

# Quick Start Guide

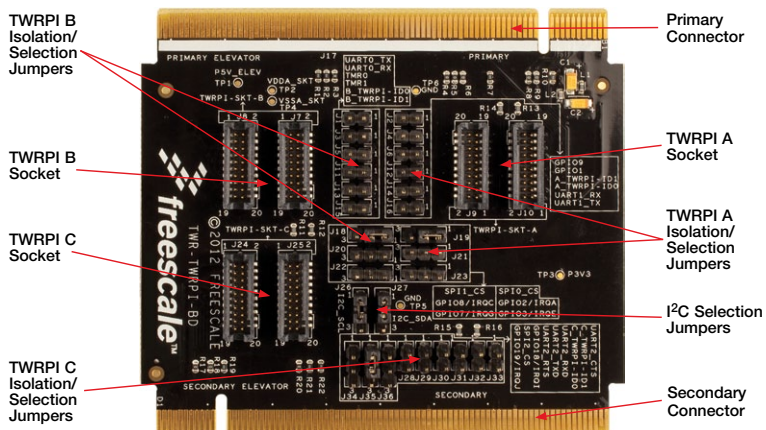
TWR-TWRPI-BD

Tower Plug-In Carrier Module



TOWER SYSTEM

## GET TO KNOW THE TWR-TWRPI-BD



### TWR-TWRPI-BD Freescale Tower System

The TWR-TWRPI-BD 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-TWRPI-BD Features

- Enables rapid prototyping and evaluation of sensors, radios and other peripherals available as Tower plug-ins (TWRPIs)
- Adds up to three additional general-purpose TWRPI modules to the Freescale Tower System and interfaces them with signals available on the Tower elevator edge connectors
- Provides access to SPI, I<sup>2</sup>C, and UART communication interfaces
- Each TWRPI socket features:
  - Independent SPI interfaces, each with two selectable slave select signals
  - Independent UART interfaces with optional flow control available on sockets A and C
  - Independent selection of GPIO or interrupt functionality
  - Optional TWRPI ID signals for detection of TWRPI modules
- Selectable I<sup>2</sup>C bus shared between all TWRPI sockets
- All signals can be isolated from the Tower System to avoid any potential signal conflicts with additional peripheral Tower modules



# Step-by-Step Installation Instructions

In this quick start guide you will learn to set up the TWR-TWRPI-BD module and run the included demonstration software. For more detailed information, review the user manual at [freescale.com/Tower](https://www.freescale.com/Tower)

## 1 Identify TWRPIs

Identify the desired TWRPIs to be utilized with the TWR-TWRPI-BD and the respective interfaces required for each TWRPI.

## 2 Configure Jumpers

Configure the TWR-TWRPI-BD jumpers to correctly interface with the respective TWRPI. Refer to the jumper table in this document for reference and the user manual for additional details. Be aware that not all controller modules will provide access to all signals available on the TWR-TWRPI-BD. Refer to the respective controller module documentation for details of which signals are available.

## 3 Ensure Compatibility

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

## 4 Insert TWRPIs

Insert the desired TWRPIs in the respective sockets. The TWRPIs are keyed and uniquely spaced such that the sockets will only accept general-purpose TWRPIs that are aligned properly. For your convenience, there is a mounting hole that can be used to mount an antenna when working with select radio-based TWRPIs.

## 5 Assemble Your Tower System

Assemble your Tower System, including a Tower System controller module and the TWR-TWRPI-BD module with inserted TWRPIs.

## 6 Refer to Additional Materials

The TWR-TWRPI-BD provides access to Tower plug-ins from signals available on the Tower elevator edge connectors. Refer to the respective TWRPI documentation for details regarding the use and functionality of the TWRPI. Refer to the jumper table in the document and the TWR-TWRPI-BD user manual for additional details regarding with signals are available to each TWRPI socket. Refer to [freescale.com/Tower](https://www.freescale.com/Tower) for additional information on the TWR-TWRPI-BD and available TWRPIs.

## TWR-TWRPI-BD 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.

### TWRPI Socket A Configuration

Jumper	Option	Setting	Description
J2	GPIO4/UART CTS Isolation	1-2	Connects J9_Pin19 to primary elevator signal GPIO9/UART1_CTS (A9)
J4	GPIO5/UART RTS Isolation	1-2	Connects J9_Pin20 to primary elevator signal GPIO1/UART1_RTS (B21)
J6	TWRPI-ID1 Isolation	1-2	Connects J10_Pin18 to primary elevator signal AN1 (A29)
J12	TWRPI-ID0 Isolation	1-2	Connects J10_Pin17 to primary elevator signal AN0 (A30)
J14	UART RX/ GPIO2 Isolation	1-2	Connects J9_Pin17 to primary elevator signal UART1_RX (A43)
J16	UART TX/ GPIO3 Isolation	1-2	Connects J9_Pin18 to primary elevator signal UART1_TX (A44)

