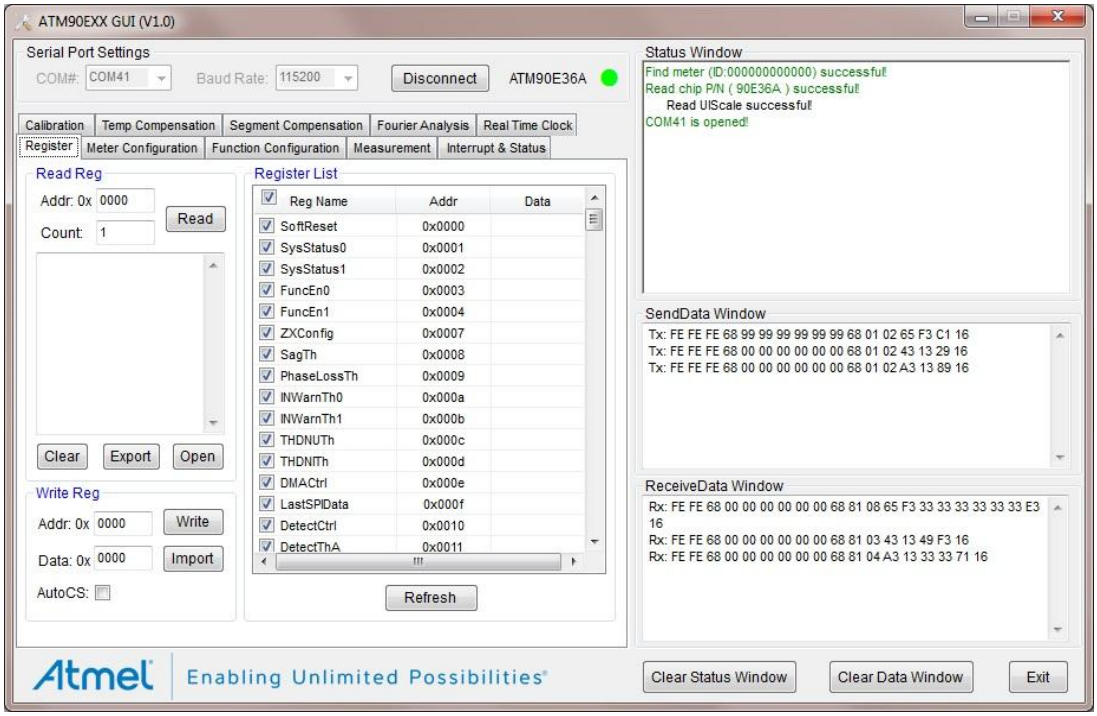
USER GUIDE

90Exx Metering Demo Board GUI



Preface

90Exx Metering Demo Board GUI is designed to meter Atmel AFE chips of ATM90E2x, ATM90E32AS and ATM90E36.

Table of Contents

1. Introduction

1.1 Features

- Optimized graphic user interface
- Expandable registers
- Data import and export supported

1.2 Kit Overview

90Exx metering demo board GUI (hereinafter referred to as GUI) is designed for evaluating ATM90E2x, ATM90E32AS and ATM90E36A metering chips. The GUI adopts user-defined DL/T645-1997 communication protocol. Metering parameters are calibrated through the RS485 interface.

2. Getting Started

2.1 Start GUI

Please download the GUI, unzip it and then launch it by clicking on ‘ATM90EXX GUI.exe’.

2.2 Connection

Follow below steps to connect to the serial port through GUI.

1. Select the COM port from the drop-down list.
2. Select Baud Rate from the following selection: 1200, 2400, 4800, 9600, 19200 bps. Default is 2400 bps.
3. Click on the Connect button. GUI will perform the following:
   a) Read meter number
   b) Read chip part number
   c) Display part number
   d) Auto select the GUI functions corresponding to the part number
   e) Read voltage and current scale from the meter

2.3 Design Documentation and Related links

The following list contains links to the most relevant documents.

1. AFE Control Board SAM4C User Guide – PDF version.
2. ATM90E25 datasheet – PDF version.
3. ATM90E32AS datasheet – PDF version.
4. ATM90E36A datasheet – PDF version.

