ToGo Board Kit Guide

Rev. **

Table of Contents

1. Introduction

Thank you for your interest in the ToGo Board. The ToGo Board enables customers to evaluate and develop projects using several MCU device. The ToGo Board offers footprint-compatibility with Arduino™ Shields, 6-pin Digilent® Pmod™ Peripheral Modules, and mikroBUS™ boards. This kit features three LEDs, a push button switch, and USB-UART bridge functionality block, and a onboard EEPROM. This kit supports operating voltages of 3.3 V or 5 V. You will use the MCU relative IDE to develop and debug your MCU device projects.

1.1 Kit Contents

The ToGo Board contains the following, as shown in photo.

- ToGo Board
- USB Standard-A to Mini-B cable
- MCU module
- RF module
- Sensor module

1.2 Board Details

The ToGo Board consists of the following blocks, as shown in Table 1.

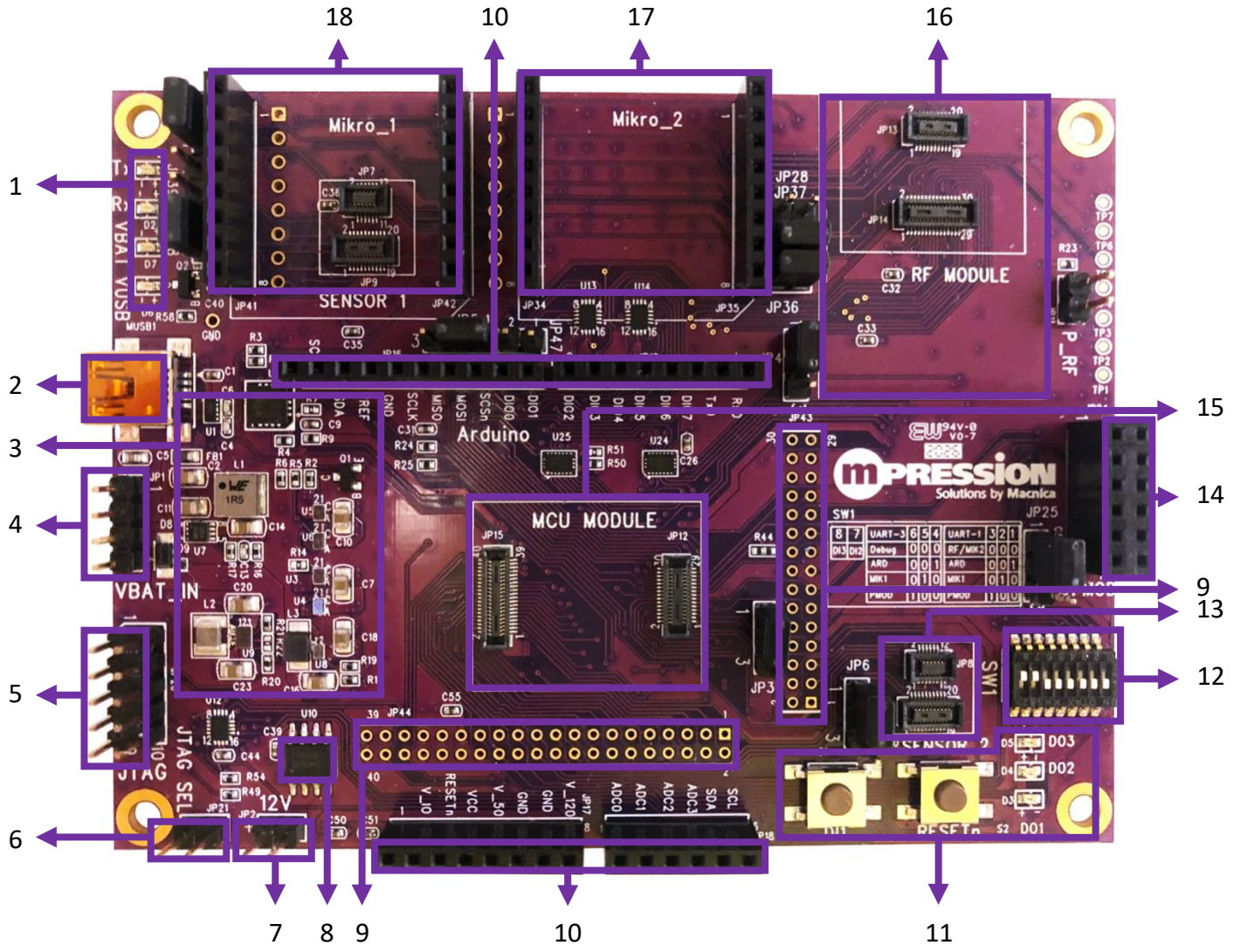

Table 1 ToGo Board blocks

1 Power and Status LED	10 Arduino Compatible Header
2 USB Connector	11 Reset Button, User Button and LEDs
3 System Power Supply and USB-UART Bridge	12 UART Switch
4 Battery Power Input	13 Sensor 2 Module Connector
5 Debug and Programming Interface	14 Pmod Bus Connector
6 Debug and Programming Interface Selector	15 MCU Module Connector
7 External 12V Power Input	16 RF Module Connector
8 On Board EEPROM	17 Mikro Bus 2 Module Connector
9 MCU Module Test Point	18 Sensor 1 Module/Mikro Bus 1 Module Connector

1.3 Power

The operation voltage of ToGo Board is 3.3V and 5V. There are two power sources for ToGo Board, mini-USB Vbus and battery input. Each power input has independent power regulator to provide the system operating power. The LEDs indicate the power source on the status LED (Table 1 item 1). The battery input is first priority power source, if USB and battery power connect to ToGo Board together, the system will automatic switch the power source to battery power input.

There are corresponding jumpers to switch each mpression module's power. Especially MCU module power, this power not only provide the MCU power but also UART, GPIO, EEPROM and etc… All of the module's power jumper definition is listing in Table 1-2.

Table 2 Power selection for mpression module

JP3	Open	No Power Supply for MCU Module
	Short Pin1 and Pin2	3.3V for MCU Module
