

TMC222 Evaluation Kit Manual

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1 Introduction

The TMC222 evaluation kit makes it possible to evaluate the features of the TMC222 stepper motor controller and driver chip. It contains the TMC222 evaluation board, which allows connecting the TMC222 chip to a power supply, a motor and an IIC master. The board is mainly intended for direct attachment to the Trinamic USB-to-X interface converter which allows easy interfacing the evaluation board to a PC running under Windows 98/2000/XP via the USB interface. An evaluation software running under Windows is also provided on the TechLibCD which is also supplied with the evaluation kit. This software allows easy evaluation of all the features provided by the TMC222 chip. The evaluation software needs the Trinamic USB-to-X interface converter to work.

This manual describes the evaluation board as well as the evaluation software. Please see also the USB-to-X manual for a description of the USB-to-X interface converter. You can find it in the "systems" directory of the TMC TechLib CD supplied with this evaluation kit or on the TRINAMIC web site (<http://www.trinamic.com>).

2 The TMC222 Evaluation Board

2.1 Overview

The evaluation board (Figure 1) mainly contains the TMC222 stepper motor controller and driver chip and some connectors that make it possible to connect the power supply, a stepper motor, a reference switch and an IIC master (mainly the USB-to-X interface converter).

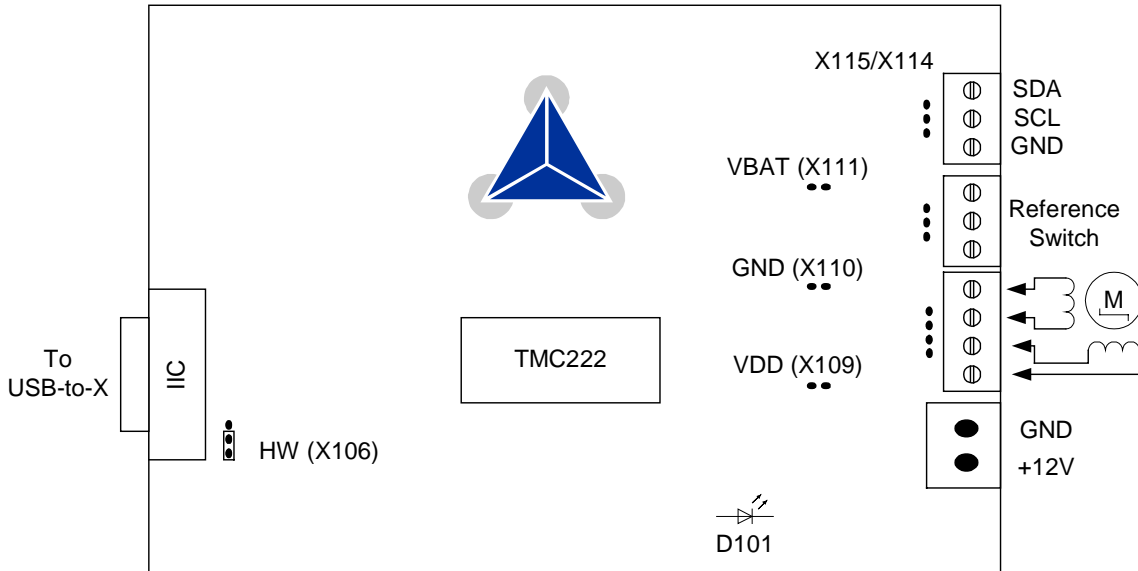


Figure 1: The TMC222 evaluation board (overview)

2.2 Connectors

The evaluation board is equipped with the following connectors:

- Power connector (X100): Connect your power supply here. The voltage must be between 12V and 29V DC. The board is protected against reverse polarity by a diode.
- USB-to-X connector (X101): This Sub-D connector is to be used to directly attach the board to the Trinamic USB-to-X interface converter. Just plug it on the appropriate Sub-D connector of the USB-to-X device. **Never connect this connector to an RS232 interface, as this could result in damage of the TMC222 chip!** The pinout of this connector is as follows: Pin 1: SCL, Pin 6: SDA, Pin 3: GND.
- Motor connector (X102/X103): Connect a 2-phase bipolar stepper motor (maximum coil current 800mA) here. Connect one coil to the pins marked "OA1" and "OA2" and the other coil to the connectors marked "OB1" and "OB2". You can either use the pins (X102) or the clamp (X103). **Do not connect or disconnect a motor while the evaluation board is powered, as this could damage the TMC222 chip!**
- Reference switch connector (X104/X105): A reference switch can be connected here, either between the pins "REF" and "GND" or between "REF" and "VBAT" (the functionality is the same, please see the TMC222 datasheet for details). Either the pins (X104) or the clamp (X105) can be used.
- IIC connector (X114/X115): If the board is not used with the USB-to-X interface converter, an IIC master can be connected here. The connector provides the SDA and SCL signal and a GND line. It can also be used to connect more than one evaluation board to one USB-to-X interface.
- VBAT connector (X111): This connector provides the supply voltage for measuring purposes (it is directly connected to the "+12V" pin of the power connector (X100)).
- GND connector (X110): This connector is connected to ground for measuring purposes.
- VDD connector (X109): This connector is connected to the 5V voltage regulator output of the TMC222 chip, to measure the 5V generated by the TMC222 chip.

