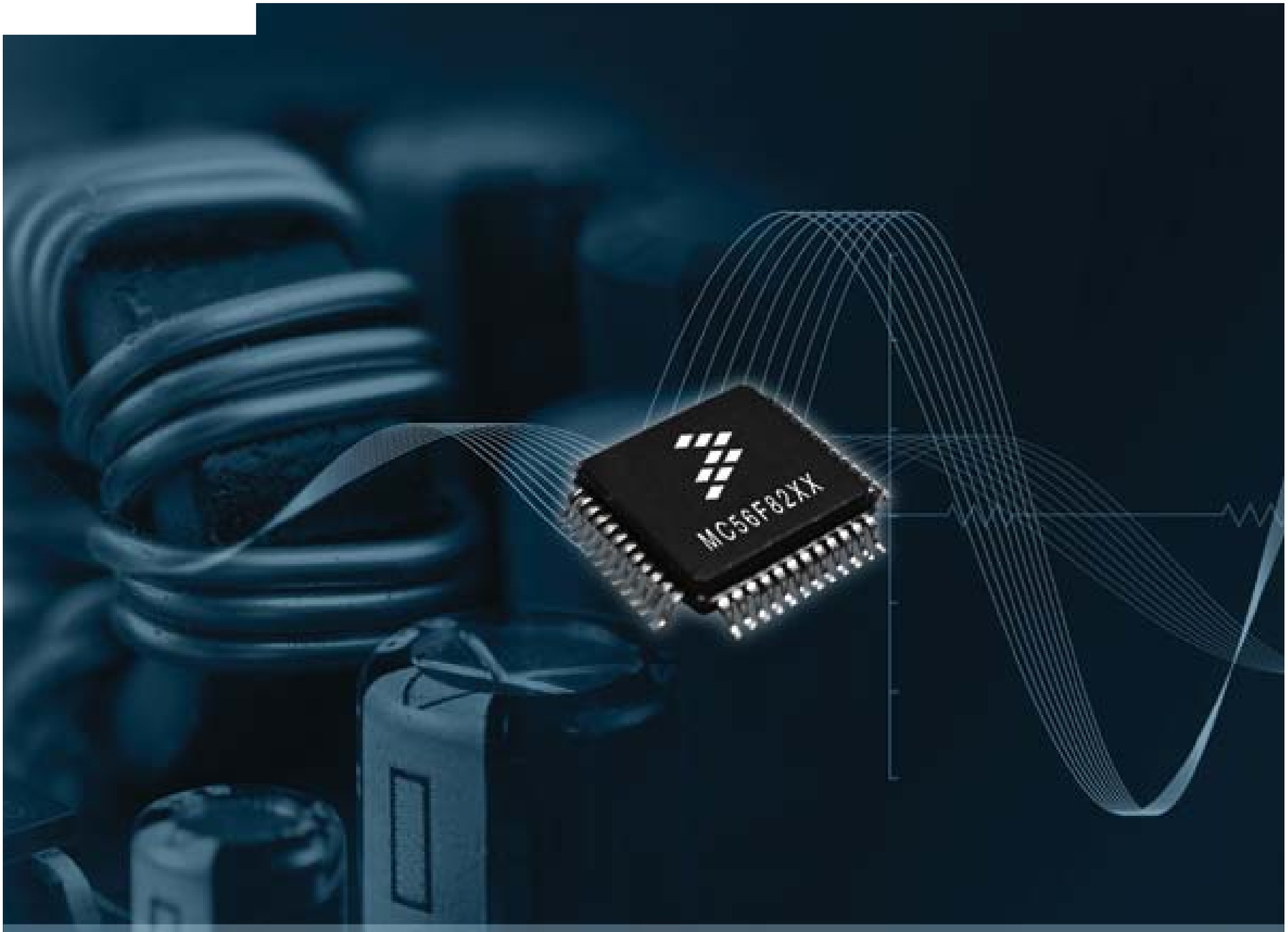
ide for TWR-MC56F8257

TOWER SYSTEM

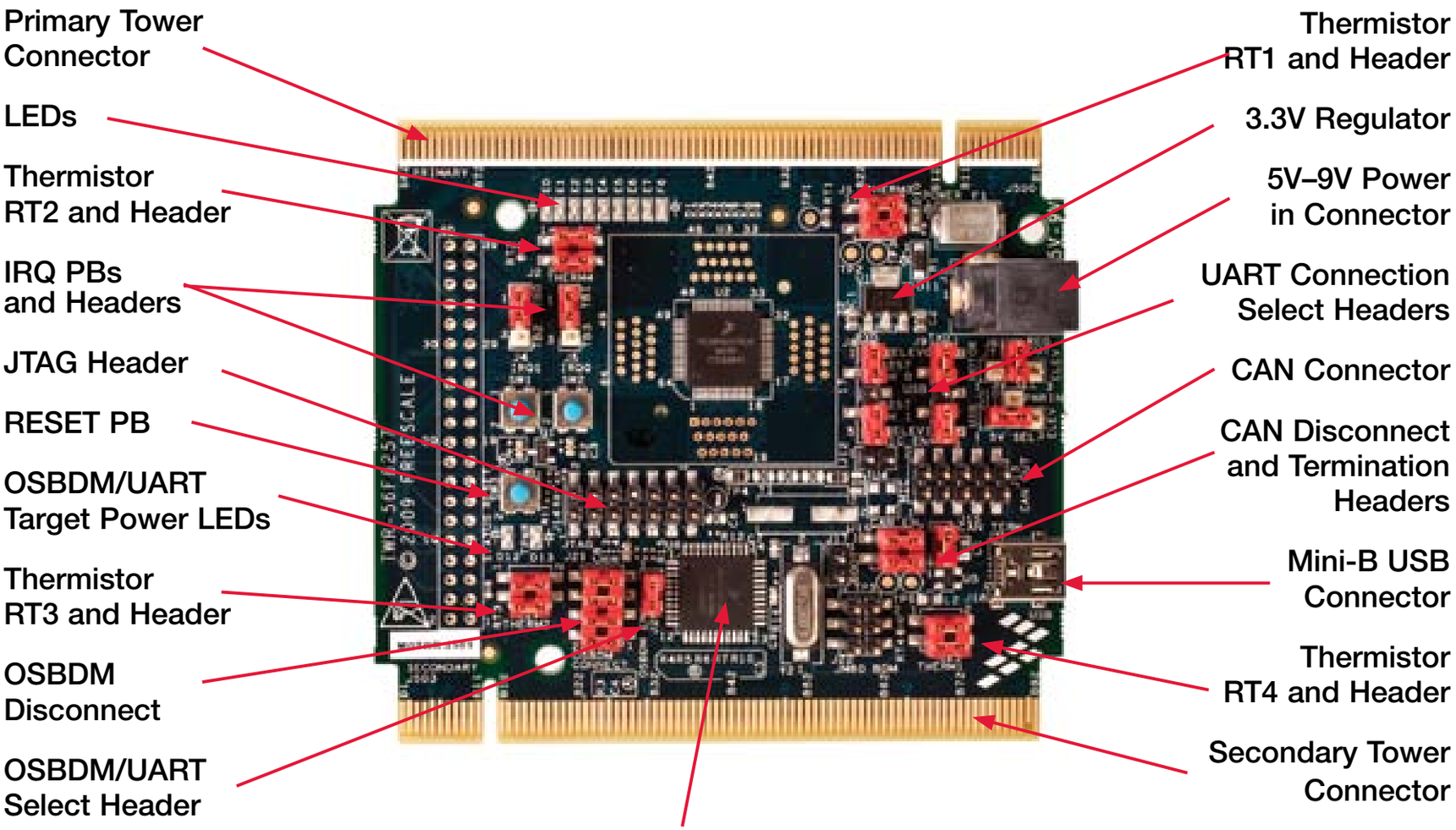


MC56F8257

For power conversion and motor control applications

freescale™ semiconductor

Get to Know the TWR-MC56F8257



TWR-MC56F8257
Freescale Tower System

The TWR-MC56F8257 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 constructing your Tower System today.

TWR-MC56F8257 Features List

Three mission choices to evaluate the MC56F8257 (and future) DSC in 64 LQFP package:

- Stand-alone operation for cost-effective power conversion system development
- Stand-alone mother board for the APMOTOR56F8000E BLDC motor demo system
- Main control board in a Tower System for large system development

Four flexible powering choices all provide clean VDDA and VSSA for low analog noise floor:

- USB power from host computer
- Barrel connector for small external power supply
- Power from APMOTOR56F8000E connector
- Tower System elevator board power via edge connections

Devices included for evaluation of the DSC:

- Optional 8 MHz crystal circuit
- Nine LEDs
- Auxiliary signal connector allows access to all pins of the DSC in stand-alone mode
- Four thermistors for single ended or differential ADC input to the DSC
- CAN transceiver header and termination
- Two push buttons for user input or interrupts to the DSC
- Reset push button for the DSC
- USB to SCI bridge via on-board MC9S08JM60

Two debugging configuration choices:

- JTAG to the board
- OSBDM via USB, jumper selection

Step-by-Step Installation Instructions

In this Quick Start Guide, you will learn how to set up the TWR-56F8257 module and run the default thermistor and LED application.

