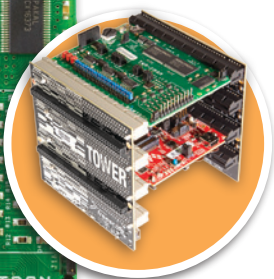# F-RAM Memory Module

Nonvolatile F-RAM
Memory Module (TWR-FRAM)

Compatible with the Freescale Tower System

RAMTRON

Get to know the TWR-FRAM

Battery clip
(3V battery included)

256-Kb I²C Serial F-RAM

1-Mb SPI
Serial F-RAM

4-Mb Parallel
F-RAM

256-Kb
I²C TCXO/
Processor
Companion

8-bit nonvolatile
GPIO State Saver

Primary (Functional)
Connections

256-Kb I²C RTC/
Processor Companion

256-Kb SPI RTC/
Processor Companion
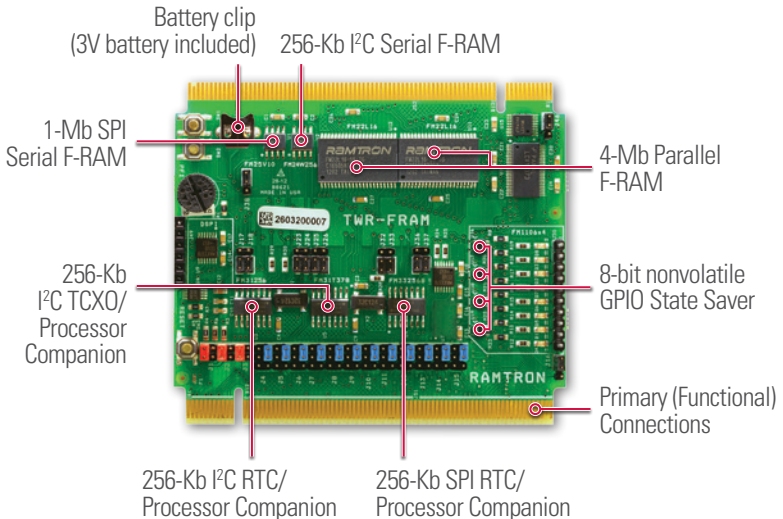
Requires use with Tower System processor module and elevator modules (TWR-ELEV) - sold separately

How to build your TWR-FRAM

✔ **Step 1** Download and install software from www.**ramtron**.com/go/**TWR-FRAM**. Download Quick Start Guide and supporting files.

✔ **Step 2** Install 3V lithium battery on the TWR-FRAM board. The clip is rigid; please use care when installing the battery.

✔ **Step 3** Locate the Elevator Modules (sold separately), identified by the four card-edge connections.

✔ **Step 4** Identify each Elevator Module as either Primary Elevator (white connections) or Secondary Elevator (black connections).

✔ **Step 5** Plug primary connections side of the TWR-FRAM board to the Primary Elevator. Place the TWR-FRAM in top position of the Elevator (see inset photo). This provides easy access to the jumper pins.

✔ **Step 6** Identify the primary and secondary card edges of the Processor Module (TWR-K53N512 or similar device) and any additional modules you add to your tower system.

✔ **Step 7** Plug the primary card edge of each module into the Primary (functional) Elevator.

✔ **Step 8** Place the Secondary Elevator module onto the secondary card edges.

✔ **Step 9** Follow instructions in the Quick Start Guide.
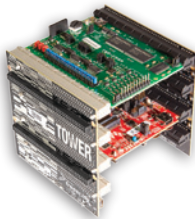
TWR-FRAM Jumper Options

The following tables show all jumper options available.
The ***default*** installed jumper settings are shown in the bold
with asterisks. The jumper pin positions are shown below:

4-pin jumper

4	3
1	2

3-pin jumper

1	2	3
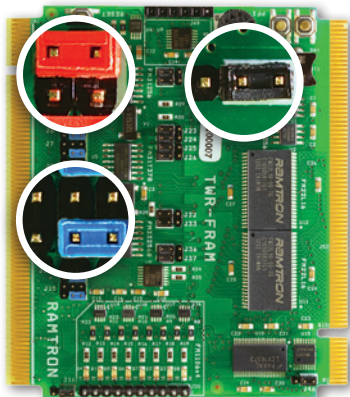
6-pin jumper

6	5	4
1	2	3

Jumper	Option
J1	DSPI Voltage
J2	VTWR Voltage
J32	FM33256B CS
J38	FM25V10 CS
J8	SPI SCK
J10	SPI CS
J4	SPI MISO

