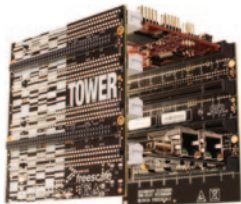
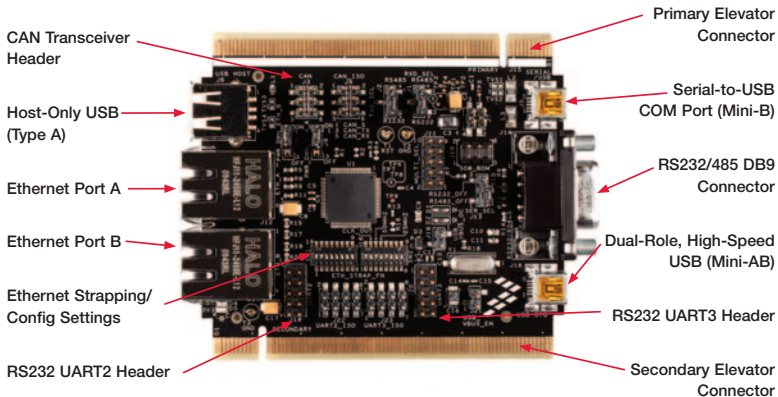




# Get to know the TWR-SER2



## TWR-SER2 Freescle Tower System

The TWR-SER2 module is part of the Freescle 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 constructing your Tower System today.

## TWR-SER2 features

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- Industrial Ethernet PHY configurable as:
  - 10/100 dual-or single-port RMII
  - 10/100 single-port MII
- Industrial High-Speed, Dual-Role USB (Host/Device) over UPLI
- Dedicated host mode USB port
- Four concurrent RS232 serial transceivers, including one S08JS16 based Serial-to-USB
- RS485 transceiver
- CAN transceiver

# How to build your Tower

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**STEP  
1**

## Locate the Elevator Modules

Each elevator module is identifiable by its four card edge connectors

**STEP  
2**

## Identify the Elevator Modules

Each elevator module is either Primary or Secondary. They are identifiable as follows:

- Primary Elevator:  
Written on inside top and denoted by white card edge connectors
- Secondary Elevator:  
Written on inside bottom

**STEP  
3**

## Locate Additional Modules

Gather any additional modules that will be used to assemble your desired Tower System configuration

**STEP  
4**

## Identify the Primary and Secondary Card Edges

For each module, the words Primary and Secondary are written along the card edges. The Primary edge is denoted by a white stripe

**STEP  
5**

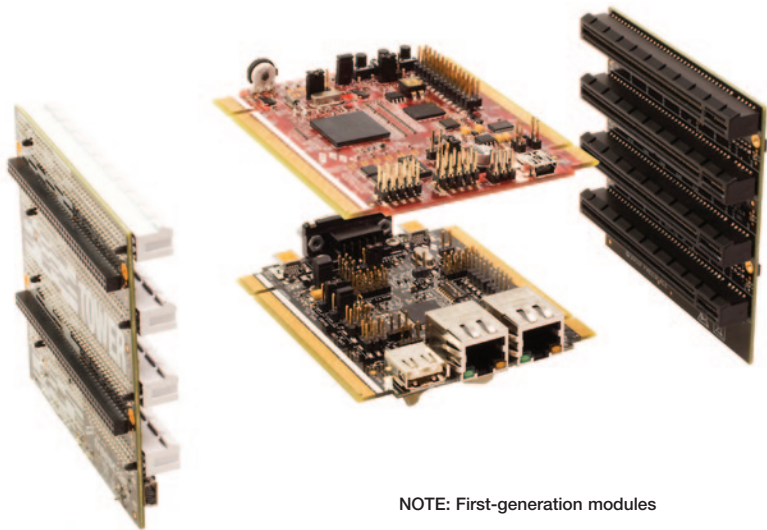
## Plug in Primary Card Edge

Match the white stripe on the edge of each module to any available connector on the Primary Elevator and plug it in

**STEP  
6**

## Attach Secondary Elevator

With all desired modules connected to the Primary Elevator, carefully attach the Secondary Elevator onto the secondary card edges of each module

STEP  
7

## Make Additional Connections

Plug in necessary cables and power sources

### NOTE: First-generation modules

If using the first generation of TWR-ELEV modules, the board labeled Functional Elevator is equivalent to the Primary Elevator as described in the instructions above. The board labeled Dummy Elevator is different than the Secondary Elevator, but will work with most assembled Tower Systems.

