TDINV3000W050B: 3000W SINGLE PHASE INVERTER EVALUATION BOARD

1 Overview

The design files, source code and even complete project for the TDINV3000W050B 3kW Single Phase Inverter kit can be found at https://www.transphormusa.com. The following instructions show how to build and load the firmware project to Microchip PIM control card on the computer or laptop in order to conduct an evaluation for TDINV3000W050B 3kW inverter EVB.



Figure 1. TDINV3000W050B 3kW Single Phase Inverter Evaluation Board

2 Hardware Tools

- TDINV3000W050B single-phase inverter assembly
- Microchip dsPIC33 plug in module card (MA330048)
- 12V power supply with U.S. adaptor
- MPLAB REAL IDE emulator system kit (DV244005)
- Microchip standard driver board (AC244001)
- RJ-11 modular cable
- Extension Pak with 6-pin header (AC164110)
- USB isolator
- USB-A cable

TDINV3000W050B Firmware Guide



Figure 2. Required Hardware Tools

We recommend using the MPLAB® REAL ICE or ICD4 In-Circuit Emulator (part number: DV164045). An overview of tools on related parts is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/. The MPLAB® REAL ICE or ICD4 User's Guide is available at https://www.microchip.com/development-tools/.

3 Installing Software

- a. Download the MPLAB® X IDE v5.25 (or higher) software from the <u>https://www.microchip.com/mplab/mplab-x-ide</u> and install it in computer or laptop
- b. Also, download the latest MPLAB XC16 compiler from the Microchip website at <u>https://www.microchip.com/en-us/tools-resources/develop/mplab-xc-compilers/downloads-documentation#XC16</u> for the IDE system to select a suitable set of compiler in order to work correctly
- c. Open the MPLAB® X IDE v5.25



d. And then open the Build Tool dialog in Tools / Options / Embedded / Build Tools and add XC16 compiler to the setup

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4 Loading Firmware

- a. Download the complete TDINV3000W050B firmware from the Transphorm or Microchip websites. Save the downloaded zipped folder to a local folder on computer or laptop
- b. Open the MPLAB® X IDE v5.25 operator interface
- c. On the projects window, right click and select 'Open Project'

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d. Navigate to the folder where TDINV3000W050B code is unzipped at and select project



e. The content of the firmware will now be shown on the Projects window. See below



5 Connection

a. Connect 12V auxiliary supply to TDTTP2500B066B EVB, but do not apply any input voltage to the inverter EVB yet. Both LED1 and LED2 on the inverter board are illuminated after connection



Figure 3. Red Illuminated LED1 and LED2 on EVB

b. Connect the Microchip driver board, RJ-11 cable and Extension Pak together first, and then connect them to the REAL IDE kit and Microchip MA330048 PIM card like the Figure 4 below



Figure 4. Microchip MA330048 PIM Connection

c. Verify LD1 on PIM card is blinking after making all necessary connections



Figure 5. Green Blinking LD1 on PIM



6 Building and Loading Code

After connecting the REAL ICE emulator kt to Microchip MA330048PIM control card, follow the steps below to build and load the code to dsPIC33 digital signal processors (DSP).

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a. Under 'Production' menu, select the 'Clean and Build Project' option or press shift + F11. See below

b. Verify completion of build, with no errors 'BUILD SUCCESSFUL (total time: 10S)' and 'Loading complete'

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c. Once the code has be built successfully, select the 'Make and Program Device' option to load the code to the Microchip dsPIC33 digital signal processors

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- e. Verify LD1 on MA330048 card is still illuminated green, and both LED1 and LED2 on the TDINV3000W050B EVB are also illuminated red still
- f. Remove connections from Microchip MA330048 PIM control card, and restart evaluation of TDINV3000W050B EVB using Transphorm's SuperGaN[™] and Microchip REALICE® technology