3. Introduction of GUI

3.1 Main Interface

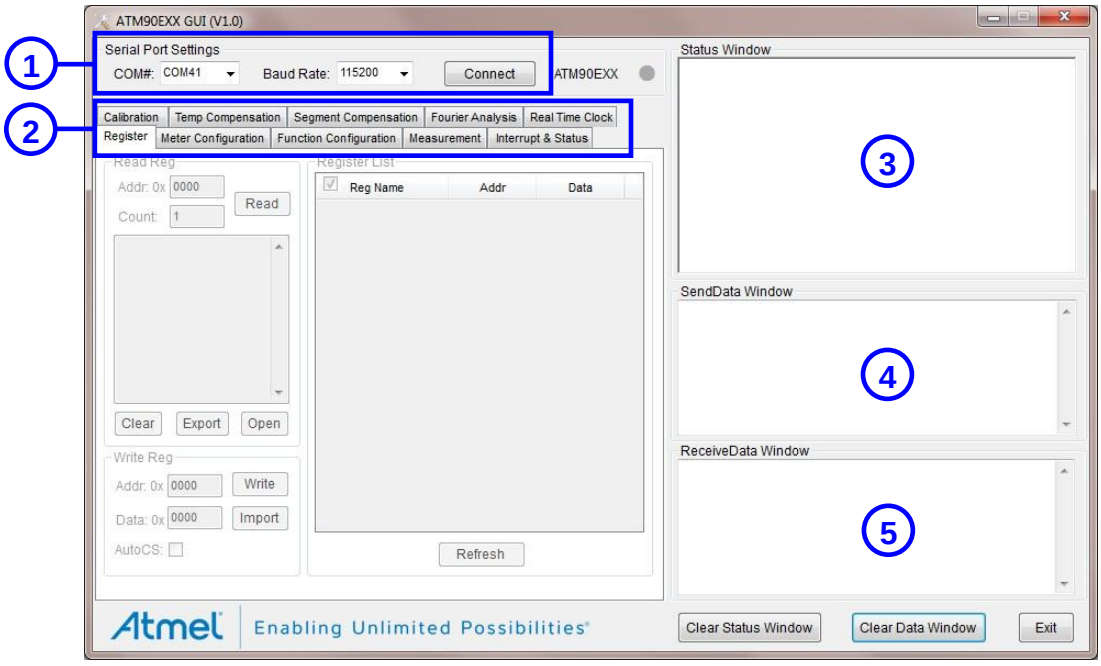


Figure 3-1 Main Interface

【1】Serial Port Settings: configure the serial port. When complete, click on 'Connect'.
【2】Function Tab: different tabs contain different functions.
【3】Status Window: display operation results and status.
【4】SendData Window: display the DL/T645-1997 data frame to be sent.
【5】ReceiveData Window: display the DL/T645-1997 data frame received.

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3.2 Register

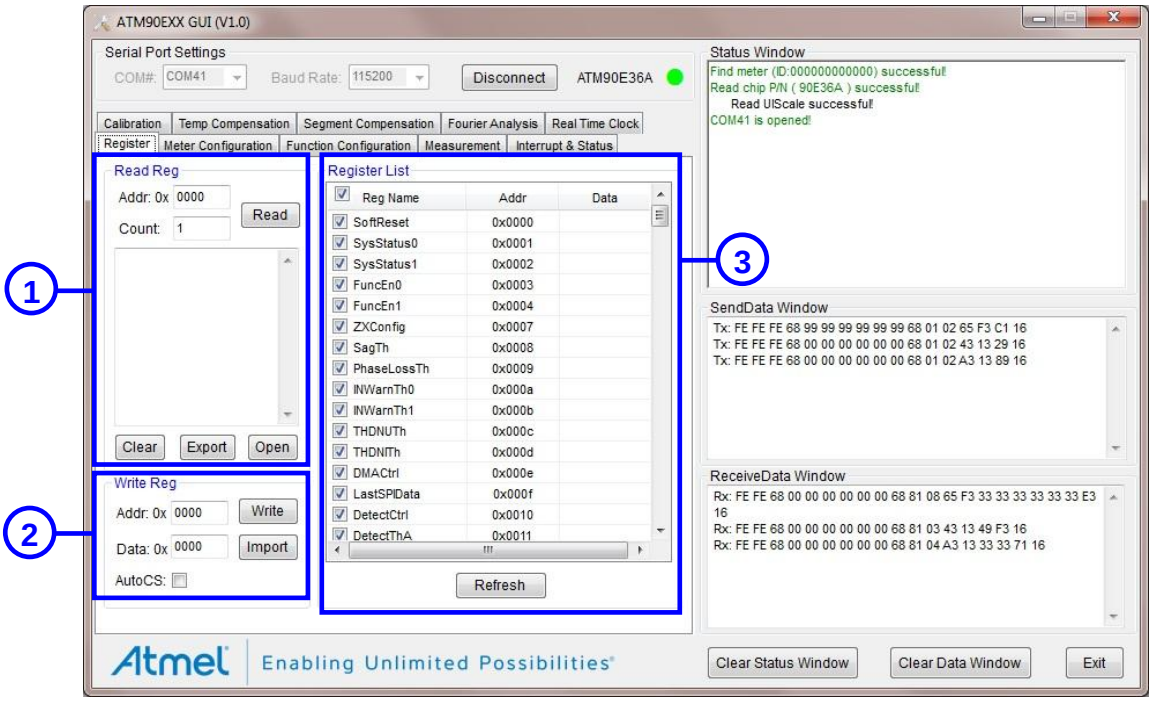

Figure 3-2 Register

【1】Read Reg: read register values.

- Addr: address of the register
- Count: the number of registers to read
- Read: read the specified register
- Clear: clear data in the display window
- Export: export the register reading log and save it as a .txt file
- Open: Open a .txt file and load it into GUI

【2】Write Reg: write values to registers.

- Addr: address of the register
- Data: Data to be written
- Write: write data to the specified register
- AutoCS: if checked, check-sum will be automatically calculated
- Import: import a file and write to the registers according to the address and data in the imported file

