

Figure 1: FLEX Demo Daughter Board

ZigBee Connector [CON3 + CON4]			
CON3		CON4	
Pin 1	+3.3V	Pin 1	GND
Pin 2	C2RX	Pin 2	CSDI
Pin 3	CN20	Pin 3	SPI _{SS}
Pin 4	SPI _{DO}	Pin 4	SPI _{DI}
Pin 5	SPI _{CL}	Pin 5	C2TX
Pin 6	CN19	Pin 6	CN21

Socket for EEPROM [U3]

Pin 1	VDD (+3.3V/+5V)	Pin 2	GND
Pin 3	GND	Pin 4	GND
Pin 5	SCL	Pin 6	GND
Pin 7	SDA	Pin 8	GND

CAN Connector [MORS2]

Pin 1	O_CAN+
Pin 2	O_CAN-
Pin 3	GND

AUX Connector [CON8]

Pin 1	RB13 (AN13)	Pin 2	RB12 (AN12)
Pin 3	RA1	Pin 4	RD14 (U1CTS)
Pin 5	DSP _{MCLR}	Pin 6	RG9 (CN11)
Pin 7	RA0	Pin 8	RF3 (U1TX)
Pin 9	RF2 (U1RX)	Pin 10	RB3 (AN3)
Pin 11	RC14 (CN0)	Pin 12	RC4 (AN19)
Pin 13	+AV DD _{ext}	Pin 14	RA10 (V _{REF+})
Pin 15	RA9 (V _{REF-})	Pin 16	RA5
Pin 17	RA4	Pin 18	+5V
Pin 19	+3.3V	Pin 20	GND

Note: This connector contains some spare pins which were unused in the board

**UART Connector [MORS1]**

Pin 1	CTS (232/TTL) / TX+ (422)
Pin 2	RX (232/TTL) / TX- (422) / 485- (485)
Pin 3	TX (232/TTL) / RX+ (422) / 485+ (485)
Pin 4	RTS (232/TTL) / RX- (422)
Pin 5	GND

I2C/LEGO Mindstrom NXT Connector [CON15]

Pin 1	-
Pin 2	GND (connected to DL3)
Pin 3	GND (connected to DL3 through a resistor)
Pin 4	LEGO_I2C_Enable (+5V)
Pin 5	LEGO_I2C_SCL
Pin 6	LEGO_I2C_SDA

LEDs

DL1 (<i>yellow</i>)	RD2
DL2 (<i>yellow</i>)	RD0
DL3 (<i>green</i>)	I2C bus powered on CON15

Push Btns.	pin	pos. 1-2 (normal)	pos. 3-4 (pressed)
PULS1	RD11	+3.3V	GND
PULS2	RD9	+3.3V	GND

DIP Switches [DP1]

No.	Pin	ON	OFF
1	RE7	+3.3V	GND
2	RE6	+3.3V	GND
3	RE5	+3.3V	GND
4	RG13	+3.3V	GND
5	RA7	+3.3V	GND
6	RG14	+3.3V	GND
7	RD4	+3.3V	GND
8	RD1	+3.3V	GND

Note: Default positions are indicated with grey background

Standard Connectors for Piggybacking

- 64 pin [CON2] (refer CON6 of FLEX Base Board)
- 40 pin [CON5] (refer CON5 of FLEX Base Board)
- 16 pin [CON1] (refer CON3 of FLEX Base Board)

Plug-ins:

- CON21, CON17 and CON16 are plug-in specific:
 - Configuration A: with Servo motors
 - Configuration B: with DC motors
- CON24, CON25, CON27, CON18, CON22 and CON23 receive outputs depending on the plug-in mounted on CON21, CON16 and CON17
- CON24, CON25, CON27 and CON18 are connected to CON17
- CON22 and CON23 are connected to CON16

**Motor 1 Connector [CON24]**

	Configuration A: Servo motors	Configuration B: DC motors
Pin 1	Servo PWM command connected to RD7_PIN84	-
Pin 2	PWR SERVO	DC Motor 1A
Pin 3	GND _{OUT}	DC Motor 1B

Motor 2 Connector [CON25]

	Configuration A: Servo motors	Configuration B: DC motors
Pin 1	Servo PWM command connected to RD6_PIN83	-
Pin 2	PWR SERVO	DC Motor 2A
Pin 3	GND _{OUT}	DC Motor 2B

Touchscreen Connector [CON27]

	Configuration A: Servo motors	Configuration B: DC motors
Pin 1	Touchscreen Left	GND _{OUT}
Pin 2	Touchscreen Top	Analog potentiometer 1 or index for the encoder (connected to RB9_PIN33/AN9)
Pin 3	Touchscreen Right	Analog potentiometer 2 or index for the encoder (connected to RB15_PIN44/AN15)
Pin 4	Touchscreen Bottom	GND _{OUT}

Analog I/P Connector [CON18]

	Configuration A: Servo motors	Configuration B: DC motors
Pin 1	-	V _{OUT}
Pin 2	-	GND _{OUT}

Encoder 1 Connector [CON22]

