

8-, 16- and 32-bit MCUs/MPUs

# Freescale Tower System

## Modular development platform

### Overview

The Freescale Tower System is a modular development platform for 8-, 16- and 32-bit MCUs and MPUs that enables advanced development through rapid prototyping. Featuring more than fifty development boards or modules, the Tower System provides designers with building blocks for entry-level to advanced MCU development.



### The Freescale Tower System

#### Controller/Processor Module (MCU/MPU)

- Tower MCU/MPU board
- Works stand-alone or in Tower System
- Features integrated debugging interface for easy programming and run control via standard USB cable

#### Secondary Elevator

- Additional and secondary serial and expansion bus signals
- Standardized signal assignments
- Mounting holes and expansion connectors for side-mounting peripheral

#### Tower Plug-In (TWRPI)

- Designed to attach to modules that have a TWRPI socket(s)
- Adds features and functionality
- Swappable with other TWRPIs
- Examples include accelerometers, key pads, touch pads, sliders and rotary touch pads

#### Primary Elevator

- Common serial and expansion bus signals
- Two 2x80 connectors on back side for easy signal access and side-mounting board (LCD module)
- Power regulation circuitry
- Standardized signal assignments
- Mounting holes

#### Size

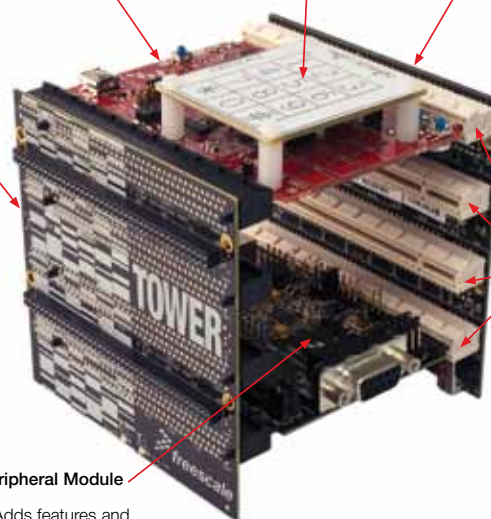
- Fully assembled Tower System is approx. 3.5" H x 3.5" W x 3.5" D

#### Board Connectors

- Four card-edge connectors
- Uses PCI Express® connectors (x16, 90 mm/ 3.5" long, 164 pins)

#### Peripheral Module

- Adds features and functionality to your designs
- Interchangeable with other peripheral modules and compatible with all controller/processor modules
- Examples include serial interface, memory, Wi-Fi®, graphical LCD, motor control, audio, Xtrinsic sensing and high precision analog modules



## Modular and Expandable

- Controller modules provide easy-to-use, reconfigurable hardware
- Interchangeable peripheral modules (including communications, memory and graphical LCD) make customization easy
- Open-source hardware and standardized specifications promote the development of additional modules for added functionality and customization

## Speeds Development Time

- Open source hardware and software allow quick development with proven designs
- Integrated debugging interface allows for easy programming and run control via standard USB cable

## Cost Effective

- Interchangeable peripheral modules can be re-used with all Tower System controller modules, eliminating the need to purchase redundant hardware for future designs
- Enabling technologies like LCD, Wi-Fi, motor control, serial and memory interfacing are offered off-the-shelf at a low cost to provide a customized enablement solution

## Software Enablement and Support

The increasing complexity of industrial applications and expanding functionality of semiconductors are driving embedded developers toward solutions that require the integration of proven hardware and software platforms. Freescale, along with a strong alliance network, offers comprehensive solutions, including development tools, debuggers, programmers and software.

## Complimentary Software and Tools

- Freescale MQX™ RTOS, TCP/IP stacks, file system, USB stacks and more\*
- Freescale Linux® BSP\*
- CodeWarrior Development Studio
- Processor Expert Software: Create, configure, optimize, migrate and deliver software components that generate source code for Freescale silicon
- Freescale eGUI: Graphical LCD driver for MCUs and eMPUs

\* Visit [freescale.com/software](http://freescale.com/software) for a list of supported devices