【3】Register list: display the complete register list

3.3 Meter Configuration

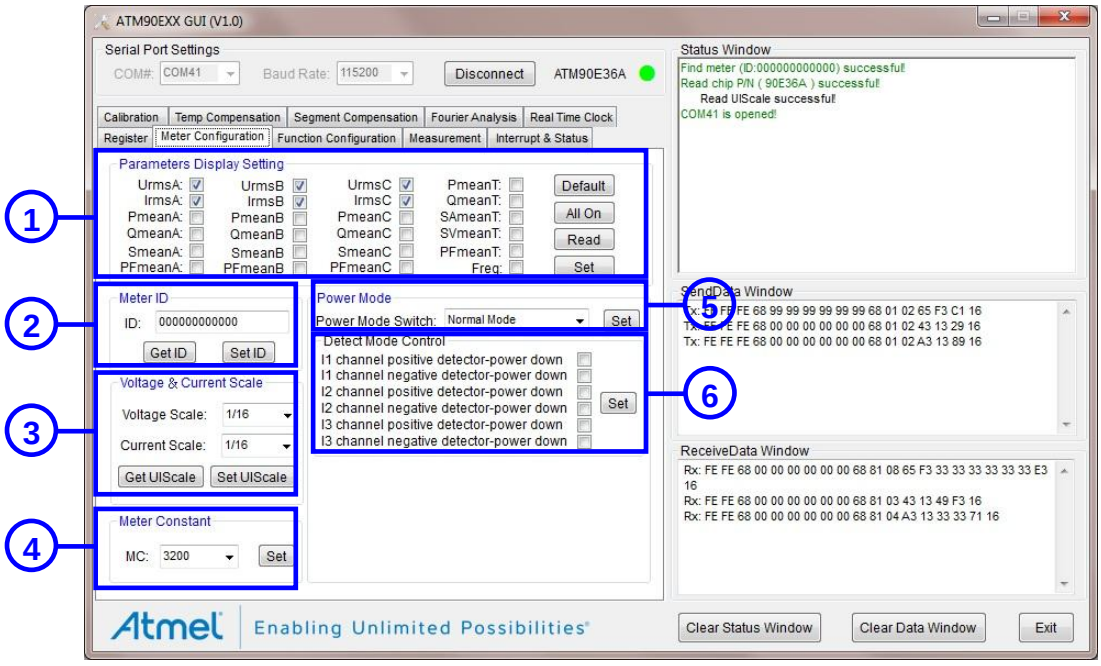

Figure 3-3 Meter configuration

【1】Parameters Display Setting: define or read the parameter items displayed on the meter panel

- Default: display the default parameters on the meter panel
- All On: display all the parameters on the meter panel
- Read: read the parameters being displayed on the meter panel. The parameters that are being displayed on the meter panel will be ticked on GUI.
- Set: display the parameters that are ticked on GUI on the meter panel

【2】Meter ID

- Get ID: get the meter ID
- Set ID: set the meter ID

【3】Voltage & Current Scale

- Voltage Scale: voltage scale value read from or to be written to the meter.
- Current Scale: current scale value read from or to be written to the meter.
- Get UIScale: read the voltage and current scale parameters.
- Set UIScale: set the voltage and current scale values.

【4】Meter Constant

Set: click to set the meter constant

【5】Power Mode

Power Mode Switch: select a power mode from the drop down box

Set: set the power mode

【6】Detect Mode Control

Tick to set current channel positive power-down or negative power down in Detect Mode.

3.4 Function Configuration

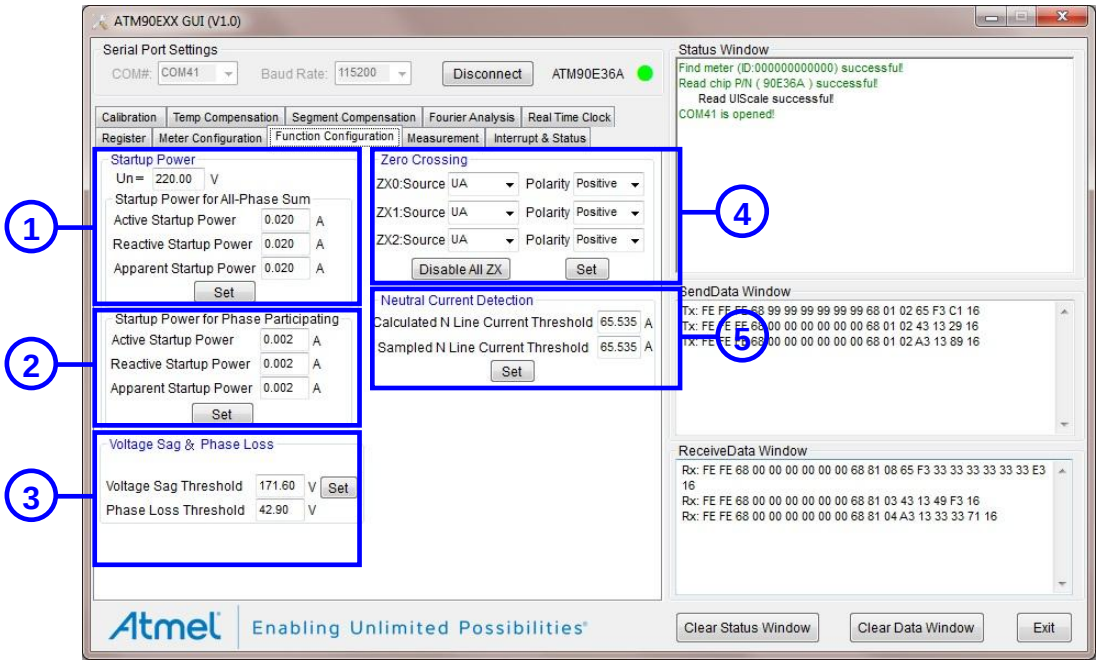

Figure 3-4 Function Configuration

【1】Startup Power:
- Un
- Active Startup Power
- Reactive Startup Power
- Apparent Startup Power