Type	Setting	Description
4-pin	1-2	DSPI voltage 1.6V
	2-3	DSPI voltage 3.0V
	3-4	DSPI voltage 1.8V
4-pin	1-2	VTWR voltage 5V
	3-4	VTWR voltage 3.3V
3-pin	*2-3*	Connects pin to SPI CS
	1-2	Disconnects pin to SPI CS
3-pin	1-2	Connects pin to SPI CS
	2-3	Disconnects pin to SPI CS
6-pin	1-2	Connect to pin B7
	2-3	Connect to pin B48
	4-5	Connect to pin B58
6-pin	1-2	Connect to pin B9
	2-3	Connect to pin B46
	4-5	Connect to pin B47
	5-6	Connect to pin B55
6-pin	1-2	Connect to pin B11
	2-3	Connect to pin B44
	4-5	Connect to pin B56

Jumper	Option	Type	Setting	Description
J7	SPI MOSI	6-pin	1-2	Connect to pin B10
			2-3	Connect to pin B45
			4-5	Connect to pin B57
J9	DSPI CLK	6-pin	1-2	Connect to pin B7
			2-3	Connect to pin B48
			4-5	Connect to pin B58
J11	DSPI CS	6-pin	1-2	Connect to pin B9
			2-3	Connect to pin B46
			4-5	Connect to pin B47
			5-6	Connect to pin B55
J5	DSPI D1	6-pin	1-2	Connect to pin B11
			2-3	Connect to pin B44
			4-5	Connect to pin B56
J6	DSPI D0	6-pin	1-2	Connect to pin B10
			2-3	Connect to pin B45
			4-5	Connect to pin B57
J3	DSPI PWR	4-pin	1-2	/SHDN DSPI via pin B22
			3-4	/SHDN DSPI via pin A35

TWR-FRAM Jumper Options *(continued from previous page)*

Jumper	Option	Type	Setting	Description
J12	I2C SCL	6-pin	1-2	Connect to pin A7
			2-3	Connect to pin B50
			4-5	Connect to pin B57
J13	I2C SDA	6-pin	1-2	Connect to pin A8
			2-3	Connect to pin B51
			4-5	Connect to pin B56
J14	INTERRUPT	6-pin	1-2	Connect to pin B58
			2-3	Connect to pin B56
			4-5	Connect to pin B62
J15	RESET	6-pin	1-2	Connect to pin A62
			2-3	Connect to pin A47
			4-5	Connect to pin A63
J16	State Saver Enable	3-pin	*1-2*	Connects EN pin to B35
			2-3	Connects EN pin to gnd
J18	FM31256 PFO	3-pin	1-2	Connects to INTERRUPT jumper
			2-3	Disconnects pin from INTERRUPT jumper
J17	FM31256 RESET	3-pin	1-2	Connects to RESET jumper
			2-3	Disconnects pin from RESET jumper
J26	FM31T378 PFO	3-pin	1-2	Connects to INTERRUPT jumper
			2-3	Disconnects pin from INTERRUPT jumper
J23	FM31T378 RESET	3-pin	1-2	Connects to RESET jumper
			2-3	Disconnects pin from RESET jumper

Jumper	Option	Type	Setting	Description
J25	FM31T378 FOUT	3-pin	1-2	Connects to INTERRUPT jumper
			2-3	Disconnects pin from INTERRUPT jumper
J24	FM31T378 INT	3-pin	1-2	Connects to INTERRUPT jumper
			2-3	Disconnects pin from INTERRUPT jumper
J33	FM33256B ACS	3-pin	1-2	Connects to INTERRUPT jumper
			2-3	Disconnects pin from INTERRUPT jumper
J36	FM33256B PFO	3-pin	1-2	Connects to INTERRUPT jumper
			2-3	Disconnects pin from INTERRUPT jumper
J37	FM33256B RESET	3-pin	1-2	Connects to RESET jumper
			2-3	Disconnects pin from RESET jumper
J46	FM22L16 SELECT	3-pin	*1-2*	Enables '138 decoder to drive chip enables to FM22L16 devices
			2-3	Disables '138 decoder from driving chip enables to FM22L16 devices

TWR-FRAM Features

Part Number	Quantity	Component
FM22L16	2	4-Mb Parallel F-RAM (expandable to 8-Mb)
FM1106	4	8-bit non-volatile GPIO State Saver
FM25V10	1	1-Mb SPI Serial FRAM
FM24W256	1	256-Kb I2C Serial FRAM
FM31T378	1	256-Kb I2C TCXO and Processor Companion
FM31256	1	256-Kb I2C RTC/Processor Companion
FM33256B	1	256-Kb SPI RTC/Processor Companion

Learn more

For more information about the TWR-FRAM module, visit
www.**ramtron**.com/go/**TWR-FRAM**. Additional information
about the Freescale Tower System is available from
www.freescale.com/tower.

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