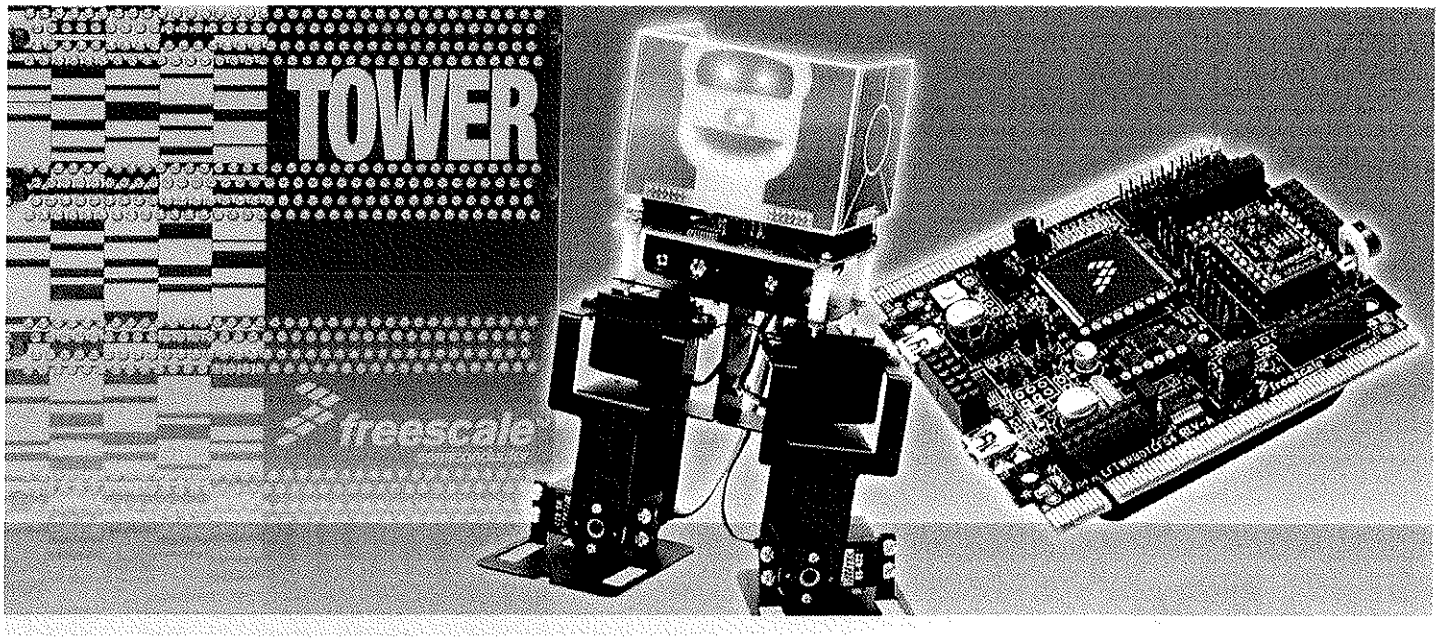


Sensors and 32-bit Microcontrollers

Freescale Tower System

Tower mechatronics board and robot

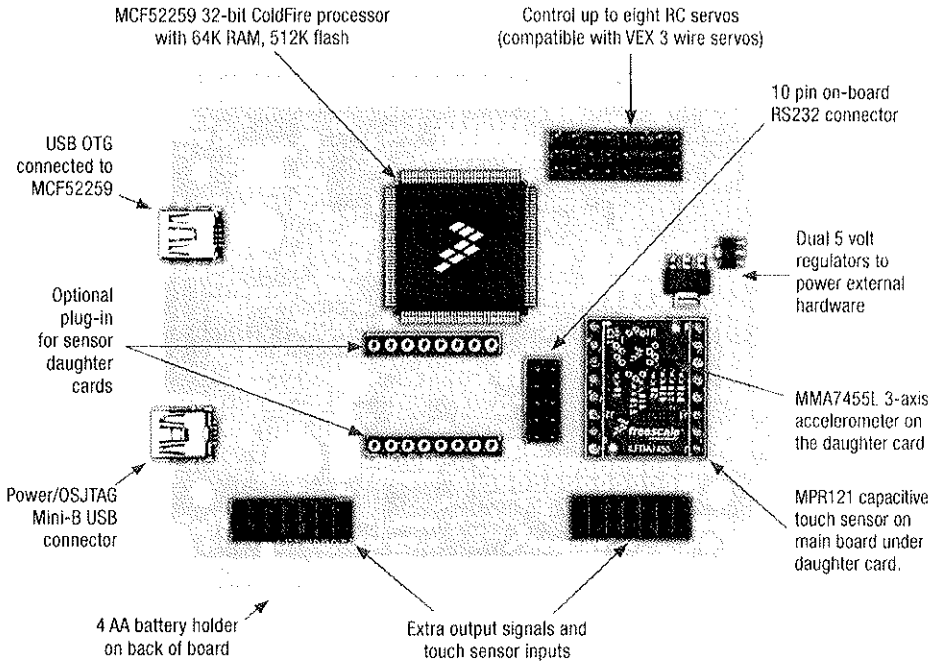
Overview

The Tower Mechatronics Board combines 32-bit computing, sensors, and actuator control into a single stand-alone board with an on-board battery supply. The Tower Mechatronics Board has a 32-bit ColdFire microcontroller with 64K of RAM, 512K of flash, and supports the full range of Freescale Xtrinsic sensors via plug-in daughter boards. The board can directly control up to eight actuators (PWM controlled RC servos) via the eight industry standard 3-pin connectors.