- HW jumper (X106): This jumper is connected to the HW pin of the TMC222 chip and thus allows setting the hardwired address of the chip. For a first test with the evaluation software the jumper should be set so that it links the HW pin to GND.
- LED (D101): This LED is connected to the 5V output of the TMC222 and so it shows that the 5V regulator of the TMC222 chip is working.

3 The TMC222 Evaluation Software

A PC software to operate the TMC222 evaluation board is supplied on the TMC TechLibCD or can be downloaded at <http://www.trinamic.com>. It needs the Trinamic USB-to-X interface converter to function correctly. The program can be used with Windows 98, Windows 2000 and Windows XP (all versions of the Windows operating system that support USB). To install it, just copy the file "EVAL222USB.EXE" to the hard disk of your PC. To run the program, just double click the file.

Before running the program, install the Trinamic USB-to-X interface converter and attach the TMC222 evaluation board to it. Then, make sure that the evaluation board is supplied with power.

3.1 Using the software

After starting the software, its main window appears (Figure 2). First, select your USB-to-X interface converter in the "Interface" section (in most cases, you will have only one USB-to-X device) and click "Open". After the connection to the USB-to-X device has been made its firmware revision will be displayed in the "Interface" section. If something goes wrong an error message will appear.

In the "IIC" section of the window the IIC address of the TMC222 chip can be entered. You should normally start with address 0, as this is a broadcast to all TMC222 chips and thus always works, regardless of the address that is programmed into the TMC222. Only even addresses can be entered.

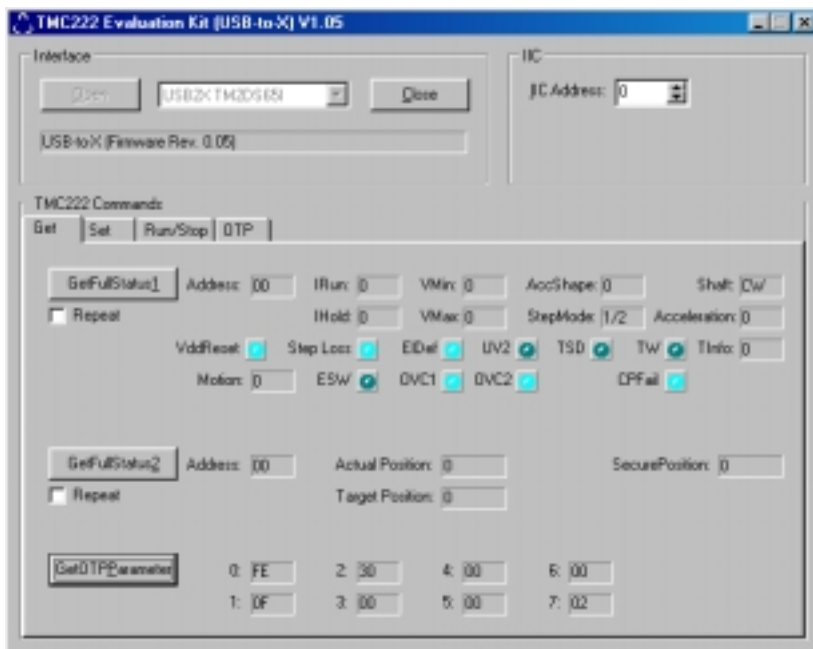


Figure 2: The TMC222 evaluation software

3.2 TMC222 commands

The "TMC222 Commands" section of the main window contains all TMC222 commands that can be sent to the evaluation board by clicking the appropriate button. The commands are organized in four groups:

- "Get": This page contains all commands that read back values from the TMC222 chip. After clicking one of the command buttons the result will be displayed beside the button. When the "Repeat" check box below the "GetFullStatus1" button is checked, the "GetFullStatus1" command will be issued every 10ms to get a continuous update of the data. The same thing is true for the "Repeat" check box below the "GetFullStatus2" command button.

- “Set”: This page contains the commands that set up parameters in the TMC222. First enter the necessary parameters in the input fields beside the button, then click the button. The command will then be sent to the TMC222 chip with the parameters you have entered.
- “Run/Stop”: This page contains motion commands. Just click the appropriate button to issue a command. The parameters of the “RunInit” command can be entered beside the “RunInit” button.
- “OTP”: This page contains the “SetOPT” command which is used to zap the OTP memory of the TMC222 chip. Enter the OTP memory address in the “OTPA” field and the value that shall be stored at that address in the “PBit” field. You can enter decimal numbers or hexadecimal numbers preceded by a “\$” sign or binary numbers preceded by a “%” sign. **Use this command only with extreme care, as zapping the OPT memory can not be reversed! Writing wrong values into the OTP memory may cause the TMC222 to cease working correctly.**