	Short Pin2 and Pin3	VBAT for MCU Module
JP4	Open	No Power Supply for RF Module
	Short Pin1 and Pin2	3.3V for RF Module
	Short Pin2 and Pin3	VBAT for RF Module
JP5	Open	No Power Supply for Sensor 1 Module
	Short Pin1 and Pin2	3.3V for Sensor 1 Module
	Short Pin2 and Pin3	VBAT for Sensor 1 Module
JP6	Open	No Power Supply for Sensor 2 Module
	Short Pin1 and Pin2	3.3V for Sensor 2 Module
	Short Pin2 and Pin3	VBAT for Sensor 2 Module

Arduino shied 12V power source also can provide the system power, and there are a 0ohm resister to against the over current issue. The PMOD Bus module and Mikro Bus module power source can be power on with 3.3V and 5V as following jumper setting.

Table 3 Power selection for external module

JP25	Open	No Power Supply for PMOD Bus Module
	Short Pin1 and Pin2	3.3V for PMOD Bus Module
	Short Pin2 and Pin3	5V for PMOD Bus Module
JP36	Open	No 3.3V for Mikro Bus 2 Module
	Short Pin1 and Pin2	3.3V for Mikro Bus 2 Module
JP37	Open	No 5V for Mikro Bus 2 Module
	Short Pin1 and Pin2	5V for Mikro Bus 2 Module
JP38	Open	No 3.3V for Mikro Bus 1 Module
	Short Pin1 and Pin2	3.3V for Mikro Bus 1 Module
JP40	Open	No 5V for Mikro Bus 1 Module
	Short Pin1 and Pin2	5V for Mikro Bus 1 Module

1.4 Debug Resource

1.4.1 Debug/Programming Interface

ToGo Board provide a debug interface for MCU module and RF module, it can be switch by jumper. If the RF module need to change to programming mode, the JP11 should be short.

Table 4 Debug interface selection

JP21	Open	Debug for MCU Module
	Short Pin1 and Pin2	Debug for RF Module

1.4.2 USB-UART Bridge

The onboard USB-UART bridge can be routing by the UART switch and it provide a virtual COM port for ToGo Board. When we use the USB-UART bridge to communicate with host, the UART transmit and receive status will indicate on the status LED (Table 1 item 1).

1.4.3 MCU Module Test Point

JP43 and JP44 is MCU module test point (Table 1 item 9). All these test points are reflected to the MCU module pins, please make sure each pin's electric specification when testing or jump wire.

1.4.4 User Define Input / Output

ToGo Board provide 1 push button, 2 dip switches and 3 LEDs for user usage. This user define input / output are connect with Arduino Shield, it can be disable by remove onboard resistor if user want to remove these features.