	Configuration A: Servo motors	Configuration B: DC motors
Pin 1	-	GND _{OUT}
Pin 2	-	+V _{ENC2}
Pin 3	-	ENC _{A2} connected to RB11_PIN35/AN11
Pin 4	-	ENC _{B2} connected to RD8_PIN68/IC1

Encoder 1 Connector [CON23]

	Configuration A: Servo motors	Configuration B: DC motors
Pin 1	-	GND _{OUT}
Pin 2	-	+V _{ENC1}
Pin 3	-	ENC _{A1} connected to the dsPIC Quadrature Encoder
Pin 4	-	ENC _{B1} connected to the dsPIC Quadrature Encoder

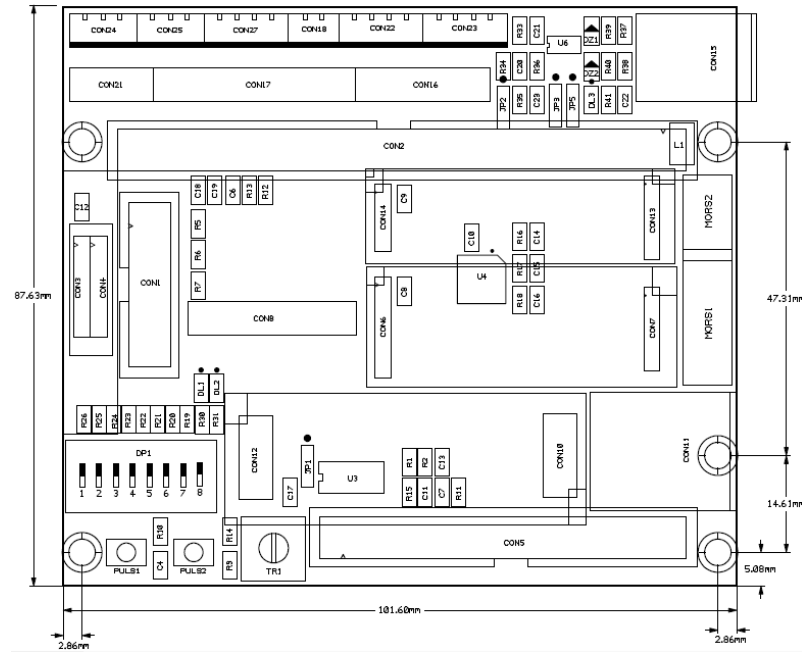


Figure 2: FLEX Demo2 Daughter Board Dimensions

Servo Motor Plug-in (for Configuration A)

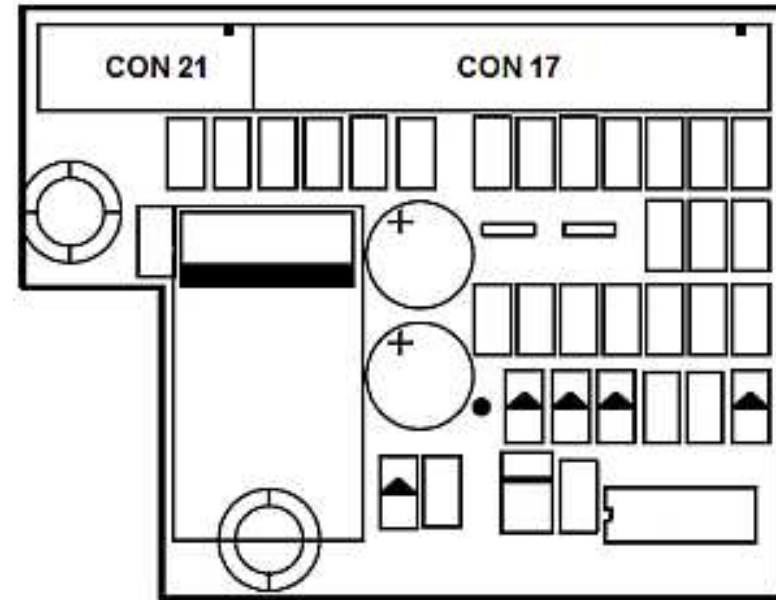


Figure 3: Servo Motors Plug-in

Refer the following technical data sheets for additional modules:

- FLEX102: FLEX Multibus Ethernet Module
- FLEX103: FLEX Multibus RS232 Module
- FLEX104: FLEX Multibus RS485 Module
- FLEX106: FLEX Multibus CAN Module

Power Connector [CON21]			
Pin 1	+5V	Pin 2	+5V
Pin 3	+3.3V	Pin 4	+3.3V
Pin 5	GND	Pin 6	GND
Pin 7	+V _{OUT}	Pin 8	+V _{OUT}
Pin 9	GND _{OUT}	Pin 10	GND _{OUT}

Servo/Touchscreen Connector [CON17]			
Pin 1	-	Pin 2	-
Pin 3	-	Pin 4	EN _A
Pin 5	LEFT	Pin 6	EN _B
Pin 7	TOP	Pin 8	EN _C
Pin 9	RIGHT	Pin 10	ADC _{BOTTOM}
Pin 11	BOTTOM	Pin 12	ADC _{RIGHT}
Pin 13	MC ₂	Pin 14	PWR SERVO2
Pin 15	PWR SERVO	Pin 16	PWR SERVO
Pin 17	GND _{OUT}	Pin 18	GND _{OUT}
Pin 19	MC ₁	Pin 20	PWR SERVO1
Pin 21	PWR SERVO	Pin 22	PWR SERVO
Pin 23	GND _{OUT}	Pin 24	GND _{OUT}

Other information on Servo plug-in

Servos: 2 nos.

