

UM12310

Hardware user manual for KIT6X02AF2T1

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User manual

Document information

| Information | Content |
|-------------|--|
| Keywords | BMA6402, BMA6002, TPL, KIT6X02AF2T1, evaluation, tool, CAN |
| Abstract | This user manual is for the KIT6402AF2T1. The purpose of the KIT6402AF2T1 is to build and interface from CAN to TPL. |



1 Introduction

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The purpose of the KIT6402AF2T1 is to build and interface from a controller area network (CAN) to a transport protocol link (TPL). CAN is a standard communication protocol of the industry that is heavily used in automotive applications, but has also applications in the industrial domain. TPL is the NXP proprietary communication protocol for battery management systems (BMS). The KIT6X02AF2T1 translates the CAN messages into TPL messages and vice versa. Due to this functionality, a standard CAN environment can establish communication with the NXP BMS devices (that is, BMA7118, BMA7418, BMA8420, or similar). Together with this additional device, the KIT6402AF2T1 allows rapid prototyping of the key functions of a BMS.

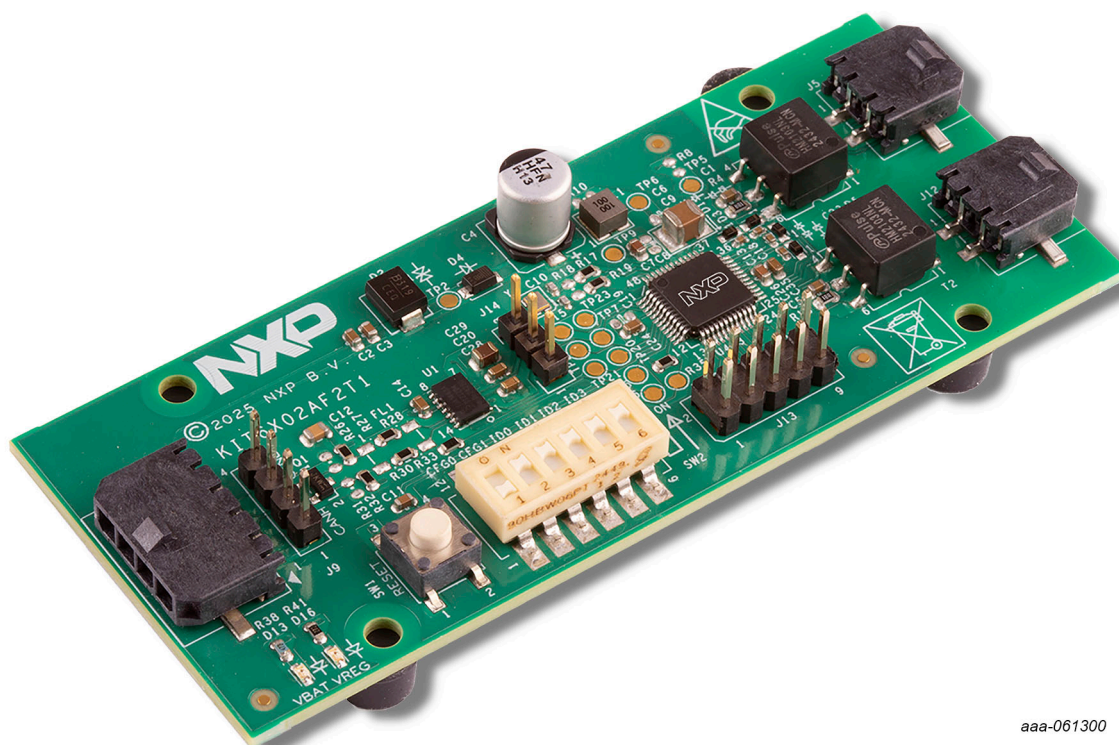
2 Finding kit resources and information on the NXP website

NXP Semiconductors provides online resources for this evaluation board and its supported device(s) on <https://www.nxp.com/>.

