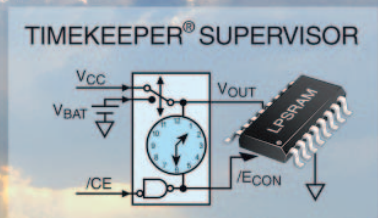
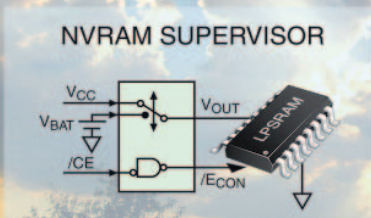
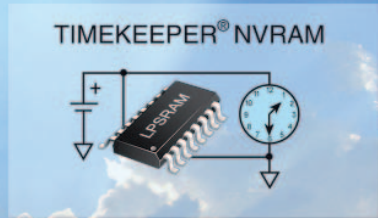
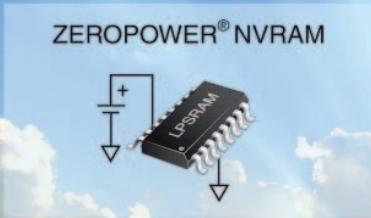


# Non-volatile RAMs

## Selection guide



September 2007

# ZEROPOWER® NVRAMs

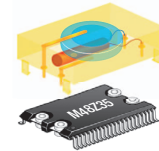
- Battery backed SRAM
- 16 Mbit to 16 Kbit

Density	Part number	V <sub>CC</sub> [V]	Battery check	Package			Comments
				SNAPHAT®	DIP	Other	
16 Mb (2 Mx8)	M48Z2M1Y	5.0			36		
	M48Z2M1V	3.3					
4 Mb (512 Kx8)	M48Z512AY	5.0			32		
1 Mb (128 Kx8)	M48Z129V	3.3	■		32		Reset output
	M48Z128Y	5.0			32		
256 Kb (32 Kx8)	M48Z35AV	3.3	■	SOH28	28		
	M48Z35	5.0		SOH28	28		
	M48Z32V	3.3				SO-44	Low-profile package
64 Kb (8 Kx8)	M48Z58	5.0		SOH28	28		
	M48Z18	5.0			28		Z18: 5 V+/-10 %
	M48Z08	5.0			28		Z08: 5 V+/-10 %
16 Kb (2 Kx8)	M48Z12	5.0			24		Z12: 5 V+/-10 %
	M48Z02	5.0			24		Z02: 5 V+/-10 %

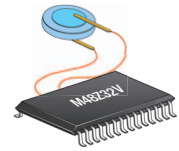
## High density surface mount

For high density (1 Mb and above) surface mount ZEROPOWER NVRAM solutions, ST offers NVRAM supervisors for non-volatizing low-power SRAMs. Users can mix and match these devices to implement a variety of configurations. Refer to the SUPERVISOR tables for more information.

## ZEROPOWER example solutions



3.3 V or 5 V, 32 Kx8 SNAPHAT solution with ST's M48Z35



Low profile 3.3 V, 32 Kx8 solution with ST's M48Z32V

# TIMEKEEPER® NVRAMS

- Battery backed SRAM with real-time clocks
- 32 Mbit to 1 Kbit

Density	Part number	V <sub>CC</sub> [V]	Clock (1)	µP and System Supervisory Features				-40° to +85° C	Package			Comments
				Alarm	Watchdog	POR-LVD output (2)	Battery monitor		SNAPHAT	DIP	Other	
32 Mb (1 Mx32)	<b>M440T1MV</b>	3.3	16B	■	■		■				PBGA-168	
4 Mb (512 Kx8)	<b>M48T512Y</b>	5.0	8B							32		
	<b>M48T251Y</b>	5.0	Ph							32		Phantom clock interface
1 Mb (128 Kx8)	<b>M48T248Y</b>	5.0	Ph							32		Phantom clock interface
	<b>M48T129V</b>	3.3	16B	■	■	■	■			32		
	<b>M48T129Y</b>	5.0										
	<b>M48T128Y</b>	5.0								32		
256 Kb (32 Kx8)	<b>M48T37V</b>	3.3	16B	■	■	■	■	■	SOH44			
	<b>M48T37Y</b>	5.0										
	<b>M48T35AV</b>	3.3	8B				■	■	SOH28	28		
	<b>M48T35</b>	5.0	8B					■	SOH28	28		
64 Kb (8 Kx8)	<b>M48T59</b>	5.0	16B	■	■	■	■		SOH28	28		
	<b>M48T58</b>	5.0	8B				■		SOH28	28		
	<b>M48T18</b>	5.0	8B						(3)	28		5 V+/-10 %; Power-fail interrupt
	<b>M48T08</b>	5.0	8B							28		5 V+10/-5 %; Power-fail interrupt
	<b>M48T08Y</b>	5.0	8B						SOH28			Replaces M48T18-100MH1
16 Kb (2 Kx8)	<b>M48T12</b>	5.0	8B				■			24		5 V+/-10 %
	<b>M48T02</b>	5.0	8B				■			24		5 V+10/-5 %
1 Kb (128 x8)	<b>M48T86</b>	5.0	16B	■	■	■	■		SOH28	24		Multiplexed bus; Squarewave output

