Quick Start Guide

TWR-IND-IO

Industrial I/O Module

freescale™

TOWER SYSTEM

Get to Know the TWR-IND-IO

TWR-IND-IO
Freescale Tower System

The TWR-IND-IO module is part of the Freescale Tower System, a modular development platform that enables rapid prototyping and tool re-use through reconfigurable hardware. Take your design to the next level and begin prototyping with your Tower System today.

TWR-IND-IO Features

- USB to Serial Ready Play solution, providing serial connectivity via USB
- RS-232 transceiver with available flow control signaling
- RS-485 transceiver with optional isolation and PROFIBUS capability
- Dual CAN transceivers
- Analog signals accessible via screw terminals: 3x ADC, 1x DAC, VDDA, VSSA
- Digital signals accessible via LEDs and thru-hole points: 6x PWM, 3x timer
- Signal jumpers to allow isolation, probing and remapping of interfaces
- Compatible with the TWR-SER to provide access to additional industrial I/O interfaces

Step-by-Step Installation Instructions

1 Configure Jumpers

Configure the TWR-IND-IO jumpers to align with the intended Tower System controller module. Be aware that not all controller modules will provide access to all features available on the TWR-IND-IO. Refer to the Jumper Table in this document for reference and the user manual for additional details regarding the flexibility of this module.

2 Ensure Compatibility

Each interface featured on the TWR-IND-IO is capable of being isolated from the Tower System. To maintain the best compatibility with additional Tower peripheral modules it is recommended that any unused interfaces be isolated.

3 Assemble Your Tower System

Assemble your Tower System, including a Tower System controller module, the TWR-IND-IO peripheral module, and the TWR-ELEV elevator modules. Refer to the assembly instructions provided with the TWR-ELEV modules for correct orientation and assembly of boards. NOTE: The TWR-IND-IO module is intended to be compatible with the TWR-SER serial module, thus expanding the number of available interfaces.

4 Refer to Additional Materials

Many existing MQX™ example projects can be adapted to utilize the respective I/O interfaces on the TWR-IND-IO by modifying the “user_config.h” file and recompiling the MQX BSP. Refer to the TWR-IND-IO user manual and the latest MQX release notes for details. Refer to the TWR-IND-IO page on **freescale.com/Tower** for additional information and example application projects for select Tower System controller modules.

TWR-IND-IO Jumper Options

The following is a list of all jumper options. The default installed jumper settings are shown in white text within the black boxes.

Jumper	Option	Setting	Description
J3	LED Enable for Digital Signal Block A (3x PWM)	1-2	Provides power to the associated LEDs, remove to isolate PWM signals or to use JP1 - JP3
J4	LED Enable for Digital Signal Block B (3x PWM)	1-2	Provides power to the associated LEDs, remove to isolate PWM signals or to use JP4 - JP6
J5	LED Enable for Digital Signal Block C (3x Timer)	1-2	Provides power to the associated LEDs, remove to isolate timer signals or to use JP7 - JP9
J6	Voltage I/O selection	1-2	5V interface between MCU and transceivers
		2-3	3.3V interface between MCU and transceivers
J7	USB2SER RTS/CTS	1-2	Provides a loopback of RTS/CTS, remove to allow access to RTS and CTS
J9	USB2SER TX/RX	1-2	Connects UART0 TX to USB2SER RX. Pin 1 - UART0 TX, Pin 2 - USB2SER RX
		3-4	Connects UART0 RX to USB2SER TX. Pin 3 - UART0 RX, Pin 4 - USB2SER TX
J13	CAN1 Termination Enable	1-2	Enables 121 Ohm termination between CANH and CANL
J14	CAN2 Termination Enable	1-2	Enables 121 Ohm termination between CANH and CANL
J15	CAN Isolation Jumpers	1-2	Connects CAN1_TX to TXD on CAN transceiver associated with J11
		3-4	Connects CAN1_RX to RXD on CAN transceiver associated with J11
		5-6	Connects CAN1_TX to TXD on CAN transceiver associated with J12
		7-8	Connects CAN1_RX to RXD on CAN transceiver associated with J12

TWR-IND-IO Jumper Options continued

The following is a list of all jumper options. The default installed jumper settings are shown in white text within the black boxes.

Jumper	Option	Setting	Description
J16	UART3 Isolation/Access Jumpers	1-2	Connects UART3_TX to T1IN on RS-232 transceiver associated with J17
		3-4	Connects UART3_RX to R1OUT on RS-232 transceiver associated with J17
		5-6	Connects UART3_RTS to T2IN on RS-232 transceiver associated with J17
		7-8	Connects UART3_CTS to R2OUT on RS-232 transceiver associated with J17
J18	UART3 RTS/DCD Loopback	1-2	Provides a loopback of RTS to DCD on UART3
		2-3	Provides a pulldown on UART3 DCD
J19	UART2 RTS/DCD Loopback	1-2	Provides a loopback of RTS to DCD on UART3
		2-3	Provides a pulldown on UART3 DCD
J20	UART2 Isolation/Access Jumpers	1-2	Connects UART2_RX to R on RS-485 transceiver associated with J22/J23
		3-4	Connects UART2_TX to D on RS-485 transceiver associated with J22/J23
		5-6	Connects UART2_RTS to DE on RS-485 transceiver associated with J22/J23
		7-8	Connects UART2_CTS to a pull-down resistor
J21	RS-485 Termination Enable	1-2	Enables 121 Ohm termination between RS-485 A and B

TWR-IND-IO Header Descriptions

The following is a list of all available headers and their descriptions

Header	Description	Pin Details
J2 (J24, J25)	Analog Screw Terminal	1-VDDA, 2-VSSA, 3-DAC0, 4-VSSA, 5-AN1, 6-AN2 7-AN3, 8-VSSA, 9-VDDA
J7	USB2SER RTS/CTS	1-CTS, 2-RTS
J8	UART1	1-TXD1, 2-RXD1, 3-RTS1, 4-CTS1
J11	CAN1 Header	1-CANH, 2-GND, 3-CANL
J12	CAN2 Header	1-CANH, 2-GND, 3-CANL
J17	RS-232 Header	3-TXD, 4-CTS, 5-RXD, 6-RTS, 9-GND (others signals are NC)
J22	RS-485 Screw Terminal (Power)	1-Isolated GND, 2-Isolated VCC, 3-Isolated GND
J23	RS-485 Screw Terminal (Signal)	1-Isolated DE, 2-RS-485 B, 3-RS-485 A

Quick Start Guide

Visit **freescale.com/Tower** for information on the TWR-IND-IO module, including:

- TWR-IND-IO user guide
- TWR-IND-IO schematics
- Tower System fact sheet

Support

Visit **freescale.com/support** for a list of phone numbers within your region.

Warranty

Visit **freescale.com/warranty** for complete warranty information.

For more information, please visit freescale.com/Tower

Join the online Tower community at towergeeks.org

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