flex

iENBL Breakout Board Documentation

v24

# Table of Contents

1 Summary

BooL are a break-out board for the iENBL 20-pin external connector.

The board will give you easy access to several communication pins, programming interfaces, an easy reset button and GPIO-pins with option to use as LEDs.

It is populated with two banana connector for supplying external power to the battery voltage rail - **WARNING: Do NOT connect a power supply to the banana sockets if a battery are connected!**
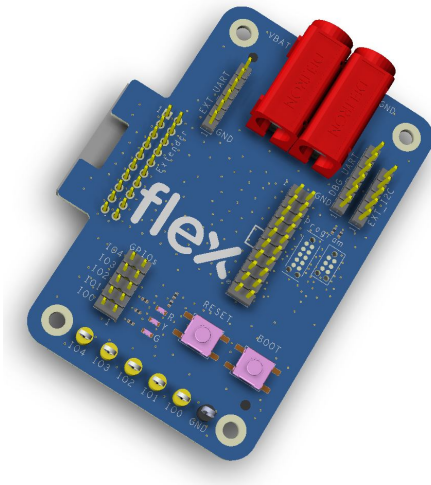
3D rendering of BooL C

1.1 Compatibility

- iENBL V1 A → BooL A
- iENBL V1 B → BooL A
- iENBL V1 C → BooL A
- iENBL V1 D → BooL B/C

- iENBL V2 A → BooL B/C
- iENBL V2 B → BooL B/C

1.2 Revision History and Issues

1.2.1 BooL A

First revision

1.2.1.1 Known Issues

N/A

1.2.2 BooL B

1.2.2.1 Changes

1.2.2.2 Known Issues

1.2.3 BooL C

1.2.3.1 Changes

Incorrect silkscreen names for the buttons fixed

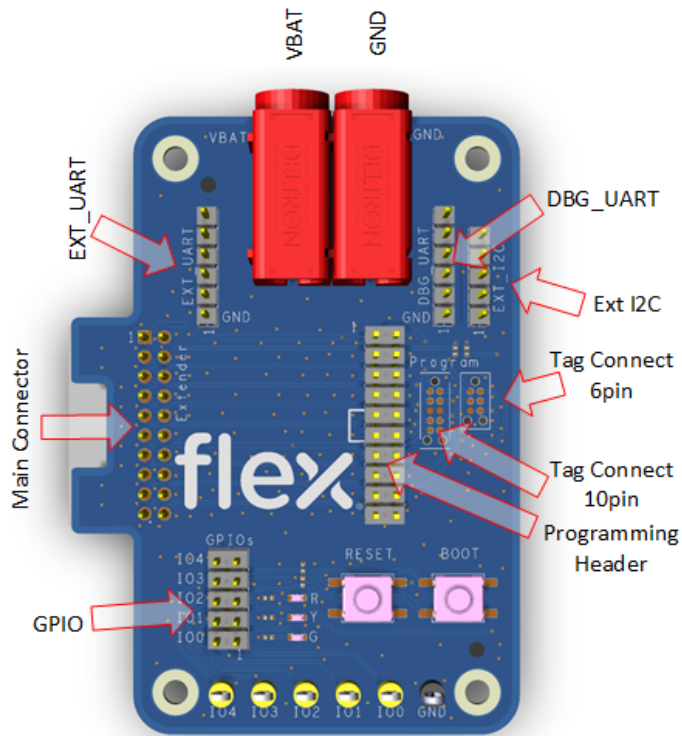10-pin Tag Connect footprint added

Silkscreen text added indicating the GND pins for the EXT_UART and DBG_UART connectors

1.2.3.2 Known Issues

UART pins on the 10-pin Tag Connect footprint only works for iENBL V1

2 Connectors

2.1 Placement

2.2 Main Connector

Shall be connected to the external 20 pin header of the iENBL. This connector has extra long pins that can be used as en extender to connect an extra add-on board.

