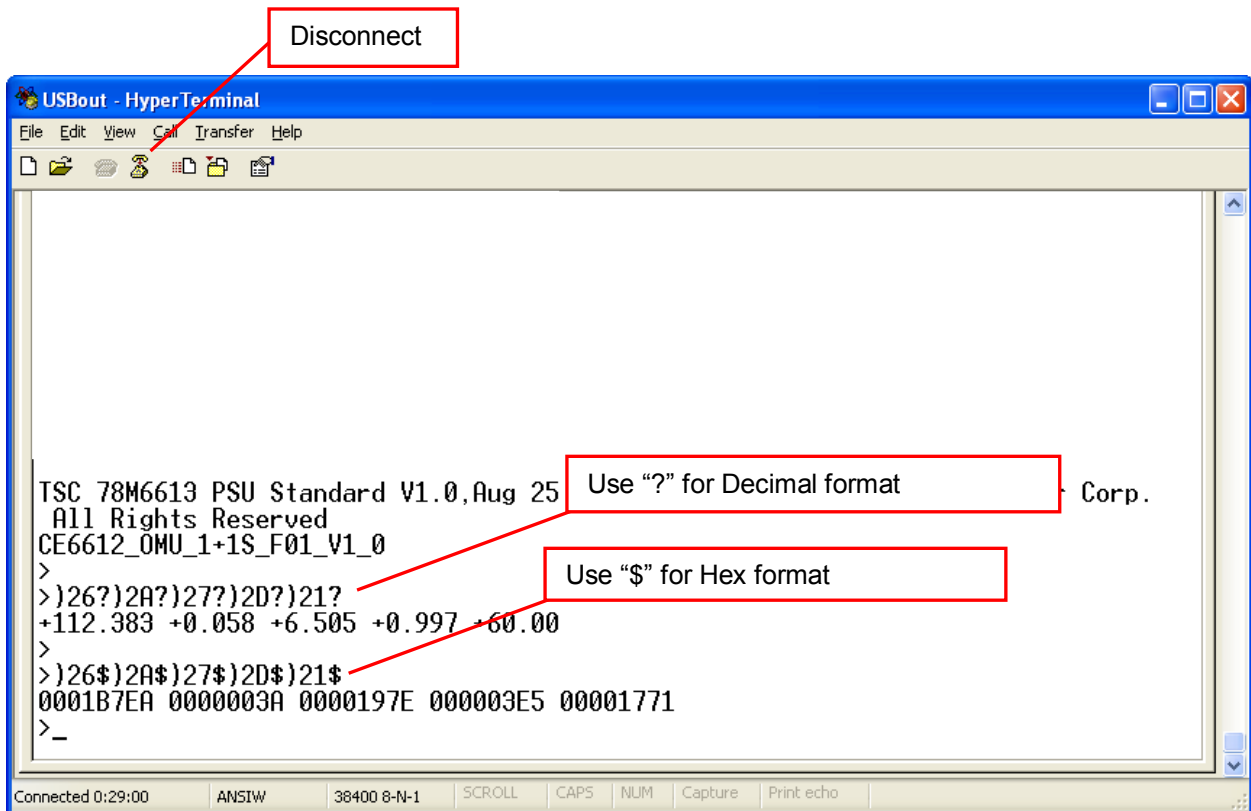
Refer to the applicable Firmware Description Document for a complete description of available CLI commands and their invocation usage.

2.8 In-Circuit Emulator (ICE) Adaptor

The 78M6631 firmware (stored in internal flash memory) can be updated to accommodate program enhancements. Use the Signum ADM51 or the Teridian TFP-2 to download new firmware to the 78M6631. The supplied ICE Adaptor is required to interface the flat ribbon cable (provided with the ADM51 or TFP-2) to the 78M6631 Evaluation Board.
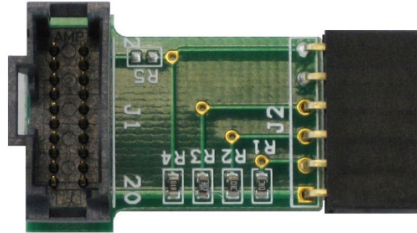