1.16B: Parallel access real-time clock with 16 registers for time, date, alarm and watchdog

8B: Parallel access real-time clock with 8 registers for time and date. No alarm, no watchdog

Ph: Phantom (serial) interface to the real-time clock over bit 0 of the data bus

2. POR-LVD: Power-on reset/low-voltage detect

3. M48T18-100MH1 (SNAPHAT package) replaced by M48T08Y-10MH1

# NVRAM supervisors

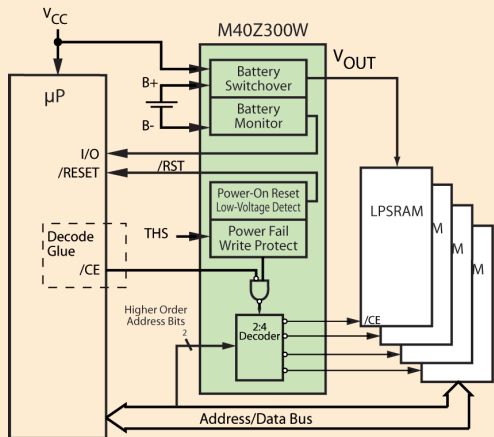
## Microprocessor supervisors with switchover

### ■ Turn low-power SRAMs into NVRAMs

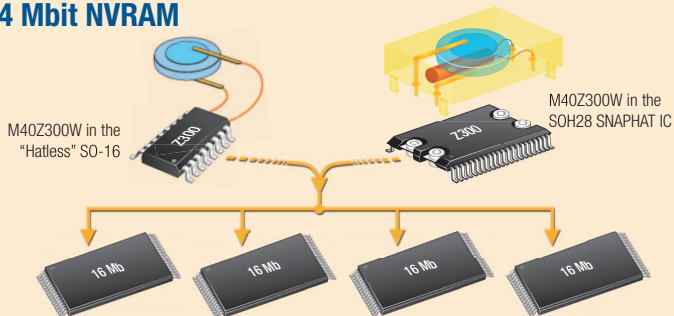
Root p/n	V <sub>RST</sub> (V <sub>PFD</sub> ) [V]	Reset output	Manual reset input	PFI/ PFO (1)	Watch-dog	Chip enable gate	Battery freshness seal	Package	Comment
M40SZ100W	2.60	Active low, open drain	■	■		■		SO-16	Battery monitor
M40Z111	4.35, 4.60	n/a				■		SOH28	
M40Z300W	2.60, 2.90	Active low, open drain				4		SO-16, SOH28	Battery monitor
STM690A	4.65	Active low, push-pull						SO-8	
STM690R,S,T	2.63, 2.93, 3.08		■	■			SO-8, TSSOP8		
STM692A	4.40						SO-8		
STM703	4.65	Active low, push-pull						SO-8	
STM704	4.40		■	■			SO-8, TSSOP8		
STM704R,S,T	2.63, 2.93, 3.08						SO-8		
STM795R,S,T	2.63, 2.93, 3.08	Active low, open drain				■		SO-8	V <sub>cc</sub> switch signal
STM802L,M	4.65, 4.40	Active low, push-pull		■	■			SO-8, TSSOP8	2 % PFI Threshold
STM802R,S,T	2.63, 2.93, 3.08								
STM804R,S,T	2.63, 2.93, 3.08	Active high, open drain		■	■			SO-8, TSSOP8	2 % PFI Threshold
STM805L	4.65	Active high, push-pull		■	■			SO-8	
STM805R,S,T	2.63, 2.93, 3.08	Active high, open drain		■	■			SO-8, TSSOP8	
STM806R,S,T	2.63, 2.93, 3.08	Active low, push-pull	■	■				SO-8, TSSOP8	2 % PFI Threshold
STM817L,M	4.65, 4.40	Active low, push-pull		■	■		■	SO-8, TSSOP8	
STM818L,M					■	■			
STM819L,M			■	■		■			