2.2.1 iENBL V1

PIN	Name	Main Function	Alt. Function JTAG	Alt. Function SPI	Alt. Function SWPMI	Alt. Function SAI	Alt. Function ADC/Timer	Alt. Function Misc	MCU Pin
1	VDD_MAIN	VDD 3V3	VDD 3V3	VDD 3V3	VDD 3V3	VDD 3V3	VDD 3V3	VDD 3V3	3,3V
2	MCU_BOOT0	BOOT0						GPIO	PH3
3	EXT_I2C_SDA	I2C3_SDA	NJTRST	SPI1/3_MISO		SAI1_MCLK_B	TIM3_CH1	GPIO	PB4
4	EXT_I2C_SCL	I2C3_SCL					ADC123_IN1	GPIO	PC0
5	DBG_UART_RX	USART2_RX	JTDI	SPI1/3_NSS	SWPMI1_SUSPEND		TIM2_CH1	GPIO	PA15
6	GND	GND	GND	GND	GND	GND	GND	GND	GND
7	MCU_SWDIO/ JTMS	JTMS/SWDIO	JTMS/SWDIO		SWPMI1_TX	SAI1_SD_B		IR_OUT / GPIO	PA13
8	GND	GND	GND	GND	GND	GND	GND	GND	GND

9	MCU_SWCLK/ JTCK	JTCK/SWCLK	JTCK/SWCLK		SWPMI1_RX	SAI1_FS_B		GPIO	PA14
10	GND	GND	GND	GND	GND	GND	GND	GND	GND
11	VBAT	VBAT	VBAT	VBAT	VBAT	VBAT	VBAT	VBAT	BAT
12	EXT_UART_TX	UART4_TX		SPI3_SCK				GPIO	PC10
13	MCU_SWO/ JTDO	JTDO/ TRACESWO	JTDO/ TRACESWO	SPI1/3_SCK		SAI1_SCK_B	TIM2_CH2	GPIO	PB3
14	EXT_UART_RX	UART4_RX		SPI3_MISO				GPIO	PC11
15	MCU_nRST	MCU RESET	MCU RESET	MCU RESET	MCU RESET	MCU RESET	MCU RESET	MCU RESET	NRST
16	EXT_GPIO2	GPIO			SWPMI1_IO		TIM1_CH1	MCO	PA8
17	DBG_UART_TX	USART2_TX						GPIO	PD5
18	EXT_GPIO1	GPIO			SWPMI1_TX			CAN2_TX	PB13
19	EXT_GPIO3	GPIO				SAI1_SD_A	ADC123_IN4		PC3
20	EXT_GPIO0	GPIO		SPI1/3_MOSI		SAI1_SD_B	TIM3_CH2	CAN2_RX	PB5

2.2.2 iENBL V2

PIN	Name	Functions					MCU Pin	Domain
1	VDD_MAIN	VDD 1V8						1,8V
2	MCU_BOOT0	BOOT0					PH3	1,8V
3	EXT_I2C_SDA	I2C1_SDA					PG13	3.3V
4	EXT_I2C_SCL	I2C1_SCL					PG14	3.3V
5	CELL_DBG_UART_RX							CELL
6	GND	GND					GND	GND
7	MCU_SWDIO/JTMS	JTMS/SWDIO		IR_OUT	SWPMI1_TX	SAI1_SD_B	PA13	1.8V
8	GND	GND					GND	GND
9	MCU_SWCLK/JTCK	JTCK/SWCLK			SWPMI1_RX	SAI1_FS_B	PA14	1.8V
10	GND	GND					GND	GND
11	VDD_SYS	VDD BAT					BAT	BAT

12	EXT_UART_TX	I2C3_SCL	LPUART1_TX			SAI1_MCLK_A	PG7	3.3V
13	MCU_SWO/JTDO	JTDO/TRACESWO		SPI1/3_SCK		SAI1_SCK_B	PB3	1.8V
14	EXT_UART_RX	I2C3_SDA	LPUART1_RX				PG8	3.3V
15	MCU_nRST	MCU RESET					NRST	1.8V
16	EXT_GPIO2			SPI1_MOSI		SAI2_MCLK_B	PG4	3.3V
17	CELL_DBG_UART_TX							CELL
18	EXT_GPIO1			SPI1_SCK		SAI2_SCK_B	PG2	3.3V
19	EXT_GPIO3		LPUART1_CTS	SPI1_NSS		SAI2_SD_B	PG5	3.3V
20	EXT_GPIO0			SPI1_MISO		SAI2_FS_B	PG3	3.3V

2.3 EXT_I2C

5 pin header in the upper right corner. There are mounted 1.1K pull-up resistors on the SDA and SCL pins. To use this connector as I2C you need to place a jumper on GPIO3 and set the EXT_GPIO3 Pin high (will supply the pull-ups with 3.3V).