The information page for the KIT6x02AF2T1 evaluation board is at <https://www.nxp.com/KIT6X02AF2T1>. The information page provides overview information, documentation, software and tools, parametrics, ordering information and a getting started tab. The getting started tab provides quick-reference information applicable to using the KIT-PC2TPLEVB evaluation board, including the downloadable assets referenced in this document.

3 Getting ready

The purpose of the KIT6402AF2T1 is to build and interface from CAN to TPL. The KIT6402AF2T1 can be used in any regular CAN environment. It can also be used with NXP PC software (scripting GUI) such as battery management units (BMU): [RD-K344BMU](#), [RD-K358BMU](#), [RD-BESSK358BMU](#), and [S32K358BMU](#) to communicate via TPL to attached NXP devices (that is, BMA7118, BMA7418, BMA8420, or similar). To use the KIT with the NXP PC software, extra hardware is required.



aaa-061300

Figure 1. KIT6X02AF2T1 overview

This document guides the user through the process of using the [KIT6402AF2T1](#).

3.1 Kit contents

The KIT6402AF2T1 kit includes:

- KIT6402AF2T1 - CAN to electrical transport protocol link (ETPL) gateway board
- Cable for supply and CAN interface
- ETPL cable - two-wire twisted pair TPL cable (50 cm)

4 Getting to know the hardware

The purpose of the KIT6402AF2T1 is to allow a communication to NXP AFE boards (e.g. EVBMA7118 or EVBMA777T2).

4.1 Kit overview

Figure 2 is an overview of the KIT6402AP2T1.



Figure 2. KIT6402AF2T1 overview

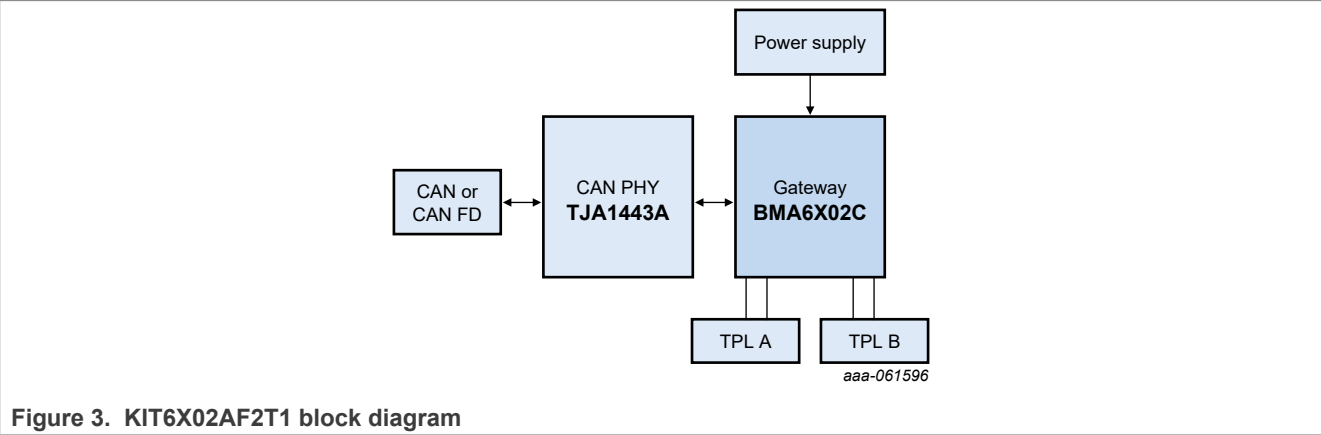
4.2 Board features

The main features of the KIT6X02AF2T1 are:

- Communication link from CAN to TPL and back
- CAN communication speeds up to 1 MHz for regular CAN, and for CAN-FD, up to 5 MHz
- Supply and mode control of the CAN physical layer interface via the integrated voltage regulator of the BMA6X02C
- Two galvanically isolated ETPL ports
- Supports the TPL3 protocol version
- Two status LEDs