Figure 3: ICE Adaptor

Figure 4 shows how to attach the ICE Adaptor to the 78M6631 Evaluation Board. Please make note of the orientation of the ICE Adaptor as to how it attaches to the 78M6631 Evaluation Board (V3P3 ICE Adaptor pin connects to the +V3P3 Evaluation Board pin).
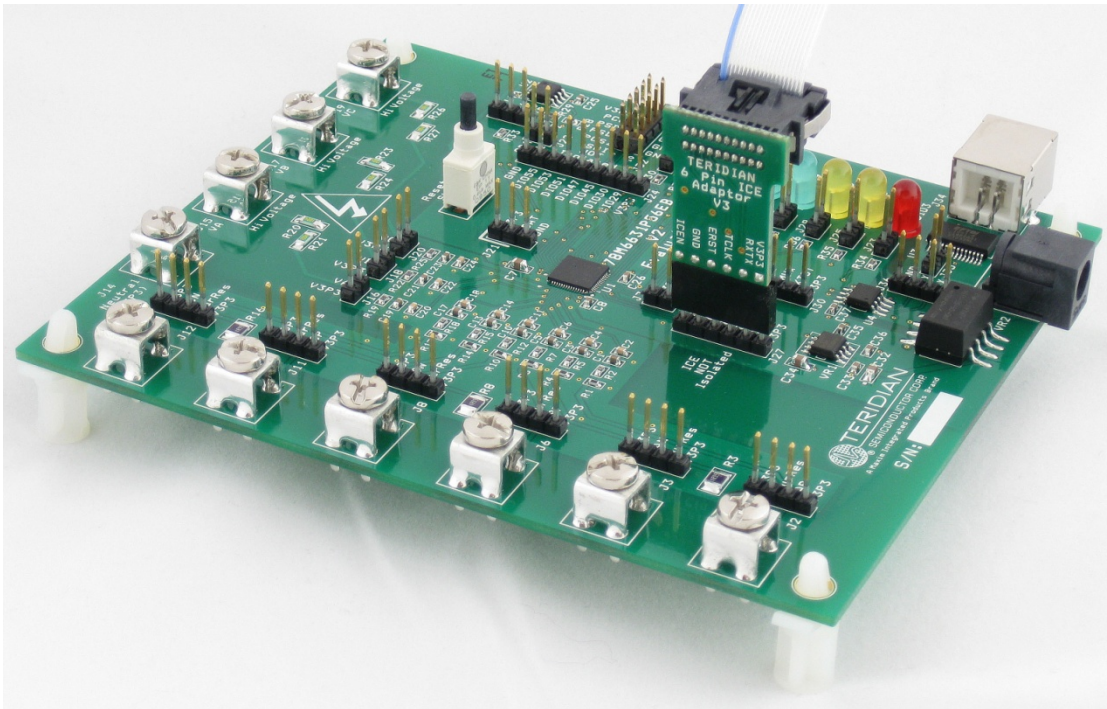

Figure 4: Attaching the ICE Adaptor

CAUTION HIGH VOLTAGE Disconnect the 78M6631 Evaluation Board from live AC voltages before connecting the ADM51 or TFP-2. An Earth ground disparity and high AC voltages are present on the 78M6631 Evaluation Board when it is connected to the AC outlet. Equipment damage to the 78M6631, ADM51/TFP-2 and attached PC may occur when live AC voltages are present on the 78M6631 Evaluation Board. Refer to the *78M6631 Safety Precautions Applications Note* for additional information.

It is recommended to always use the supplied flat ribbon cable. Do not use discrete wires in place of the flat ribbon. Poor signal integrity will cause flash memory programming errors. Additional adaptors and flat ribbon cables can be ordered through Maxim's Teridian customer service.

Power to the 78M6631 is provided via the USB cable. Attach the USB cable during programming.

3   Schematics, Bill of Materials and PCB Layouts

This section includes the schematics, bill of materials and PCB layouts for the 78M6631 Evaluation Board.