Pin no.	1	2	3	4	5
Signal Name	NC	3V3	EXT_I2C_SDA	GND	EXT_I2C_SCL

2.4 DBG_UART - For iENBL V1

6-pin header containing the Debug UART for iENBL V1.

Pin no.	1	2	3	4	5	6
Signal name	GND	NC	NC	DBG_UART_RX	DBG_UART_TX	NC

2.5 EXT_UART - For iENBL V2

6-pin header containing the Debug UART for iENBL V2.

Pin no.	1	2	3	4	5	6
Signal name	GND	NC	NC	EXT_UART_RX	EXT_UART_TX	NC

2.6 Tag Connect 6-pin

Pin no.	1	2	3	4	5	6
Signal name	VDD_MAIN	MCU_SWCLK	MCU_nRST	MCU_SWO	GND	MCU_SWDIO

2.7 Tag Connect 10-pin

Pin no.	1	2	3	4	5	6	7	8	9	10
Signal name	VDD_MAIN	MCU_SWDIO	GND	MCU_SWCLK	VBAT	MCU_SWO	DBG_UART_TX	GND	DBG_UART_RX	MCU_nRST

2.8 20-pin Programming Header

	J-Link		ST-LINK/V2		BooL 20p Programmer	
PIN	**JTAG**	**SWD**	**JTAG**	**SWD**	**PIN**	**Name**
1	MCU VDD	MCU VDD	MCU VDD	MCU VDD	1	VDD_MAIN
2	NC	NC	MCU VDD	MCU VDD	2	N/C
3	nTRST	NC	JNTRST	GND*	3	nTRST / EXT_I2C_SDA
4	GND	GND	GND	GND	4	GND
5	TDI	NC/VCOM_TX	JTDI	GND*	5	JTDI/ DBG_UART_RX
6	GND	GND	GND	GND	6	GND
7	TMS	SWDIO	JTMS	SWDIO	7	MCU_SWDIO/JTMS

8	GND	GND	GND	GND	8	GND
9	TCK	SWCLK	JTCK	SWCLK	9	MCU_SWCLK/JTCK
10	GND	GND	GND	GND	10	GND
11	RTCK/GND	NC	NC	NC	11	GND
12	GND	GND	GND	GND	12	GND
13	TDO	SWO	JTDO	TRACESWO	13	MCU_SWO/JTDO
14	GND	GND	GND	GND	14	GND
15	NRST	NRST	NRST	NRST	15	MCU_nRST
16	GND	GND	GND	GND	16	GND
17	NC/DBGRQ	NC/VCOM_RX	NC	NC	17	DBG_UART_TX
18	GND	GND	GND	GND	18	GND
19	VDD_5V	VDD_5V	VDD_3V3	VDD_3V3	19	N/C
20	GND	GND	GND	GND	20	GND

2.9 GPIO 10-pin header

Header to access GPIO0-4. If jumpers is added here, additional functionality will be added.

Pin no.	1	2	3	4	5	6	7	8	9	10
Signal name	LED_GREEN	EXT_GPIO0	LED_YELLOW	EXT_GPIO1	LED_RED	EXT_GPIO2	I2C_PULL	EXT_GPIO3	BUTTON_BOOT	MCU_BOOT0

2.10 Banana Sockets

2.10.1 Red

VBAT, connect 3.3-4.2 V power supply here. **WARNING: Do NOT connect a power supply to the banana sockets if a battery are connected!**

2.10.2 Black

GND

2.11 Miscellaneous

2.11.1 Reset button

Connected to the MCU reset pin. Will trigger hardware reset when pressed down.

2.11.2 Boot button

Connected to the MCU BOOT0 pin. If pressed down in combination with the reset button, the MCU will go into bootloader mode. Jumper needs to be added on GPIO4 to enable this functionality.

2.11.3 LEDs

Red/Yellow/Green LEDs, GPIO0/1/2 jumpers needs to be added to enable this functionality.

2.11.4 Hook test points

Connected to IO0-4 and GND respectively,