Max current: 1500mA

Max voltage: 36V in input (5.6V in output)

FLEX Pins:

- OC8 used for servo1 on CON24 (servo 1)
- OC7 used for servo2 on CON25 (servo 2)
- Touch screen on CON27 connected to Flex pins- AN9, AN15, RE1, RE2 and RE3

DC Motor Plug-in (for Configuration B)

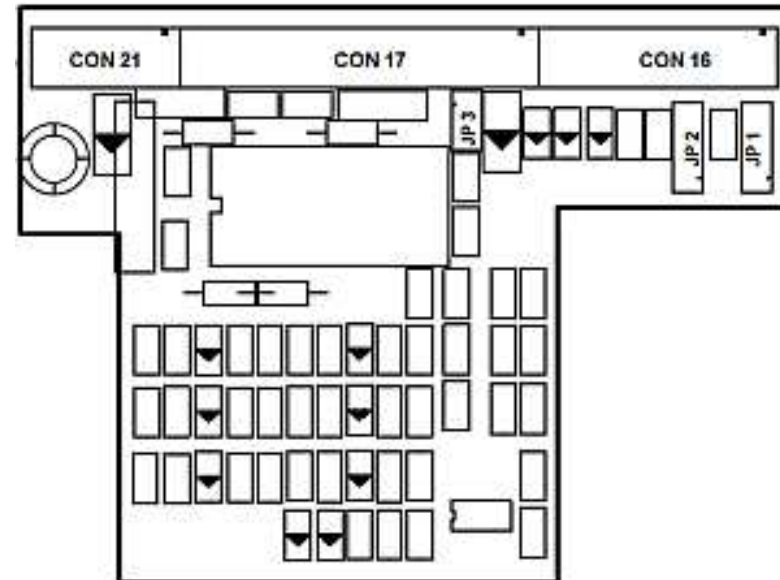


Figure 4: DC Motors Plug-in

Jumper	pos. 1-2	pos. 2-3
V _{ENC1} [JP1]	+V _{OUT}	+5V
V _{ENC2} [JP2]	+V _{OUT}	+5V
Con17-V _{IN2} [JP3]	+V _{IN2}	-

Note: Default jumper settings are indicated with grey background

DC Motor-1 Connector [CON16]

Pin 1	GND _{OUT}	Pin 2	QE _{A1}
Pin 3	+V _{ENC1}	Pin 4	QE _{B1}
Pin 5	ENC _{A1}	Pin 6	ADC _{VOU} T
Pin 7	ENC _{B1}	Pin 8	QE _{A2}
Pin 9	GND _{OUT}	Pin 10	QE _{B2}
Pin 11	+V _{ENC2}	Pin 12	QE _{B1}
Pin 13	ENC _{A2}	Pin 14	FAULT
Pin 15	ENC _{B2}	Pin 16	ADC _{CUR}

DC Motor-2 Connector [CON17]

Pin 1	+V _{IN2}	Pin 2	PWM_L _{M1}
Pin 3	GND _{OUT}	Pin 4	PWM_H _{M1}
Pin 5	ENC _{B4}	Pin 6	PWM_L _{M2}
Pin 7	GND _{OUT}	Pin 8	PWM_H _{M2}
Pin 9	ENC _{B3}	Pin 10	QE _{B4}
Pin 11	GND _{OUT}	Pin 12	QE _{B3}
Pin 13	-	Pin 14	EN _{M2}
Pin 15	M2 _A	Pin 16	-
Pin 17	M2 _B	Pin 18	-
Pin 19	-	Pin 20	EN _{M1}
Pin 21	M1 _A	Pin 22	-
Pin 23	M1 _B	Pin 24	-

Power Connector [CON21]

Pin 1	+5V	Pin 2	+5V
Pin 3	+3.3V	Pin 4	+3.3V
Pin 5	GND	Pin 6	GND
Pin 7	+V _{IN1}	Pin 8	+V _{IN1}
Pin 9	GND _{OUT}	Pin 10	GND _{OUT}

Other information on DC-motor plug-in

PWM channels: 2 nos.

Max current: 600mA per channel (total max current: 1200mA)

Max voltage: 36V

FLEX Pins:

- PWM1L-PWM1H on CON24 (channel 1)
- PWM2L-PWM2H on CON25 (channel 2)
- Encoder 1 on CON23 connected to QE1
- Encoder 2 on CON22 connected to pins AN11-IC1
- Potentiometer 1 on CON27 connected to pin AN15
- Potentiometer 2 on CON27 connected to pin AN9