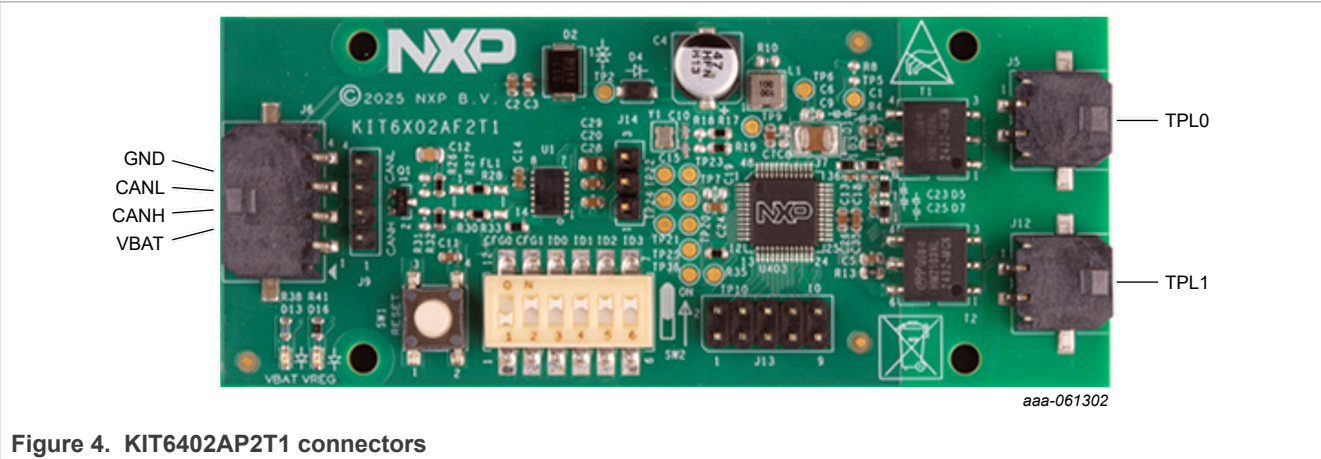
The KIT6X02AF2T1 serves as a hardware tool-supporting evaluation of ETPL devices via a CAN interface. Control of the CAN bus can be done with any CAN environment. If no specific environment is available, there is also a software solution from NXP available that allows the evaluation of a BMS system.

4.3 Block diagram



4.4 Connectors

The KIT6402AF2T1 has one connector for the supply and CAN communication, and two TPL ports.



Connector J6 connects the KIT6402AF2T1 to the supply and CAN cable.

Table 1. Interface - J5

| Pin number | Connection | Description |
|------------|------------|---|
| 1 | VBAT | Battery supply Apply a voltage from 6 V to 18 V for normal operation of the board. |
| 2 | CANH | CAN high-line |
| 3 | CANL | CAN low-line |
| 4 | GND | Supply ground |

Connectors J1 and J2 connects to the KIT6402AF2T1 TPL ports 0 and 1.

Table 2. TPL port 0 - J1

| Pin number | Connection | Description |
|------------|------------|-----------------------|
| 1 | TPL0_P | TPL port 0 (positive) |
| 2 | TPL0_N | TPL port 0 (negative) |

Table 3. TPL port 1 - J2

| Pin number | Connection | Description |
|------------|------------|-----------------------|
| 1 | TPL1_P | TPL port 1 (positive) |
| 2 | TPL1_N | TPL port 1 (negative) |

4.5 Switches

The KIT6X02AF2T1 has one bank of DIP switches and a reset button. Each of the components are shown in [Figure 5](#).