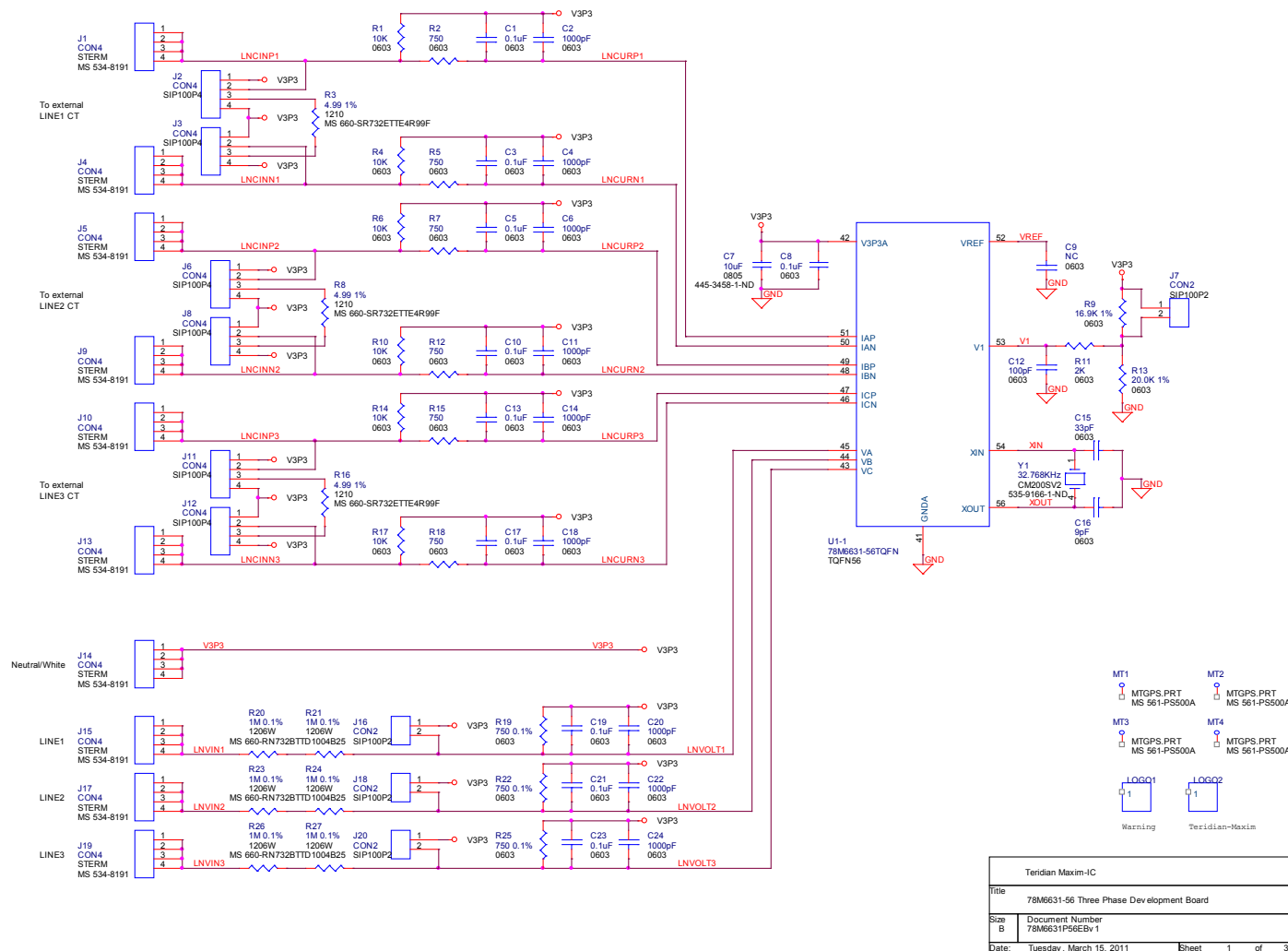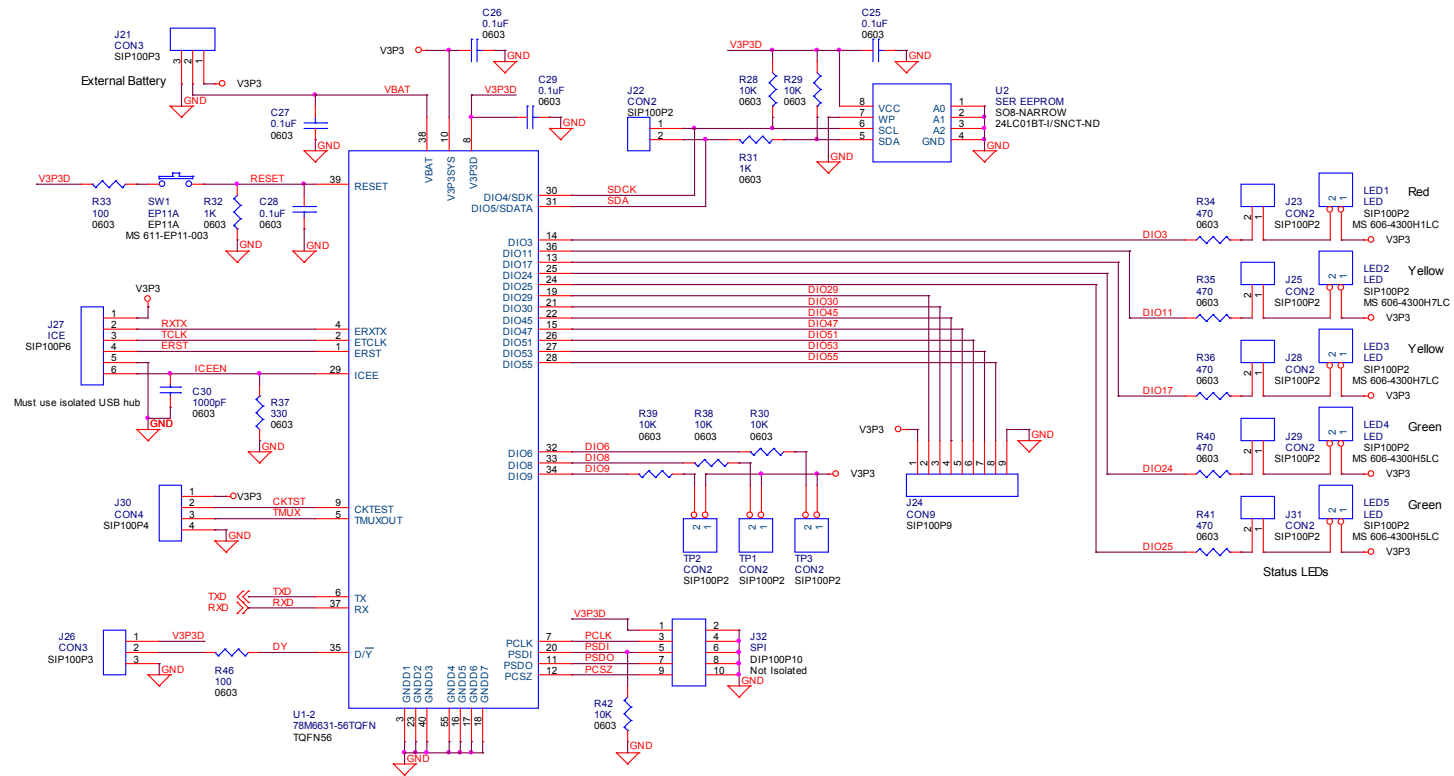