### TWRPI Socket A Configuration *(continued)*

Jumper	Option	Setting	Description
J19	SPI CS Selection	1-2	Connects J9_Pin11 to primary elevator signal SPI0_CS0 (B46)
		2-3	Connects J9_Pin11 to primary elevator signal SPI0_CS1 (B47)
J21	GPIO0/IRQ Selection	1-2	Connects J9_Pin15 to primary elevator signal GPIO2 (B22)
		3-4	Connects J9_Pin15 to primary elevator signal IRQ_A (B62)
J23	GPIO1/IRQ Selection	1-2	Connects J9_Pin16 to primary elevator signal GPIO3 (B23)
		3-4	Connects J9_Pin16 to primary elevator signal IRQ_E (B58)

**TWRPI Socket B Configuration**

Jumper	Option	Setting	Description
J1	UART TX/GPIO3 Isolation	1-2	Connects J7_Pin18 to primary elevator signal UART0_TX (A42)
J3	UART RX/GPIO2 Isolation	1-2	Connects J7_Pin17 to primary elevator signal UART0_RX (A41)
J5	TMR/GPIO5 Isolation	1-2	Connects J7_Pin20 to primary elevator signal TMR0 (A34)
J11	TMR/GPIO4 Isolation	1-2	Connects J7_Pin19 to primary elevator signal TMR1 (A33)
J13	TWRPI-ID0 Isolation	1-2	Connects J8_Pin17 to primary elevator signal AN2 (A28)
J15	TWRPI-ID1 Isolation	1-2	Connects J8_Pin18 to primary elevator signal AN3 (A27)
J18	SPI CS Selection	1-2	Connects J7_Pin11 to primary elevator signal SPI1_CS0 (B9)
		2-3	Connects J7_Pin11 to primary elevator signal SPI1_CS1 (B8)
J20	GPIO0/IRQ Selection	1-2	Connects J7_Pin15 to primary elevator signal GPIO8 (A10)
		3-4	Connects J7_Pin15 to primary elevator signal IRQ_C (B60)
J22	GPIO1/IRQ Selection	1-2	Connects J7_Pin16 to primary elevator signal GPIO7 (A11)
		3-4	Connects J7_Pin16 to primary elevator signal IRQ_G (B56)

**TWRPI Socket C Configuration**

Jumper	Option	Setting	Description
J28	UART RTS/GPIO5 Isolation	1-2	Connects J25_Pin20 to secondary elevator signal UART2_CTS (C43)
J29	UART TX/GPIO3 Isolation	1-2	Connects J25_Pin18 to secondary elevator signal UART2_TX (C42)
J30	UART RX/GPIO2 Isolation	1-2	Connects J25_Pin17 to secondary elevator signal UART2_RX (C41)
J31	TWRPI-ID0 Isolation	1-2	Connects J24_Pin17 to secondary elevator signal AN8 (C30)
J32	TWRPI-ID1 Isolation	1-2	Connects J24_Pin18 to secondary elevator signal AN9 (C29)
J33	UART CTS/GPIO4 Isolation	1-2	Connects J25_Pin19 to secondary elevator signal UART2_CTS (C44)
J34	GPIO1/IRQ Selection	1-2	Connects J25_Pin16 to secondary elevator signal GPIO19 (D17)
		3-4	Connects J25_Pin16 to secondary elevator signal IRQ_J (D61)
J35	SPI CS Selection	1-2	Connects J25_Pin11 to secondary elevator signal SPI2_CS0 (D9)
		2-3	Connects J25_Pin11 to secondary elevator signal SPI2_CS1 (D8)
J36	GPIO0/IRQ Selection	1-2	Connects J25_Pin15 to secondary elevator signal GPIO18 (D16)
		3-4	Connects J25_Pin15 to secondary elevator signal IRQ_I (D62)

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Jumper	Option	Setting	Description
J26	I <sup>2</sup> C SCL Selection	1-2	Connect primary elevator signal I2C0_SCL (A7) to all TWRPI sockets
		3-4	Connect primary elevator signal I2C1_SCL (B50) to all TWRPI sockets
J27	I <sup>2</sup> C SDA Selection	1-2	Connect primary elevator signal I2C0_SDA (A8) to all TWRPI sockets
		2-3	Connect primary elevator signal I2C1_SDA (B51) to all TWRPI sockets





Visit [freescale.com/Tower](http://freescale.com/Tower) for more information on the TWR-TWRPI-BD, including:

- Schematics
- User manual

## Support

Visit [freescale.com/support](http://freescale.com/support) for a list of phone numbers within your region.

## Warranty

Visit [freescale.com/warranty](http://freescale.com/warranty) for complete warranty information.

For more information, visit [freescale.com/Tower](http://freescale.com/Tower)

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