Set: click to configure the above values

【2】Startup Power for Phase Participating:
- Active Startup Power
- Reactive Startup Power
- Apparent Startup Power

Set: click to configure the above values

【3】Voltage Sag & Phase Loss:
- Voltage Sag Threshold
- Phase Loss Threshold
- Set: click to configure the above values

【4】Zero Crossing:

Disable All ZX: click to disable all ZX

Set: click to configure ZX0/1/2 sources and polarity

【5】Neutral Current Detection:
- Calculated N Line Current Threshold
- Sampled N Line Current Threshold

Set: click to configure the above values

3.5 Measurement

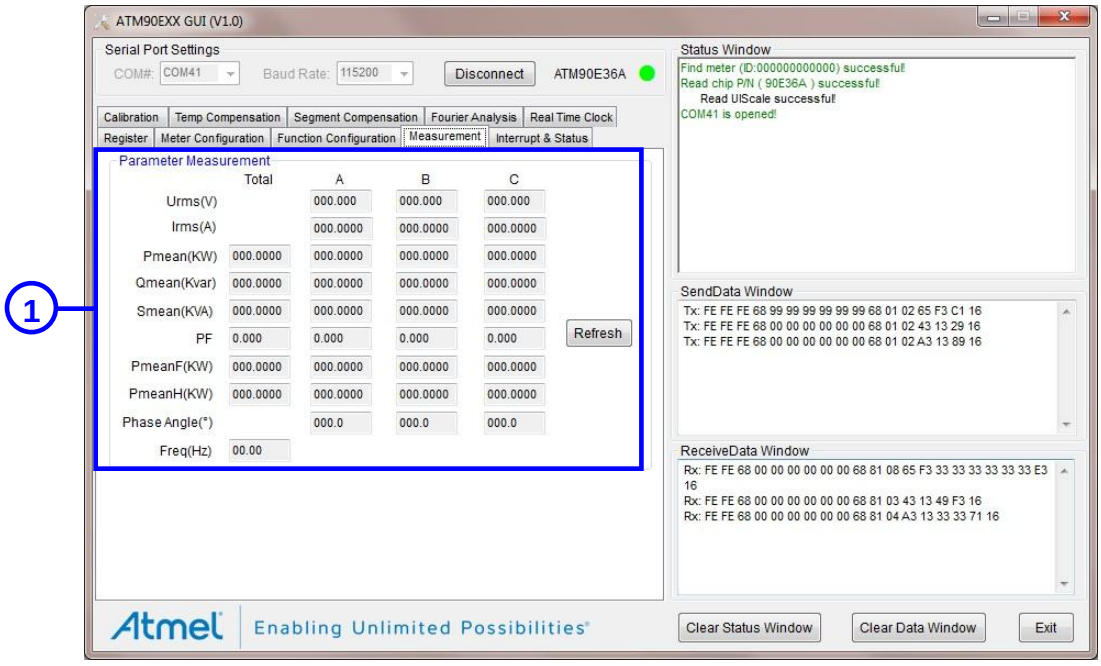

Figure 3-5 Measurement

【1】Parameter Measurement:

- Urms (V): voltage RMS
- Irms (A): current RMS
- Pmean (kW): mean active power
- Qmean (kW): mean reactive power
- Smean (kW): mean apparent power
- PF: Power Factor
- PmeanF (kW): mean fundamental active power
- PmeanH (kW): mean harmonic active power
- Phase Angle
- Freq (Hz)

Refresh: click to read the above parameters

3.6 Interrupt & Status

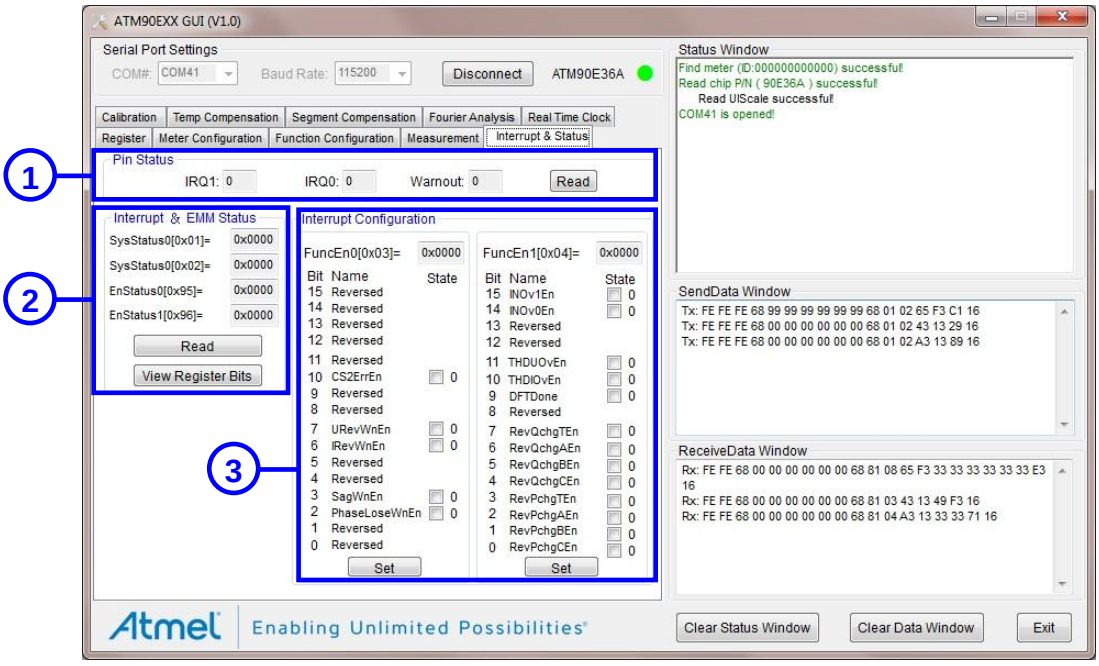

Figure 3-6 Interrupt & Status

【1】Pin Status

- IRQ1: IRQ1 pin status
- IRQ0: IRQ0 pin status
- Warnout: Warnout pin status

Read: click to read the above parameters

【2】Interrupt & EMM Status

- SysStatus0 [0x01]
- SysStatus0 [0x02]
- EnSysStatus0 [0x95]
- EnStatus1 [0x96]