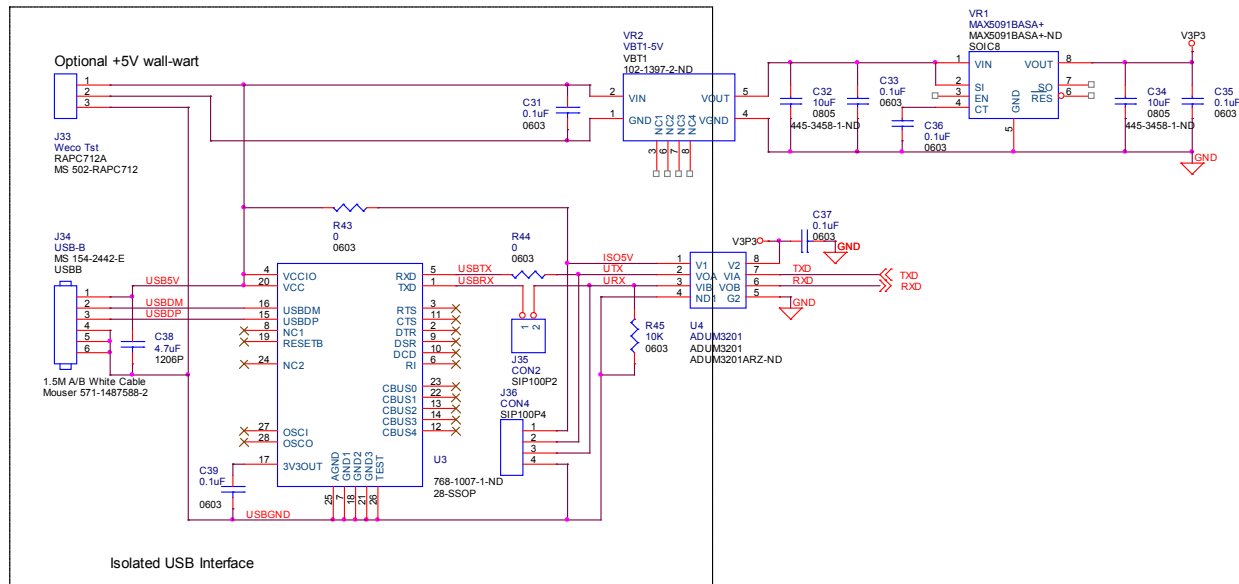## 3.1   78M6631 Evaluation Board Schematics