If using first-generation peripheral and MCU/MPU modules, the white stripe along the outer edge of the board will not be present.

# Configuration instructions

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In this Quick Start Guide, you will learn how to configure the various settings on the TWR-SER2 module for use in the Tower System.

## Ethernet Settings

Refer to these settings for typical Ethernet setting. For specific setting details refer to the TWR-SER2 Jumper Options section.

- **10/100 Dual RMII**
  - J8 and J9 should be un-shunted
  - Configure SW1 (1-8) as 11000000
  - Configure SW2 (1-8) as 10100000
- **10/100 Signal-Port RMII**
  - J9 should be un-shunted
  - Configure SW1 (1-8) as 11000000
  - Configure SW2 (1-8) as 10100000
- **10/100 Signal-Port MII**
  - J9 should be un-shunted
  - Configure SW1 (1-8) as 00110000
  - Configure SW2 (1-8) as 00010000

## High Speed Dual Role USB Settings

Refer to these settings to configure the High-Speed USB ULPI Transceiver.

- **Host Mode**—TWR-SER2 will be connected to a device, such as a USB memory stick using the appropriate mini USB adaptor.
  - J24 should be un-shunted
- **Device Mode**—TWR-SER2 will be connected to a host, such as a host PC.
  - J24 should be shunted, if it is desired that the entire Tower system be powered via this connection

## Host-Only USB Settings

Refer to these settings to configure the Host-only USB. The TWR-SER2 will be connected to a device, such as a USB memory stick connected to the standard USB Type-A receptacle.

- J16 and J21 should be shunted if VBUS enable/over-current control is required

## Serial Settings

Refer to these settings to configure the multiple serial connections.

- **Serial-to-USB**—The TWR-SER2 will be connected to a host PC using J5 (mini B). Use driver included on DVD to install the virtual COM port on the host PC.
  - J7 pins 1-2, 3-4 should be shunted
- **RS232 DB9**—The TWR-SER2 will be connected to a host PC using the onboard DB9 connector.
  - J1 pins 2-3 should be shunted
  - J2 pins 2-3 should be shunted
  - J13 pins 1-2 should be shunted
- **RS485 DB9**—The TWR-SER2 will be connected to a host PC using the onboard DB9 connector.
  - J1 pins 1-2 should be shunted
  - J2 pins 1-2 should be shunted
  - J13 pins 2-3 should be shunted
  - Loopback settings can be configured using J11
- **RS232 Headers**—The TWR-SER2 will be connected to a host PC using the required adapter cable(s) connected to J19 and/or J20.
  - J22 pins 1-2, 3-4 should be shunted to UART2 (J19)
  - J22 pins 5-6, 7-8 should be shunted if using RTS/CTS flow control on UART2 (J19)
  - J23 pins 1-2, 3-4 should be shunted to UART3 (J20)
  - J23 pins 5-6, 7-8 should be shunted if using RTS/CTS flow control on UART3 (J20)

## CAN Settings

Refer to these settings to enable the connection to the CAN Transceiver. The TWR-SER2 will be connected to a CAN device using J3. Refer to the TWR-SER2 User Manual for header pinout details.

- J4 pins 3-4, 5-6 should be connected
- J4 pins 1-2 can be connected to enable control of “Silent Mode”

## TWR-SER2 Jumper Options

The following is a list of all jumper options. The **\*default\*** installed jumper settings are shown in bold with asterisks.