STEP 1 Install CodeWarrior for Digital Signal Controllers v8.3

CodeWarrior for Digital Signal Controllers (DSCs) v8.3 (Special Edition 64 KB code size limit) is included on the Getting Started DVD. Please follow these steps.

- Insert DVD into your computer and a menu will appear.
- Select “Install CodeWarrior.” One install supports all DSC products.
- Follow the on-screen instructions until installation is complete.
- When installing CodeWarrior, select “Complete” set-up option.

For updates, please visit **freescale.com/codewarrior**

STEP 2 Connect the USB Cable

Ensure the header J20 has a shunt installed. In this case the on-board MC9S08JM60 MCU operates as an OSBDM debug interface. Connect one end of the USB cable to the PC and the other end to the mini-B connector on the TWR-56F8257 module. Allow the PC to automatically configure the USB drivers if needed.

STEP 3 Try Default Demo Application

Now you should see LEDs E0-E7 flashing in pairs, with a period of 400 ms. Touch with your finger one of the on-board thermistors (RT1, RT2, RT3, RT4) placed on each corner of the board. By touching the thermistor, you will increase its temperature. The change of the

temperature is detected by the DSC and it will change the LED flashing pattern. If you touch RT1, LEDs E0 and E1 will start flashing with a period of 200 ms. All other LEDs will be turned off. The thermistors and the LEDs are related as follows:

Thermistor	LEDs
RT1	E0, E1
RT2	E2, E3
RT3	E4, E5
RT4	E6, E7

If you remove your finger from the thermistor, the LED flashing will return to the default pattern.

STEP 4 Lab 1: Thermistor Lab Using PGA Enabled ADC

To run and debug the thermistor demonstration, follow the instructions located in the Getting Started DVD under the Training tab at the TWR-56F8257 Lab Tutorial document.

STEP 5 Learn More about the MC56F8257

Review the TWR-56F8257 labs document included in the training section of the DVD. Discover the benefits the MC56F8257 brings to your application.

- Lab 1: Thermistor Lab Using PGA Enabled ADC
- Lab 2: FFT Lab
- Lab 3: FIR Filter Lab
- Lab 4: BLDC Hall Motor Lab
- Lab 5: FreeMASTER Lab
- Lab 6: DAC and HSCMP Lab
- Lab 7: eFlexPWM Lab

The Getting Started DVD contains a zipped folder with demo board materials. Copy this folder to your computer.

For more information about the MC56F8257 and other DSC families, visit **freescale.com/MC56F82xx** and **freescale.com/dsc** to review the latest lab tutorials, application notes, supporting documents and training opportunities.

TWR-MC56F8257 Jumper Options

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

Jumper	Option	Setting	Description
J1	On-Board Thermistor RT1 Connect	**1-2, 3-4**	**Connect RT1 circuit to the MC56F827 DSC**
		none	Disconnect RT1 circuit from the MC56F8257 DSC
J2	On-Board Thermistor RT2 Connect	**1-2, 3-4**	**Connect RT2 circuit to the MC56F827 DSC**
		none	Disconnect RT2 circuit from the MC56F8257 DSC
J4	DSC Interrupt Request Button IRQ1 Select	**1-2**	**Connect SW1 to MC56F8257 DSC pin GPIOC2/TXD0/TB0/ XB_IN2/CLKO**
		3-4	Connect SW1 to MC56F8257 DSC pin GPIOF6/TB2/PWM3X
		none	Disconnect SW1 from the MC56F8257 DSC
J5	DSC Interrupt Request Button IRQ0 Select	**1-2**	**Connect SW2 to MC56F8257 DSC pin GPIOF8/RXD0/TB1**
		3-4	Connect SW2 to MC56F8257 DSC pin GPIOF7/TB3
		none	Disconnect SW2 from the MC56F8257 DSC
J6 and J7	Power Choice Selection for 3.3V Source	**J6-1 to J7-2**	**Connect the on-board voltage regulator to the P3_3V power rail**
		J7-1 to J7-2	Connect P3_3V_MOTOR to the P3_3V power rail (power the 3.3V rail from the motor control connector)
		J7-2 to J7-3	Connect P3_3V_ELEV to the P3_3V power rail (power the 3.3V rail from the tower connector)
		J7-2 open	Disconnect the P3_3V power rail – no power

To learn more about other Tower System controller and peripheral modules, visit **freescale.com/tower**.