Read: click to read the above registers

View Register Bits: click to read the bit values of the selected register.

【3】Interrupt Configuration

FuncEn0 [0x03]: input the value to be written to 0x03

Set: click to set the value to 0x03

FuncEn1 [0x04]: input the value to be written to 0x04

Set: click to set the value to 0x04

3.7 Calibration

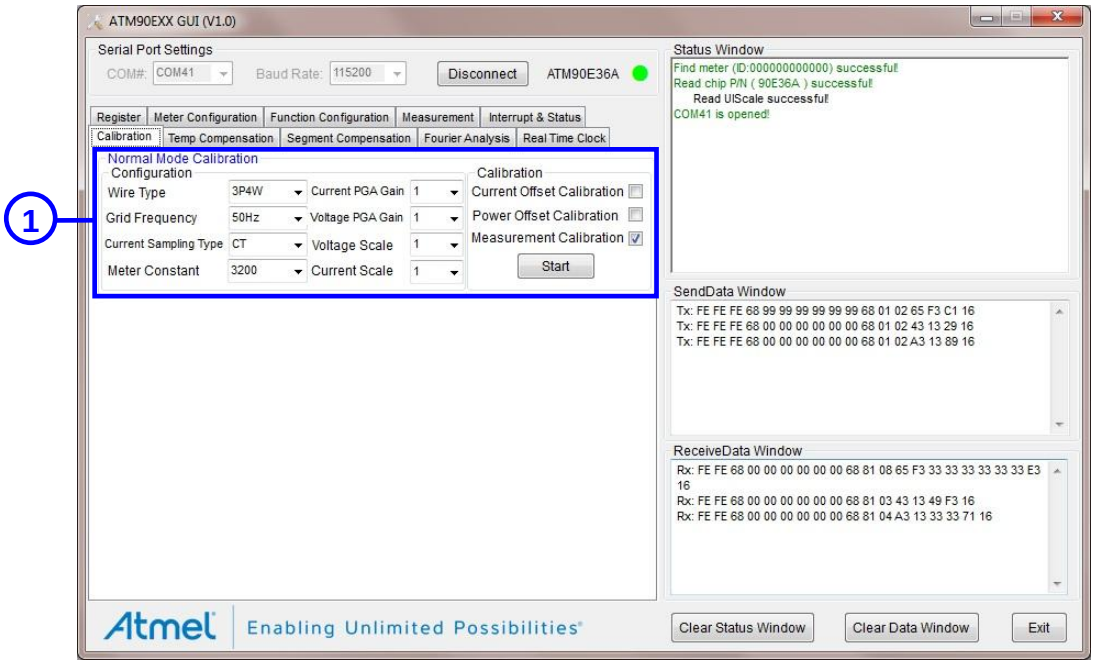

Figure 3-7 Calibration

【1】Normal Mode Calibration:

Configuration

- Wire Type
- Grid Frequency
- Current Sampling Type
- Meter Constant
- Current PGA Gain
- Voltage PGA Gain
- Voltage Scale
- Current Scale

Calibration

- Current Offset Calibration
- Power Offset Calibration
- Measurement Calibration

Start: click to start calibration which sequentially includes the following:

- Voltage and Current. Refer to Figure 3-8.
- Energy (Phase A). Refer to Figure 3-9.
- Phase Angle (Phase A). Refer to Figure 3-10.
- Energy (Phase B)
- Phase Angle (Phase B)
- Energy (Phase C)
- Phase Angle (Phase C)