Figure 5: 78M6631 Evaluation Board Electrical Schematic (1 of 3)

Figure 6: 78M6631 Evaluation Board Electrical Schematic (2 of 3)

Figure 7: 78M6631 Evaluation Board Electrical Schematic (3 of 3)

3.2 78M6631 Evaluation Board Bill of Materials

Table 13: 78M6631 Evaluation Board Bill of Materials

Item	Quantity	Reference	Part	PCB Footprint	Manufacturer PN	Manufacturer
1	21	C1,C3,C5,C8,C10,C13,C17, C19,C21,C23,C25,C26,C27, C28,C29,C31,C33,C35,C36, C37,C39	0.1µF	0603	GRM188R71H104KA93D	Murata Electronics
2	10	C2,C4,C6,C11,C14,C18,C20, C22,C24,C30	1000pF	0603	C1608X7R2A102K	TDK Corporation
3	3	C7,C32,C34	10µF	0805	C2012Y5V1C106Z	TDK Corporation
4	1	C9	NC	0603		
5	1	C12	100pF	0603	C1608C0G1H101J	TDK Corporation
6	1	C15	33pF	0603	C0603C330J5GACTU	Kemet
7	1	C16	9pF	0603	C1608C0G1H090C	TDK Corporation
8	1	C38	4.7µF	1206P	TPSB475K016R1500	AVX Corporation
9	10	J1,J4,J5,J9,J10,J13,J14, J15,J17,J19	CON4	STERM	8191	Keystone Electronics
10	8	J2,J3,J6,J8,J11,J12,J30, J36	CON4	SIP100P4	PBC36SAAN	Sullins Connector Solutions
11	14	TP1,TP2,TP3,J7,J16,J18, J20,J22,J23,J25,J28,J29, J31,J35	CON2	SIP100P2	PBC36SAAN	Sullins Connector Solutions
12	2	J21,J26	CON3	SIP100P3	PBC36SAAN	Sullins Connector Solutions
13	1	J24	CON9	SIP100P9	PBC36SAAN	Sullins Connector Solutions
14	1	J27	ICE	SIP100P6	PBC36SAAN	Sullins Connector Solutions
15	1	J32	SPI	DIP100P10	929665-01-36-I	3M
16	1	J33	Weco Tst	RAPC712A	RAPC712X	Switchcraft
17	1	J34	USB-B	USBB	154-2442-E	Kobiconn
18	1	LED1	LED	SIP100P2	4300H1LC	Chicago Miniature
19	2	LED2,LED3	LED	SIP100P2	4300H7LC	Chicago Miniature
20	2	LED4,LED5	LED	SIP100P2	606-4300H5LC	Chicago Miniature
21	1	LOGO1	Silk	WARNING		