## Tower System Modules

Controller/Processor Modules (8-, 16-, 32-bit) <a href="http://freescale.com/Towercontroller">freescale.com/Towercontroller</a>	
• Works stand alone or as part of Tower System	• Allows rapid prototyping
• Features open source debugging interface	• Provides easy programming and run control via standard USB cable
Peripheral Modules <a href="http://freescale.com/Towerperipheral">freescale.com/Towerperipheral</a>	
• Can be re-used with all Tower System controller modules	• Eliminates the need to buy/develop redundant hardware
• Interchangeable peripheral modules: Serial, memory, graphical LCD, prototyping, sensor	• Enables advanced development and broad functionality
Tower Plug-Ins <a href="http://freescale.com/TWRPI">freescale.com/TWRPI</a>	
• Designed to attach to any Tower System module with a TWRPI socket(s)	• Adds features and functionality with little investment
• Swappable components	• Allows for design flexibility
Elevator Modules <a href="http://freescale.com/Towerelev">freescale.com/Towerelev</a>	
• Two 2 x 80 connectors	• Provides easy signal access and side-mounting board (i.e. LCD module)
• Power regulation circuitry	• Provides power to all boards
• Standardized signal assignments	• Allows for customized peripheral module development
• Four card-edge connectors available	• Allows easy expansion using PCI Express® connectors (x16, 90 mm/3.5" long, 164 pins)

## Build Your Tower System in Three Steps or Less

Each assembled Tower System will accommodate:

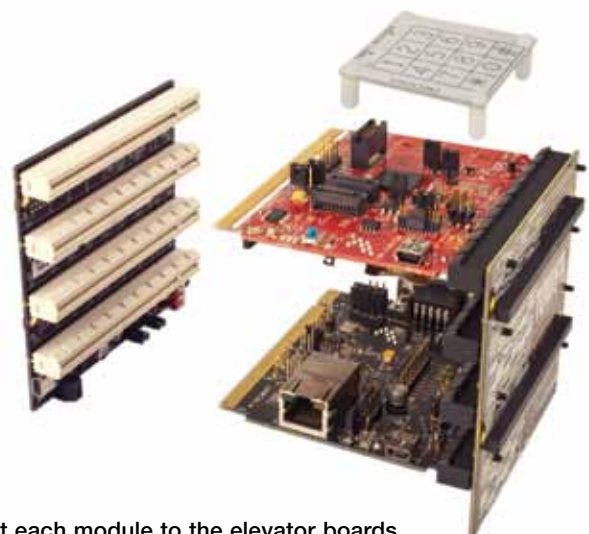
- One controller/processor module
- Up to three peripheral modules
- One or more additional side mounting peripheral modules
- Multiple Tower plug-ins (TWRPIs)
- Two elevator modules (or risers)



### 2. Choose peripheral modules and desired Tower plug-ins (TWRPIs)



### 1. Choose a controller/processor module



### 3. Connect each module to the elevator boards

## Multiple Power Options

The Freescale Tower System can be powered entirely over a USB cable via a host PC or USB wall power adaptor. Alternatively, power can be supplied to the Tower System via a screw terminal on the primary elevator.

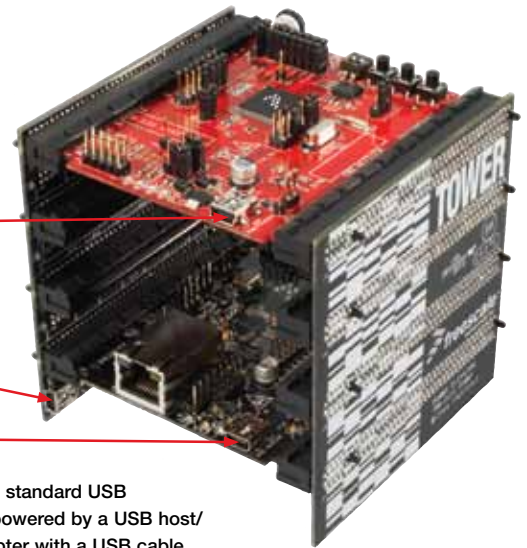
Protection circuitry is built into all Tower System modules to avoid contention on the power rails. Although power can be supplied through any module, power supplied through the elevator modules takes precedence