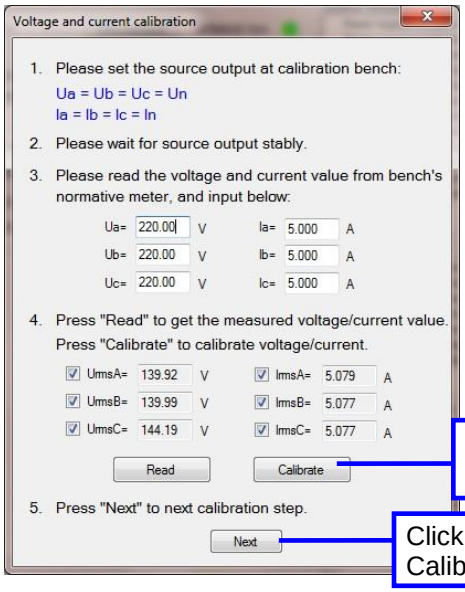

Figure 3-8 Voltage and Current Calibration

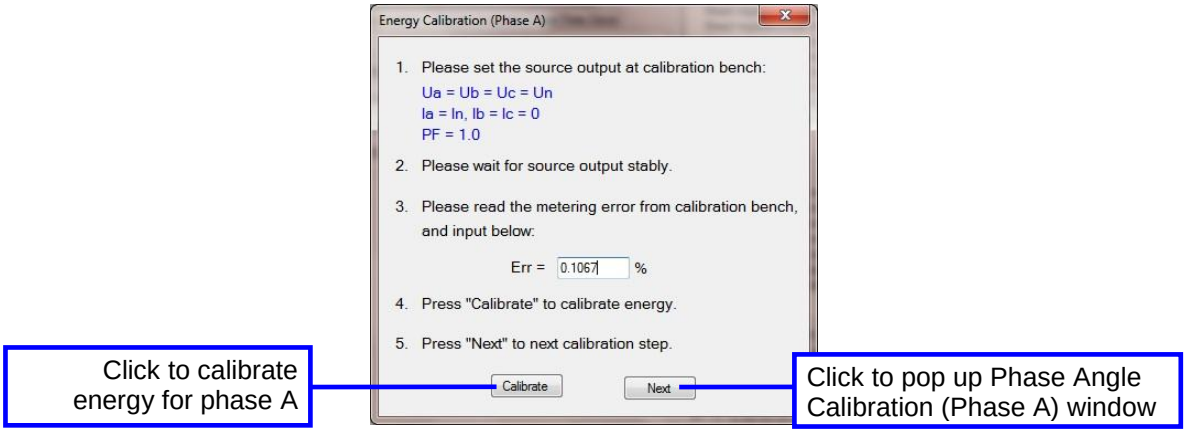

Figure 3-9 Energy Calibration (Phase A)

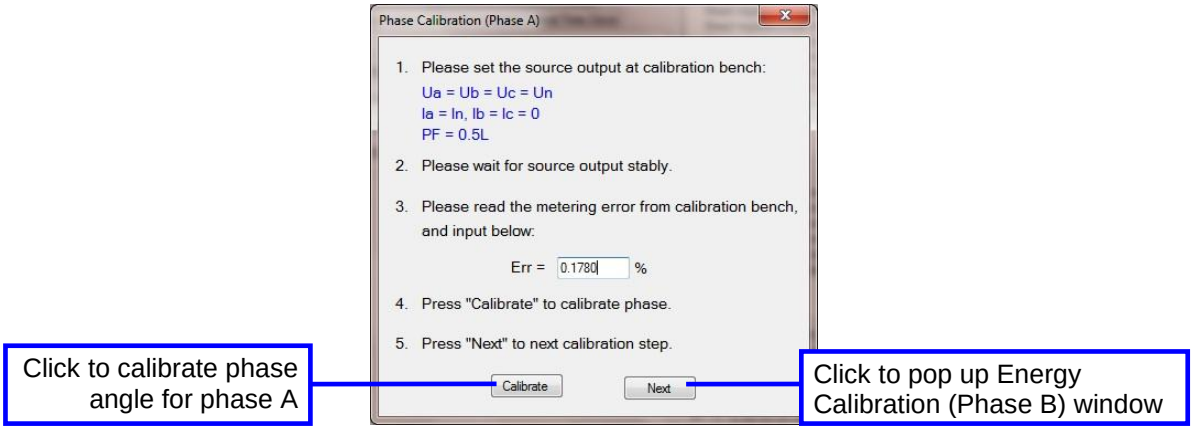

Figure 3-10 Phase Angel Calibration (Phase A)