Table 5 User define IO

DI1	Push Button	Enable by R106 Resistor	GPIO_ARD_0
DI2	DIP Switch Pin 7	Enable by R107 Resistor	GPIO_ARD_1
DI3	DIP Switch Pin 8	Enable by R109 Resistor	GPIO_ARD_2
DO1	LED D3	Enable by R111 Resistor	GPIO_ARD_3
DO2	LED D4	Enable by R113 Resistor	GPIO_ARD_4
DO3	LED D5	Enable by R115 Resistor	GPIO_ARD_5

1.4.5 UART Switch

ToGo Board provides a changeable UART routing switch to control the MCU module UART channel connection. The available changeable MCU UART channel is UART 1 and UART 3. The relative setup is as following table, it also prints on ToGo Board PCB.

Table 6 UART switch selection

SW1 Pin6, Pin5, Pin4	0, 0, 0(Default)	MCU UART 3 connect to USB-UART bridge.
	0, 0, 1	MCU UART 3 connect to Arduino shield.
	0, 1, 0	MCU UART 3 connect to Mikro Bus 1.
	1, 0, 0	MCU UART 3 connect to PMOD Bus.
SW1 Pin3, Pin2, Pin1	0, 0, 0(Default)	MCU UART 1 connect to RF/Mikro Bus 2.
	0, 0, 1	MCU UART 1 connect to Arduino shield.
	0, 1, 0	MCU UART 1 connect to Mikro Bus 1.
	1, 0, 0	MCU UART 1 connect to PMOD Bus.

1.4.6 Changeable External Interface Connection

ToGo Board provides a changeable IO routing switch to RF Module/Mikro Bus 2 and Arduino shield. It's useful when the MCU module cannot support enough IO.

Table 7 RF mpression module and Mikro bus selection

JP47	Open	MCU IO routing to RF Module/Mikro Bus 2
	Short Pin1 and Pin2	MCU IO routing to Arduino shield

1.4.7 Reset

Onboard reset button can be reset all the module on the ToGo Board. It's also provides a power on reset to make sure all of these modules which plug on ToGo Board has been reset.

1.5 Getting Started

This guide will help you be acquainted with the ToGo Board:

- The Installation chapter describes the installation of the kit software.
- The Kit Operation chapter describes the major features of the ToGo Board and functionalities such as programming, debugging, and the USB-UART bridge.
- The Appendix provides the detailed hardware description, method to use the onboard EEPROM, kit schematics, and the bill of materials (BOM).

1.6 Support Resources

ToGo Board provides a reference application code for each MCU module, please access to https://github.com/Macnica-Galaxy. For technical support contact window is as following.

Email address: Iot.galaxy@macnica.com
Tel: +886-2-8913-2200

1. Installation

This chapter describes the steps to install the software tools and packages on a PC for using the ToGo Board. This includes the IDE on which the projects will be built and used for programming.

2.1 Install USB-UART Driver

Visit https://www.ftdichip.com/Drivers/VCP.htm and download the VCP driver for your PC. Install the VCP driver on your PC. For the detail FTDI installation guide, please refer to https://www.ftdichip.com/Support/Documents/InstallGuides.htm

2.2 Install Software

ToGo Board provides many MCU modules. Thus, please download and install the relative integrated design environment (IDE). Table shows the MCU module's IDE link.

Table 8 IDE download link

Cypress PSoC 4200M Module	https://www.cypress.com/products/psoc-creator-integrated-design-environment-ide
Microchip SAML21 Module	https://www.microchip.com/mplab/mplab-x-ide
Renesas RL78 Module	https://www.renesas.com/tw/zh/products/software-tools/tools/ide/e2studio.html
Microchip PIC32 Module	https://www.microchip.com/mplab/mplab-x-ide
Dialog BLE5 Module	https://www.dialog-semiconductor.com/products/connectivity/bluetooth-low-energy/smartbond-da14585-and-da14586
ON Semi BLE5 Module	
Renesas RX65N Module	https://www.renesas.com/tw/zh/products/software-tools/tools/ide/e2studio.html

2. Kit Operation

This chapter introduces you to the ToGo Board features.

3.1 Programming and Debugging MCU Device

For MCU module programming and debugging with ToGo Board, the main debug interface is JP26. Table shows the pinout for JP26. Remember to power up the MCU module board and open the JP21.

Table 9 JP26 pin define

Pin1	MCU Module Power	Pin2	JTAG TMS/SWD DATA
Pin3	GND	Pin4	JTAG TCK/SWD CLK
Pin5	GND	Pin6	JTAG TDO
Pin7	MCU Reset	Pin8	JTAG TDI
Pin9	GND	Pin10	JTAG RSTn

3.1.1 Cypress MCU Module

Cypress MCU module programming and debugging tool is CY8CKIT-002, ToGo Board use the 5-pin connection to Cypress MCU Module. Table 10 shows the connection between ToGo Board and CY8CKIT-002 on JP21.