	Option	Setting	Description
SW1	Ethernet Strapping Functions / Settings	Dip 1	<b>*On*</b> Enables RMIi mode for Ethernet PHY A
			Off Enables MII mode for Ethernet PHY A
		Dip 2	<b>*On*</b> Connects RX_CRS to RMIIO_CRS_DV (required for RMIi operation)
			Off Disconnects RX_CRS from RMIIO_CRS_DV (required for MII operation)
		Dip 3	On Connects RX_CRS to MII_CRS (required for MII operation)
			<b>*Off*</b> Disconnects RX_CRS from MII_CRS (required for RMIi operation)
		Dip 4	On Connects RX_DV to MII_RXDV (required for MII operation)
			<b>*Off*</b> Disconnects RX_DV from MII_RXDV (required for RMIi operation)
		Dip 5	On Enables Dual PHY Extender Mode
			<b>*Off*</b> Disables Extender Mode
		Dip 6	On PHY A - Auto Negotiation (Use AN0/AN1 to set highest capability)
			<b>*Off*</b> PHY A - Forced Mode (Use AN0/AN1 to set forced mode)
		Dip 7	On AN0_A - Full-Duplex on PHY A
			<b>*Off*</b> AN0_A - Half-Duplex on PHY A
		Dip 8	On AN1_A - 100Base-TX on PHY A
			<b>*Off*</b> AN1_A - 10Base-T on PHY A
SW2	Ethernet Strapping Functions / Settings	Dip 1	<b>*On*</b> Enables RMIi mode for Ethernet PHY B
			Off Enables MII mode for Ethernet PHY B
		Dip 2	On Connects CLOCKOUT0 to Ethernet PHY Clock
			<b>*Off*</b> Isolates CLOCKOUT0 from Ethernet PHY Clock
		Dip 3	<b>*On*</b> Connects onboard 50 MHz clock to Ethernet PHY Clock
			Off Isolates onboard 50 MHz clock from Ethernet PHY Clock



	Option	Setting	Description	
SW2	Ethernet Strapping Functions/Settings	Dip 4	On	Connects onboard 25 MHz clock to Ethernet PHY Clock
			<b>*Off*</b>	Isolates onboard 25 MHz clock from Ethernet PHY Clock
		Dip 5	On	Disables onboard 25 MHz/50 MHz clock
			<b>*Off*</b>	Enables onboard 25 MHz/50 MHz clock
		Dip 6	On	PHY B - Auto Negotiation (Use AN0/AN1 to set highest capability)
			<b>*Off*</b>	PHY B - Forced Mode (Use AN0/AN1 to set forced mode)
		Dip 7	On	AN0_B - Full-Duplex on PHY B
			<b>*Off*</b>	AN0_B - Half-Duplex on PHY B
Dip 8	On	AN1_B - 100Base-TX on PHY B		
	<b>*Off*</b>	AN1_B - 10Base-T on PHY B		
J1	RS232/485 RX Select (UART 1)	1-2	RS485 Mode (connects RX to R0)	
		<b>*2-3*</b>	RS232 Mode (connects RX to R1OUT)	
J2	RS232/485 TX Select (UART 1)	1-2	RS485 Mode (connects TX to DI)	
		<b>*2-3*</b>	RS232 Mode (connects TX to T1IN)	
J4	CAN Isolation	1-2	Connects CAN_S to S	
		3-4	Connects CAN_TX to TXD	
		5-6	Connects CAN_RX to RXD	
J7	JS16 RS232 Isolation (UART 0)	<b>*1-2*</b>	Connects RX to S08JS16 RXD	
		<b>*3-4*</b>	Connects TX to S08JS16 TXD	
J8	Power Down Port B	1-2	Disables Ethernet PHY B	

*continued...*

## TWR-SER2 Jumper Options

continued...

	Option	Setting	Description
J9	Power Down Port A	1-2	Disables Ethernet PHY A
J11	RS485 Config (UART 1)	1-2	Loopback Mode (connects RE to DE)
		3-4	Loopback Mode (connects TX0_P to RX0_P)
		5-6	Loopback Mode (connects TX0_N to RX0_N)
		7-8	NC
		9-10	5V Supply to DB9
J13	RS232/485 Disable (UART 1)	<b>*1-2*</b>	Disables RS485
		2-3	Disables RS232
J16	VBUS OC Isolation	1-2	Connects USB VBUS OC to Elevator
J21	VBUS EN Isolation	1-2	Connects USB VBUS EN to Elevator
J22	RS232 (UART2) Isolation	1-2	Connects TX to T1IN
		3-4	Connects RX to R1OUT
		5-6	Connects RTS to T2IN
		7-8	Connect CTS to R2OUT
J23	RS232 (UART3) Isolation	1-2	Connects TX to T1IN
		3-4	Connects RX to R1OUT
		5-6	Connects RTS to T2IN
		7-8	Connects CTS to R2OUT
J24	USB Device Mode	1-2	Device Mode (capable of powering Tower System)



To learn more about the TWR-SER2 and other modules within the Tower System, go to [freescale.com/twrser2](http://freescale.com/twrser2). To become a member of the online Tower Geeks community, go to [towergeeks.org](http://towergeeks.org).

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