3.8 Temperature Compensation

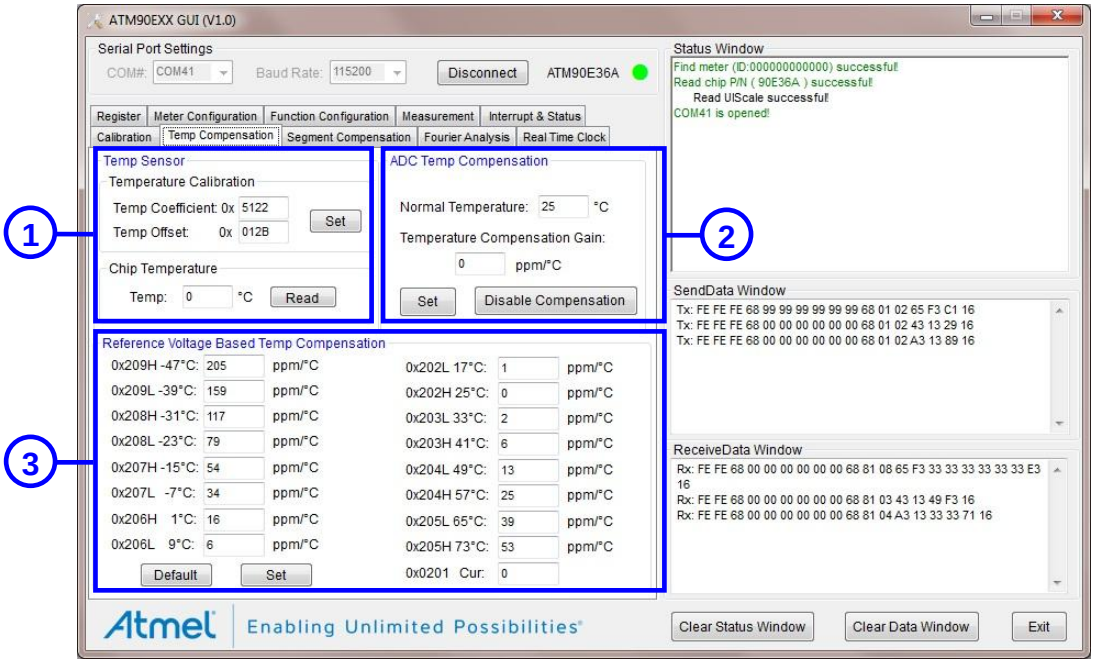

Figure 3-8 Temperature Compensation

【1】Temperature Sensor

- Temperature Calibration
  - Temperature Coefficient
  - Temperature Offset

  Set: click to configure temperature sensor
- Chip Temperature
  - Temperature

  Read: click to read chip temperature

【2】ADC Temperature Compensation

- Normal Temperature
- Temperature Compensation Gain

Set: click to set the specified temperature and gain

Disable Compensation: click to disable the current compensation

【3】Reference Voltage Based Temperature Compensation

Specify compensation at different temperatures

Default: click to read the default values

Set: click to configure the specified values

3.9 Segment Compensation (only for 90E32A)

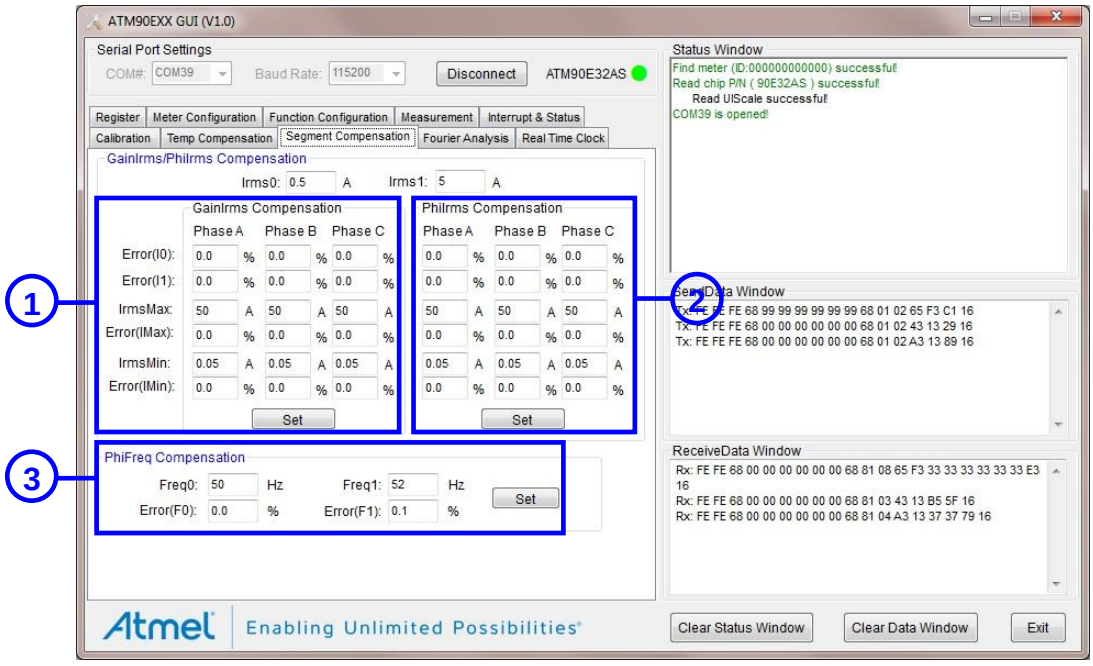

Figure 3-9 Compensation

【1】GainIrms Compensation: current RMS gain compensation

- PhaseA: phase A
- PhaseB: phase B
- PhaseC: phase C
- Error (I0): error at current I0
- Error (I1): error at current I1
- IrmsMax: current RMS at Imax
- Error (Max): error at Imax
- IrmsMin: current RMS at Imin
- Error (Min): error at Imin

Set: click to configure the above values

【2】PhiIrms Compensation: phase current RMS compensation

- PhaseA: phase A
- PhaseB: phase B
- PhaseC: phase C
- Error (I0): error at current I0
- Error (I1): error at current I1
- IrmsMax: current RMS at Imax
- Error (Max): error at Imax
- IrmsMin: current RMS at Imin
- Error (Min): error at Imin

Set: click to configure the above values

【3】PhiFreq Compensation: phase frequency compensation

- Freq0: frequency 0
- Error (F0): error at frequency 0
- Freq1: frequency 1
- Error (F1): error at frequency 1