| Item	Quantity	Reference	Part	PCB Footprint	Manufacturer PN	Manufacturer
22	1	LOGO2	Silk	LOGO TERIDIAN_MAXIM		
23	4	MT1,MT2,MT3,MT4	TP	MTGPS.PRT	561-PS500A	Eagle Plastic Devices
24	13	R1,R4,R6,R10,R14,R17,R28, R29,R30,R38,R39,R42,R45	10K	0603	ERJ-3EKF1002V	Panasonic - ECG
25	6	R2,R5,R7,R12,R15,R18	750 ±5%	0603	ERJ-3GEYJ751V	Panasonic - ECG
26	3	R3,R8,R16	12.4 ±1%	1210	MS 71-CRCW1210-12.4-E3	KOA Speer
27	1	R9	16.9K ±1%	0603	ERJ-3EKF1692V	Panasonic - ECG
28	1	R11	2K	0603	ERJ-3GEYJ202V	Panasonic - ECG
29	1	R13	20.0K ±1%	0603	ERJ-3EKF2002V	Panasonic - ECG
30	3	R19,R22,R25	750 ±0.1%	0603	ERA-3YEB751V	Panasonic - ECG
31	6	R20,R21,R23,R24,R26,R27	1M ±0.1%	1206W	RN732BTTD1004B25	KOA Speer
32	2	R31,R32	1K	0603	ERJ-3EKF1001V	Panasonic - ECG
33	2	R33,R46	100	0603	ERJ-3GEYJ101V	Panasonic - ECG
34	5	R34,R35,R36,R40,R41	470	0603	ERJ-3GEYJ471V	Panasonic - ECG
35	1	R37	330	0603	ERJ-3EKF3300V	Panasonic - ECG
36	2	R43,R44	0	0603	ERJ-3GEY0R00V	Panasonic - ECG
37	1	SW1	EP11A	Through Hole	EP11SD1CBE	C&K Components
38	1	U1	78M6631-56TQFN	TQFN56	78M6831	Maxim Integrated Products
39	1	U2	SER EEPROM	8-SOIC	24LC01B-I/SN	Microchip Technology
40	1	U3	FT232QFN32	28-SSOP	FT232RL-REEL	FTDI
41	1	U4	ADUM3201	8-SOIC	ADUM3201ARZ	Analog Devices Inc
42	1	VR1	MAX5091BASA+	8-SOICN	MAX5091BASA+	Maxim Integrated Products
43	1	VR2	VBT1-5V	8-SMD	VBT1-S5-S5-SMT	V-Infinity
44	1	Y1	32.768KHz	4-SOJ	ABS25-32.768KHZ-T	Abracon Corporation