1. PFI-PFO: Early power-fail warning (power-fail in/power-fail out)

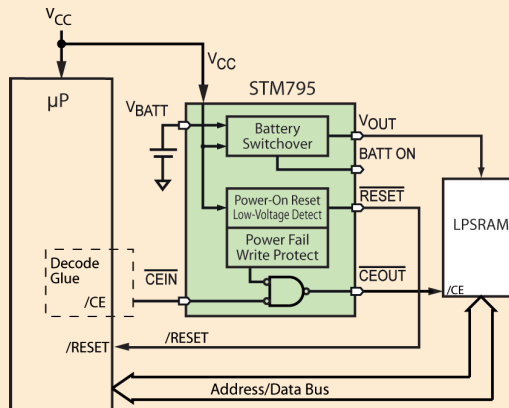
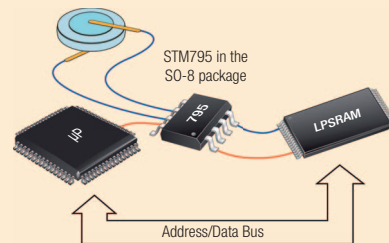
## Surface mount NVRAM solutions



### 64 Mbit NVRAM



### 4 Mbit NVRAM



# TIMEKEEPER<sup>®</sup> supervisors

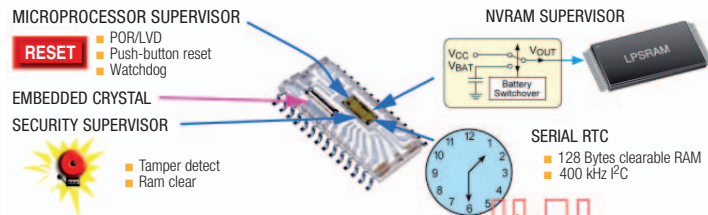
## ■ Turn low-power SRAMs into TIMEKEEPER NVRAMs

Part number	RTC bus	#Chip selects	V <sub>CC</sub> [V]	μP and system supervisory features						Square-wave output	Chip enable gate	V <sub>OUT</sub>	-40° to +85° C	Package		Comment
				Alarm	Watch-dog	POR-LVD Output (1)	PFI-PFO (2)	/Reset inputs	Battery monitor					Hatless	SNAPHAT	
M41ST95W	SPI	1	2.7-3.6	■	■	■	■	2	■	■	■	■	SOX28		32 KHz out	
M41ST87Y	400 kHz I <sup>2</sup> C	1	4.5-5.5	■	■	■	2	2	■	■	■	■	SOX28		Tamper detect; RAM clear; Unique serial No.; 32 KHz out	
M41ST87W			2.7-3.6													
M41ST85W	400 kHz I <sup>2</sup> C	1	2.7-3.6	■	■	■	■	2	■	■	■	■	SOX28	SOH28		
M41T315V	Phantom	1	3.0-3.6					1						SOH28		
M48T201V	8 b	1	3.0-3.6	■	■	■		2	■	■	■	■			SOH28	
M48T201Y			4.5-5.5													
M48T212V	8 b	2	3.0-3.6	■	■	■		2	■	■	■	■		SOH28		