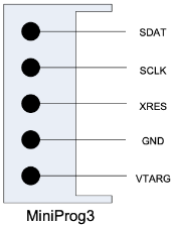

Table 10 Cypress programming and debugging connection

Pin1	VTARG	Pin2	SDAT
Pin3	GND	Pin4	SCLK
Pin5	-	Pin6	-
Pin7	-	Pin8	-
Pin9	-	Pin10	XRES

3.1.2 Microchip MCU Module

There are two types Microchip MCU module programming and debugging tool, PICKit3 and Atmel-ICE. PICKit3 is used on PIC series MCU, and Atmel-ICE is used on Atmel series MCU. Table 11 shows the connection between ToGo Board and PICKit3 on JP21.

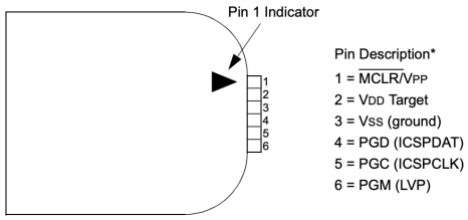

Table 11 Microchip PICKit3 programming and debugging connection

Pin1	VDD Target	Pin2	PGD(ICSPDAT)
Pin3	VSS(ground)	Pin4	PGC(ICSPCLK)
Pin5	-	Pin6	-
Pin7	-	Pin8	-
Pin9	-	Pin10	nMCLR/Vpp

Table 12 shows the connection between ToGo Board and Atmel-ICE on JP21.

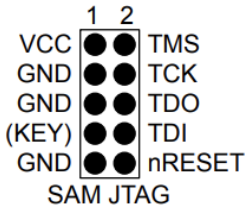

Table 12 Microchip Atmel-ICE programming and debugging connection

Pin1	VCC	Pin2	TMS
Pin3	GND	Pin4	TCK
Pin5	GND	Pin6	TDO
Pin7	-	Pin8	TDI
Pin9	GND	Pin10	nRESET

3.1.3 Renesas MCU Module

Renesas MCU module programming and debugging tool is E2 Emulator. Table shows the E2 Emulator pin out and connection between ToGo Board and E2 Emulator on JP21.

Pin No.	RL78/G10 Signal *1		Direction *2	Note
1	R.F.U	*5	—	
2	GND	*3	—	
3	R.F.U	*5	—	
4	RSTPU		Input	This pin is used to pull up the reset line.
5	TOOL0		I/O	This pin is used to transmit command/data to the target device.
6	RESET_IN		Output	This pin is used to input a reset signal from the user system.
7	R.F.U	*5	—	
8	VDD		—	
9	EMVDD	*6	—	
10	RESET_OUT	*4	Input	This pin is used to output a reset signal to the target device.
11	R.F.U	*5	—	
12	GND	*3	—	
13	RESET_OUT	*4	Input	This pin is used to output a reset signal to the target device.
14	GND	*3	—	

Pin1	VDD	Pin2	-
Pin3	GND	Pin4	-
Pin5	GND	Pin6	-
Pin7	-	Pin8	TOOL0
Pin9	GND	Pin10	RESET_OUT

3.1.4 Dialog BLE MCU Module

Dialog BLE MCU programming and debugging tool is use standard SEGGER J-Link, ToGo Board JP26 is a standard J-Link connector.

3.1.5 ON Semi BLE MCU Module

ON Semi BLE MCU programming and debugging tool is use standard SEGGER J-Link, ToGo Board JP26 is a standard J-Link connector.

3.2 USB-UART Bridge

The FTDI bridge on the ToGo Board can act as a USB-UART bridge. The UART lines between the MCU Module and the FTDI bridge are hard-wired on the board, with UART3 routing on ToGo Board UART switch. For more details on the ToGo Board switch functionality, refer to the 1.4.5 UART Switch. After installed the VCP driver and plug in ToGo Board, it will detect a victual com port on your PC.

3.3 mPression Module

There are 3 type mPression Module in ToGo Board platform, MCU Module, RF Module and Sensor Module. The connection between MCU Module and RF/Sensor Module will list in each MCU module's pin connection document. Please access to https://github.com/Macnica-Galaxy document for more detail.

3.4 External Module

There are 3 type external Module in ToGo Board platform, Pmod Bus, MikroBus and Arduino Shield. The connection between MCU Module and Pmod Bus/MikroBus/Arduino Shield Module will list in each MCU module's pin connection document. Please access to https://github.com/Macnica-Galaxy document for more detail.

Revision History

Document Title: ToGo Board Kit Guide

Revision	Issue Date	Description of Change
**	8/1/20	Initial version of the kit guide