In addition to stand-alone operation, the Tower Mechatronic Board can be plugged into the Tower System. When plugged into the Tower System the Tower Mechatronic Board becomes a controller module, capable of interfacing with all peripheral modules available in the Tower System family to expand its capabilities.

Freescale's robot is a sensor development kit in the form of a four degrees of freedom (DOF) bipedal walking robot, controlled by the Tower Mechatronic Board. Included are simple development tools that will help you learn to write software for sensors, while making a robot walk and respond to touch, motion, vibration, tilt, and other external stimuli.

Tower Mechatronics Board Features



freescale
semiconductor

Software Enablement

The Tower Mechatronic Board is supported with a full range of software. RobotSee is a scripting language as easy as BASIC, with the power of C. Using RobotSee, even people with no programming background can use the Tower Mechatronic Board to create innovative projects. When used with the Freescale Robot, RobotSee makes it easy to learn about electromechanical designs using sensors.

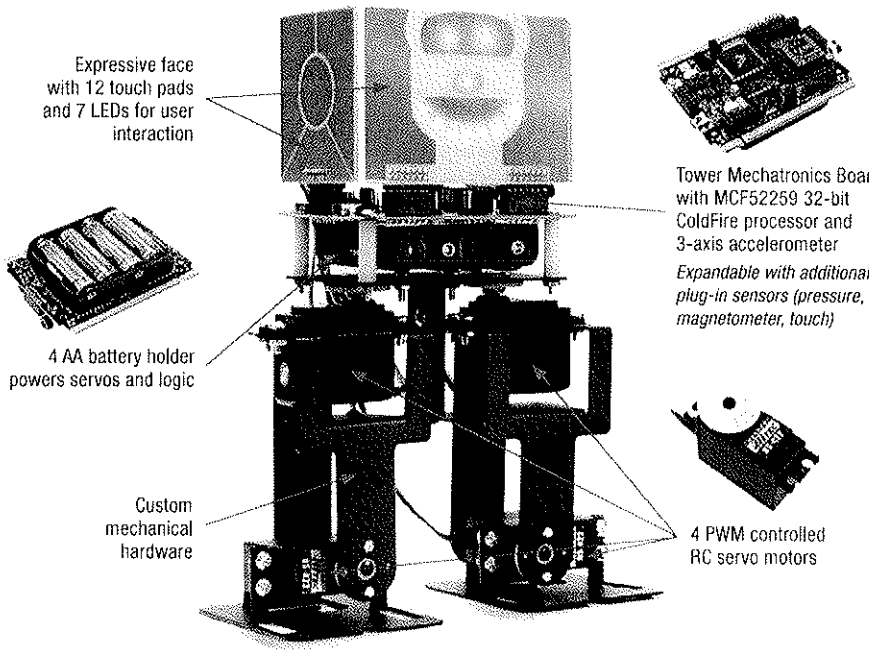
For the more advanced programmer, C is also supported. Using the on-board OSBDM debugger and CodeWarrior Special Suite integrated Development Studio (IDE), the board can easily be programmed in either C or assembly (C++ is available with the CodeWarrior Professional Suite). CodeWarrior Special Suite plus OSBDM is a complete debugging solution that includes flash programming, run control (source level single step) and trace.

Code samples make getting up and running easy, and both the robot and the Tower Mechatronics board are backed up with many samples in both C and RobotSee. RobotSee examples are available to make the robot walk, talk, access various sensors and even read your mind. A complete C CodeWarrior project is available with examples of how to make the robot walk, and access its sensors. The goal of the Tower Mechatronics Board and Freescale Robot is to help you create innovative projects as quickly and easily as possible.

Drivers available in the Toolkit

- General purpose 16-bit timers (GPT) – input capture, output compare and PWM
  - Fine RC servo control that is configurable for 0.25 us resolution
- PWM 8-bit controller
  - Configurable for 7 us resolution course RC servo control
- I2C Master Mode
  - MMA7455L 3-axis accelerometer support
  - MPR121 12 channel touch sensor support
- QSPI master mode
- UART buffered and un-buffered
- Analog to digital converter
- Interrupt controller
- DMA controller
- FlexCan controller
- Periodic interrupt timers
- DMA timers

Sensor Robot Features



Development Tools		
Kit Number		Includes
FSLBOT		• Tower Mechatronics Board • 4 PWM controlled RC servos • Leg mechanics and associated hardware • Bipedal 4DOF walking robot assembly instructions • Tower Mechatronics Board user guide • Quick Start Guide
TWR-MECH		• Xtrinsic MMA8451Q 3-axis accelerometer, • MCF52259 32-bit ColdFire processor • MPR121 touch sensor
LFDA8451		The LFDA8451 provides a device adapter for the Freescale MMA8451Q 14-bit 3-axis accelerometer

Documentation	
Document Title	Description
Tower Module Mechatronics Board User Guide	This user guide explains how to use the TWR-MECH board to write software for sensors to control the robot.
Tower Module Mechatronics Board Quick Start Guide	This quick start guide will help you use the Tower Mechatronics board as quickly and easily as possible.
Bipedal 4 Degrees of Freedom walking Robot assembly instructions	The assembly instructions will guide you in putting together the physical robot pieces. The robot will ship with: brackets, screws and motors for assembling together.

Tower Geeks Online Community

TowerGeeks.org is an online design engineer community that allows members to interact, develop designs and share ideas with the Tower System.

twitter.com/towergeeks

facebook.com/freescale

Learn More: For more information about Freescale products, please visit **www.freescale.com/robot**.

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