3.3   78M6631 Evaluation Board PCB Layouts
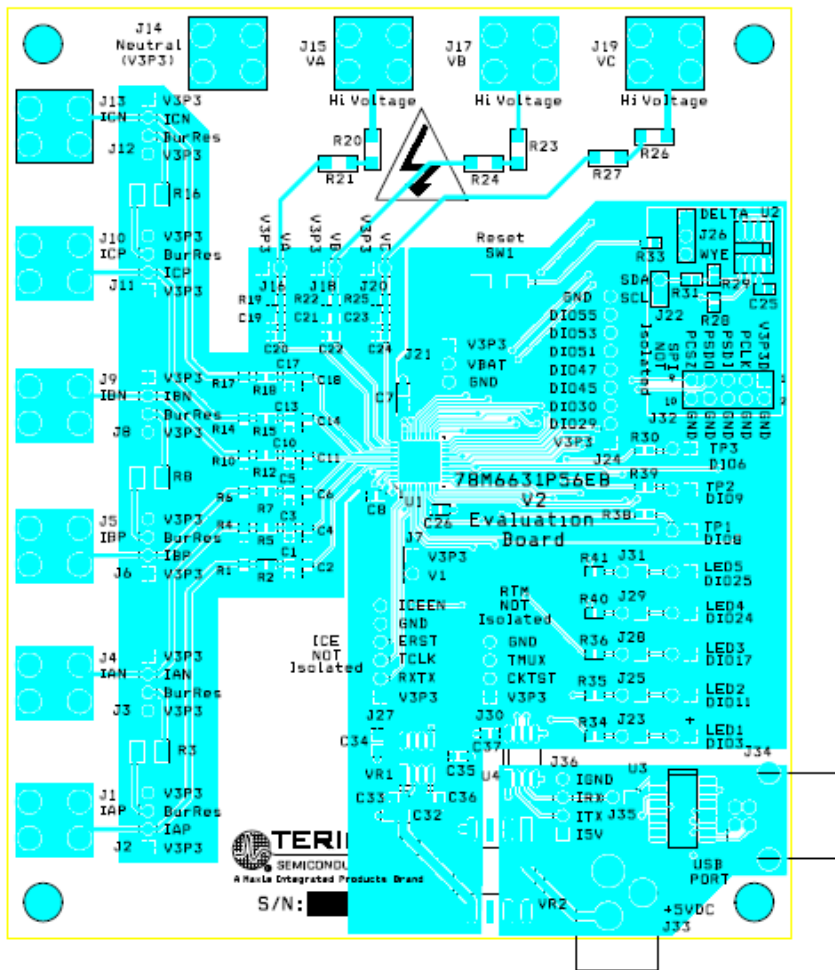
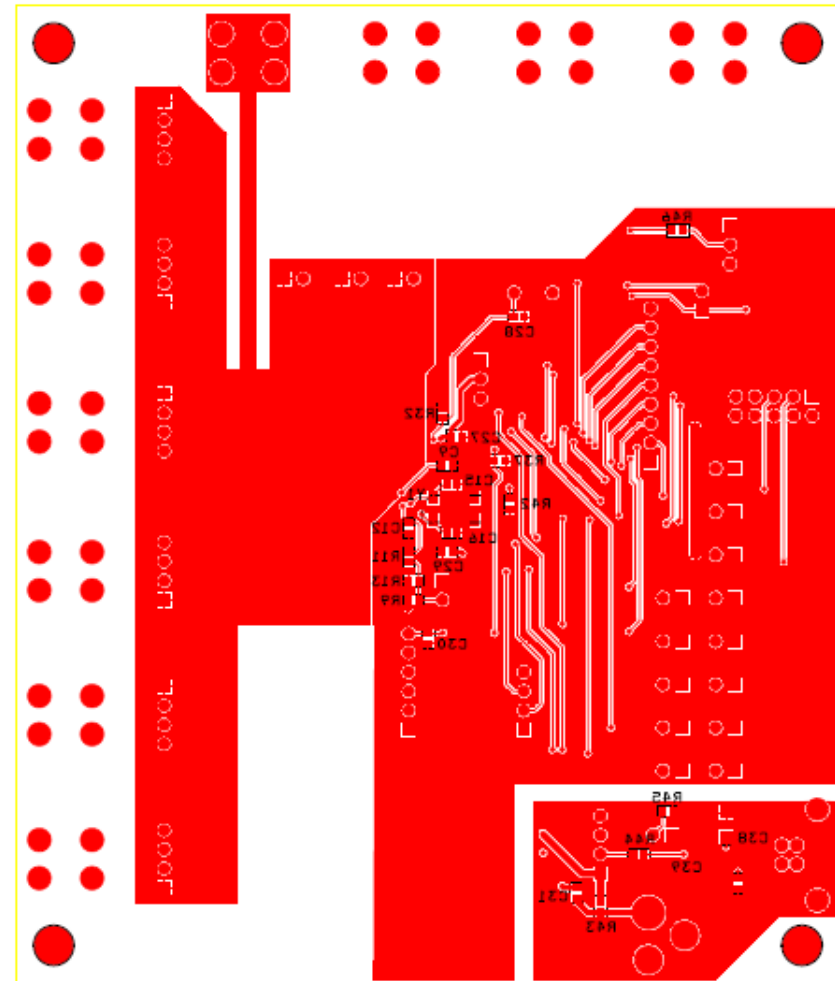**Figure 8: 78M6631 Evaluation Board PCB Top View**

Figure 9: 78M6631 Evaluation Board PCB Bottom View

4   Ordering Information

PART	TYPE
78M6631-EVM-1	78M6631 Evaluation Board

5   Included Documentation

The following 78M6631 documents are included on the CD:

78M6631 Data Sheet

6   Contact Information

For more information about Maxim products or to check the availability of the 78M6631, contact technical support at www.maxim-ic.com/support.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	7/11	Initial release	—
1	12/11	In Figure 2 and Figure 3, indicated optional resistors. Changed the Flow Control to "None".	10 17