Set: click to configure the above values

3.10 Fourier Analysis

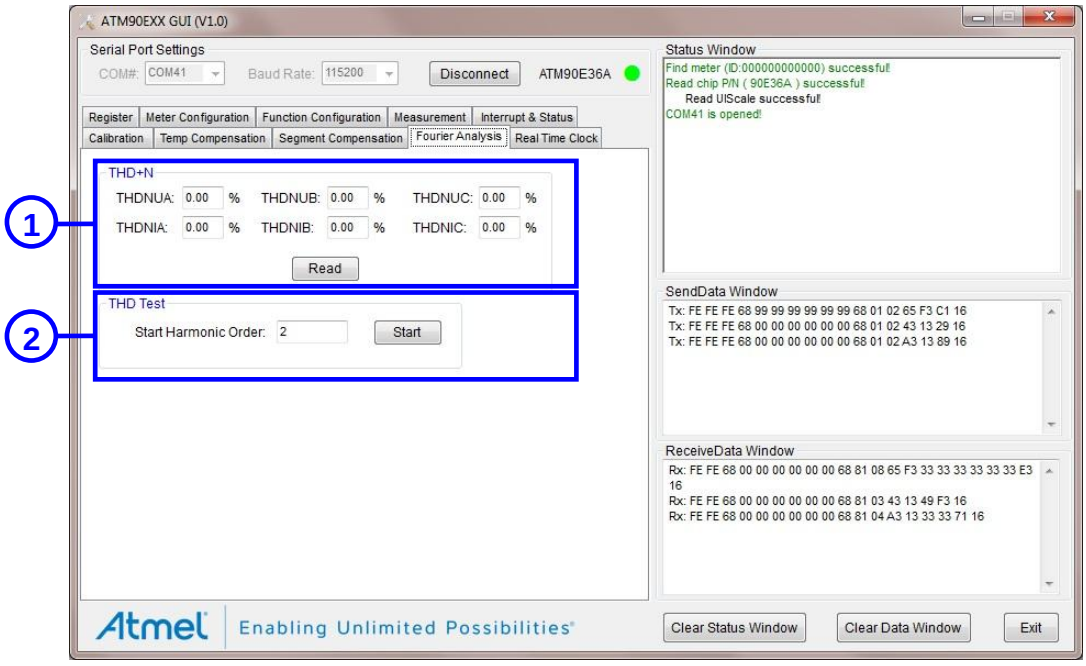

Figure 3-10 Fourier Analysis

【1】THD+N

- THDNUA: phase A voltage THD
- THDNIA: phase A current THD
- THDNUB: phase B voltage THD
- THDNIB: phase B current THD
- THDNUC: phase C voltage THD
- THDNIC: phase C current THD

Read: click to get values of the above parameters

【2】THD Test

Start Harmonic Order: the harmonic order to start with

Test: click to start test

3.11 Real Time Clock

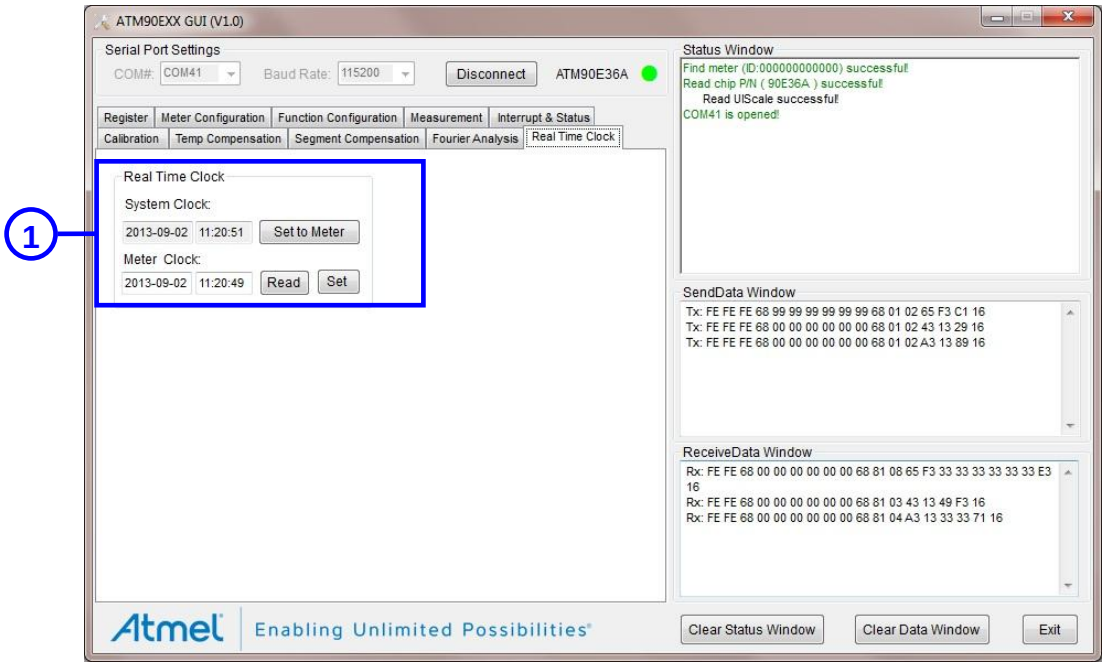

Figure 3-10 Real Time Clock

【1】Real Time Clock

- System Clock
  Set to Meter: click to set the meter clock with the system clock
- Meter Clock
  Read: click to read the meter clock
  Set: click to set the meter clock with the configured values

4. Revision History

Doc. Rev.	Date	Comments
1.0	09/09/2013	Initial release.

Atmel Corporation
1600 Technology Drive
San Jose, CA 95110
USA
Tel: (+1)(408) 441-0311
Fax: (+1)(408) 487-2600
www.atmel.com

Atmel Asia Limited
Unit 01-5 & 16, 19F
BEA Tower, Millennium City 5
418 Kwun Tong Road
Kwun Tong, Kowloon
HONG KONG
Tel: (+852) 2245-6100
Fax: (+852) 2722-1369

Atmel Munich GmbH
Business Campus
Parkring 4
D-85748 Garching b. Munich
GERMANY
Tel: (+49) 89-31970-0
Fax: (+49) 89-3194621

Atmel Japan G.K.
16F Shin-Osaki Kangyo Bldg.
1-6-4 Osaki, Shinagawa-ku
Tokyo 141-0032
JAPAN
Tel: (+81)(3) 6417-0300
Fax: (+81)(3) 6417-0370