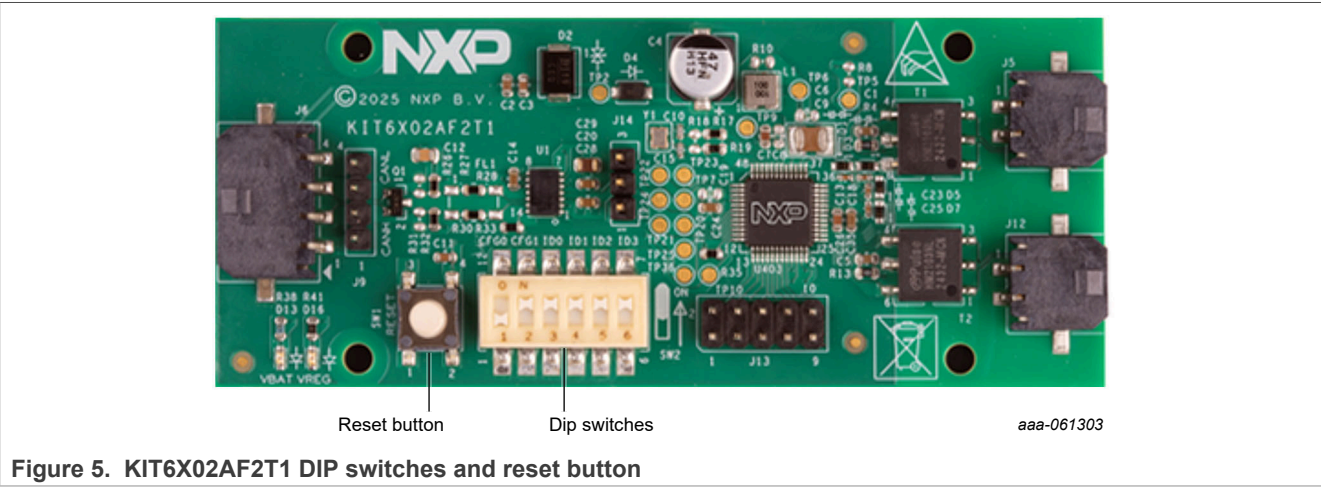


Figure 5. KIT6X02AF2T1 DIP switches and reset button

The reset button initiates a reset of the BMA6X02C on the board. The DIP switches (SW2) configure the CAN communication speed and the CAN-ID used for communication. See [Table 4](#) for details of the settings.

Note: Putting a switch in ON position means that the pin reads as LOW. Putting the switch downwards means that the pin reads as HIGH.

Table 4. DIP switches - J5

| Switch number | Function | Description |
|---------------|----------|---|
| 1 | CFG0 | CFG0 and CFG1 configure the initial data rate for the CAN communication. After power up, the speed of the CAN data speed can be configured. See the data sheet of the BMA6X02C for further details. |
| 2 | CFG1 | |
| 3 | ID0 | Pins ID0 to ID3 configure the CAN ID for the CAN communication. See the data sheet of the BMA6X02C for further details. |
| 4 | ID1 | |
| 5 | ID2 | |
| 6 | ID3 | |

Note: Check if switches are in the correct position before use.

4.6 Status LEDs

The KIT6402AF2T1 has two LEDs to indicate the supply status of the board. See [Table 5](#) for details.

Table 5. Status LEDs

| LED | Description |
|-----------|--|
| D13 - red | Active: Indicates the VBAT supply of the boards is present. |
| D16 - red | Active: Indicates the VREG supply of the boards is present. A 5 V supply will be generated by the BMA6x02C once VBAT is present. |

4.7 Debugging signals

The KIT6X02AF2T1 offers access to various debugging points to allow a fast evaluation of the product. The debugging points are shown in [Figure 6](#) .