1. Processor module  
via debugger connection

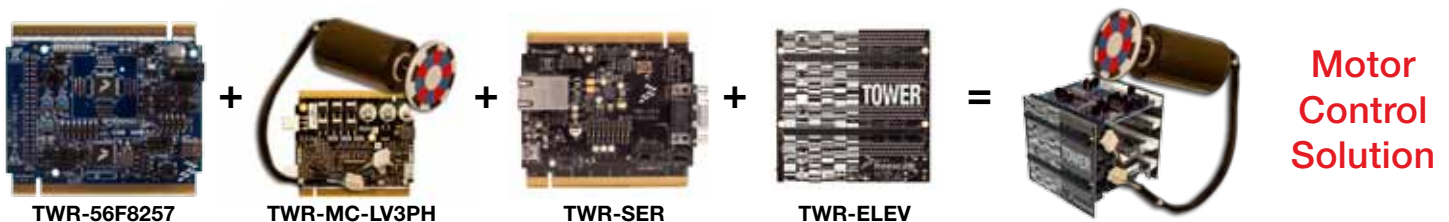
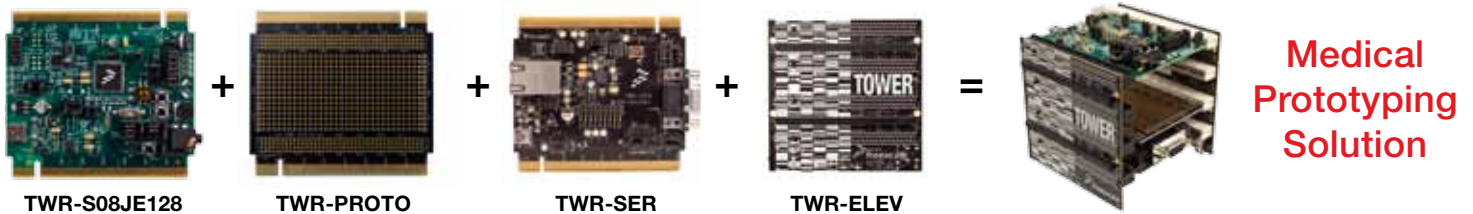
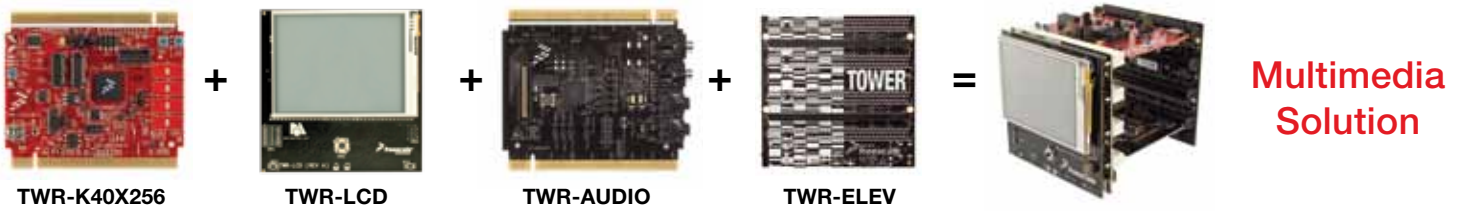
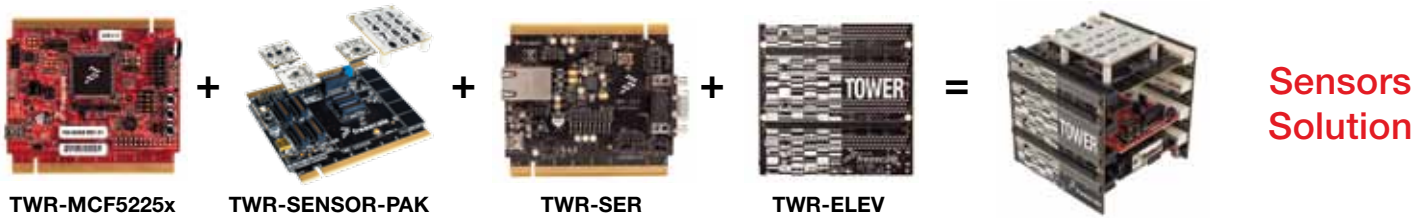
2. Tower elevator

3. Peripheral module

All power connectors are standard USB connectors that can be powered by a USB host/hub or an AC-to-DC adaptor with a USB cable.



## Example Configurations





## Tower Geeks Online Community

**TowerGeeks.org** is an online design engineer community that allows members to interact, develop designs and share ideas. Offering a direct path to explore and interact with other engineers designing with the Tower System, **TowerGeeks.org** is a great way to discuss your projects, post videos of your progress, ask questions through the forum and upload software. With updates through Twitter and Facebook, it's easy to get involved.



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Watch the **Tower System** video here.

## Partner Modules

Tap into a powerful ecosystem of Freescale technology alliances for building smarter, better connected solutions. Designed to help you shorten your design cycle and get your products to market faster, these technology alliances provide you with access to rich design tools, peripherals and world-class support and training.

A number of partners have developed modules for the Tower System. Some examples include the i.MX515 ARM® Cortex™-A8 Tower Computer Module and StackableUSB™ I/O Device Carrier module from Micro/sys, as well as the Rapid Prototyping System (RPS) AM1 and FM1 modules from iMN MicroControl.

A complete list of partner-developed modules is available at [freescale.com/Tower](https://freescale.com/Tower).

## Design Your Own

Interested in designing your own Tower System module? View application note AN4390 "Creating Your Own Tower Module" for a complete guide to starting your board design available at [freescale.com/Tower](https://freescale.com/Tower).

For a complete list of development kits and modules offered as part of the Freescale Tower System, please visit [freescale.com/Tower](https://freescale.com/Tower)

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