1. POR-LVD: power-on reset / low-voltage detect.

2. PFI-PFO: Early power-fail warning (power-fail in / power-fail out).

## Solutions with TIMEKEEPER SUPERVISORS

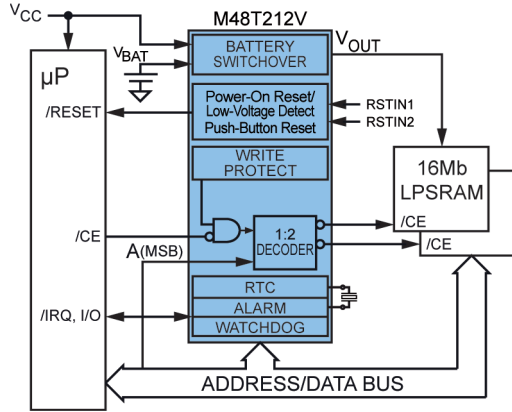


### M41ST87 SECURITIZOR

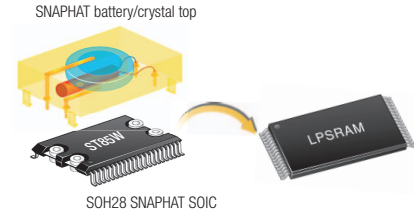
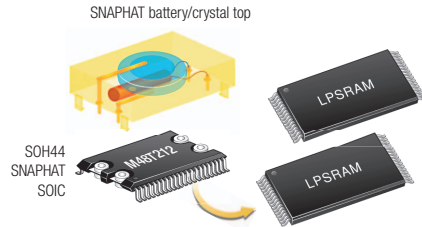
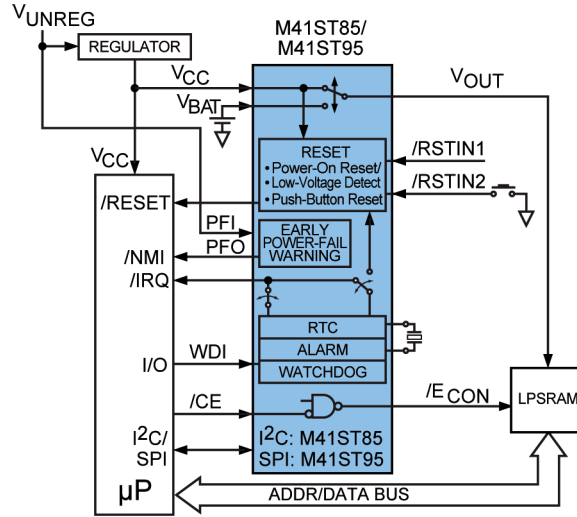
3/3.3 V or 5 V, 1 Mb -16 Mb  
for secure applications

### 3.3 V, 32 Mbit solution using the M48T212V and two 16-Mbit LPSRAMs

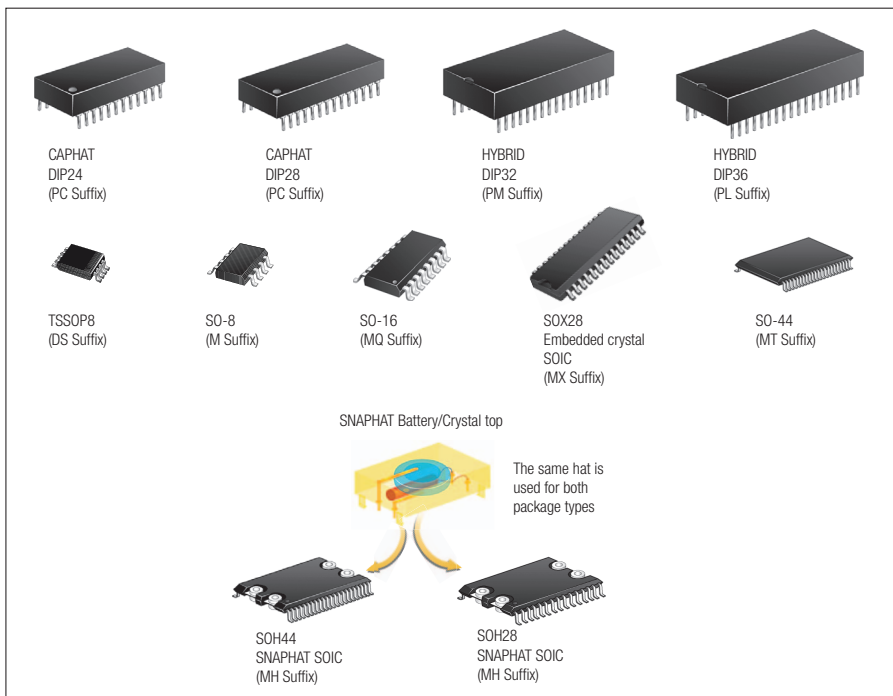
- Parallel access RTC with alarm and watchdog
- Power-on reset/low-voltage detect with push-button reset inputs



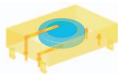
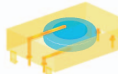
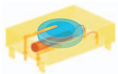
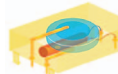
### 3.3 V, 1-16 Mb solution with the M41ST85/M41ST95



## NVRAM package options



## SNAPHAT battery/crystal tops

	48 mAh	120 mAh -40° to +85° C
ZEROPOWER and SUPERVISOR (no crystal)	 M4Z28-BR00SH1	 M4Z32-BR00SH1
TIMEKEEPER and TIMEKEEPER SUPERVISOR (includes crystal)	 M4T28-BR12SH1	 M4T32-BR12SH1/6



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