Become a member of the online Tower Geeks community at **towergeeks.org**.

TWR-MC56F8257 Jumper Options (continued)

Jumper	Option	Setting	Description
J8	DSC Serial Port Reception RXD Source Select (note that only one connection can be made to pin 3 at a time)	**1-2**	**Connect ELEV_RXD0 from the Tower connector to MC56F8257 DSC pin GPIOF8/RXD0/TB1**
		2-3	Connect RXD_SEL from the USB Serial Bridge to MC56F8257 DSC pin GPIOF8/RXD0/TB1
		Pin 2 open	Disconnect MC56F8257 DSC pin GPIOF8/RXD0/TB1
		3-4	Connect RXD_SEL from the USB Serial Bridge to MC56F8257 DSC pin GPIOF5/RXD1/XB_OUT5
		4-5	**Connect ELEV_RXD1 from the Tower connector to MC56F8257 DSC pin GPIOF5/RXD1/XB_OUT5**
		Pin 4 open	Disconnect MC56F8257 DSC pin GPIOF5/RXD1/XB_OUT5
J9	DSC Serial Port Transmission TXD Source Select (note that only one connection can be made to pin 3 at a time)	**1-2**	**Connect ELEV_TXD0 from the Tower connector to MC56F8257 DSC pin GPIOC2/TXD0/TB0/XB_IN2/CLKO**
		2-3	Connect TXD_SEL from the USB Serial Bridge to MC56F8257 DSC pin GPIOC2/TXD0/TB0/XB_IN2/CLKO
		Pin 2 open	Disconnect MC56F8257 DSC pin GPIOC2/TXD0/TB0/XB_IN2/CLKO
		3-4	Connect TXD_SEL from the USB Serial Bridge to MC56F8257 DSC pin GPIOF4/TXD1/XB_OUT4
		4-5	**Connect TXD_SEL from the USB Serial Bridge to MC56F8257 DSC pin GPIOF4/TXD1/XB_OUT4**
		Pin 4 open	Shunt for BOOTMOD[1]=0 / Un-shunt for BOOTMOD[1]=1
J10 and J11	5V Source Select	J10-1 to J11-2	Connect the power in barrel connector (through fuse F1) to the input of the 3.3V voltage regulator
		J11-1 to J11-2	**Connect P5V_TRG_USB (the switched USB 5V) to the input of the 3.3V voltage regulator**
		J11-2 to J11-3	Connect P5V_ELEV to the input of the 3.3V voltage regulator
		J11-2 open	Disconnect the input of the 3.3V voltage regulator
J12	Unused	**open**	**Unused**

TWR-MC56F8257 Jumper Options (continued)

Jumper	Option	Setting	Description
J15	CAN Termination Enable	**1-2**	**Connect the 120 ohm CAN termination resistor**
		open	No CAN termination
J16	CAN Enable	**1-2, 3-4**	**Connect the CAN transceiver TXD and RXD to MC56F8257 DSC pins GPIOC11/CANTX/SCL1/TXD1 and GPIOC12/CANRX/SDA1/RXD1**
		open	Disconnect the CAN transceiver
J17	MC9S08JM60 Bootload Enable	1-2	Enable USB bootloading of the MCU Flash memory
		open	**Disable bootloading**
J19	Thermistor RT3 Connect	**1-2, 3-4**	**Connect RT3 circuit to the MC56F827 DSC**
		none	Disconnect RT3 circuit from the MC56F8257 DSC
J20	OSBDM Enable	**1-2**	**Enable OSBDM function**
		none	Enable USB Serial Bridge function
J21	OSBDM Connect to JTAG	**1-2, 3-4, 5-6, 7-8**	**Connect the OSBDM debug signals (JTAG) to the MC56F8257 DSC JTAG pins**
		none	Disconnect OSBDM from the MC56F8257 DSC
J21	Thermistor RT4 Connect	**1-2, 3-4**	**Connect RT4 circuit to the MC56F827 DSC**

Learn more at **freescale.com/MC56F82xx** and **freescale.com/dsc**.

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