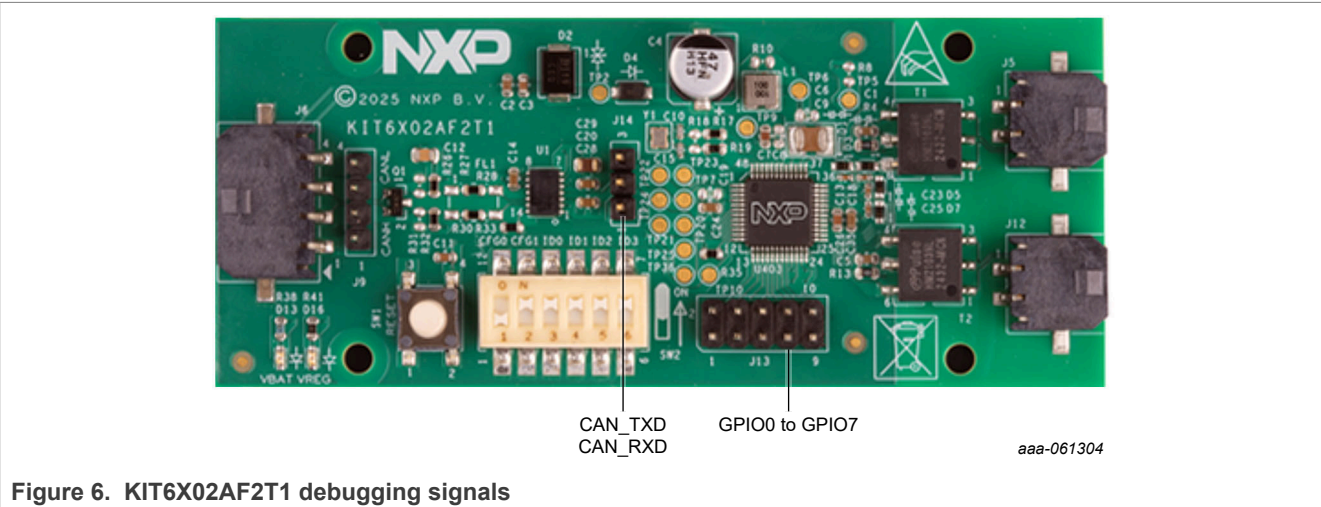


Figure 6. KIT6X02AF2T1 debugging signals

The CAN traffic can be monitored either on the CAN physical layer (J9), or on the digital pins (J14). See [Table 6](#) for details of the settings.

Table 6. CAN signals - J14

| Header number | Function | Description |
|---------------|----------|---------------------|
| 1 | GND | Ground as reference |
| 2 | CAN_TXD | CAN transmitt |
| 3 | CAN_RXD | CAN receive |

The BMA6X02C can route various status and sideband signals to the GPIO pins. These status signals can be useful for traffic monitoring and debugging. See the data sheet of the BMA6X02C for further details.

Table 7. GPIO pins - J13

| Header number | Function | Description |
|---------------|----------|------------------------------------|
| 1 | GND | Ground as reference |
| 2 | GND | Ground as reference |
| 3 | GPIO0 | General-purpose input output pin 0 |
| 4 | GPIO1 | General-purpose input output pin 1 |
| 5 | GPIO2 | General-purpose input output pin 2 |
| 6 | GPIO3 | General-purpose input output pin 3 |
| 7 | GPIO4 | General-purpose input output pin 4 |

Table 7. GPIO pins - J13...continued

| Header number | Function | Description |
|---------------|----------|------------------------------------|
| 8 | GPIO5 | General-purpose input output pin 5 |
| 9 | GPIO6 | General-purpose input output pin 6 |
| 10 | GPIO7 | General-purpose input output pin 7 |

5 Configuring the hardware

The KIT6X02AF2T1 has several configuration options. The most important ones are the CAN speed and CAN ID configuration of the BMA6X02C. This configuration can be changed with the switches on the board ([Section 4.5](#)).

5.1 Finding the kit resources

NXP Semiconductors provides online resources for this evaluation board and its supported devices on <https://www.nxp.com>. The information page for the BMA6X02 is <https://www.nxp.com/BMA6X02>. This page provides overview information, documentation, software and tools, parametrics, ordering information and a getting started tab.

5.1.1 Schematic, board layout, and bill of materials

The schematic, board layout and bill of materials for the KIT6X02AF2T1 evaluation board are available at <https://www.nxp.com/KIT6X02AF2T1>.

6 Revision history

| Document ID | Release date | Description |
|---------------|-------------------|------------------|
| UM12310 v.1.0 | 10 September 2025 | Initial version. |

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