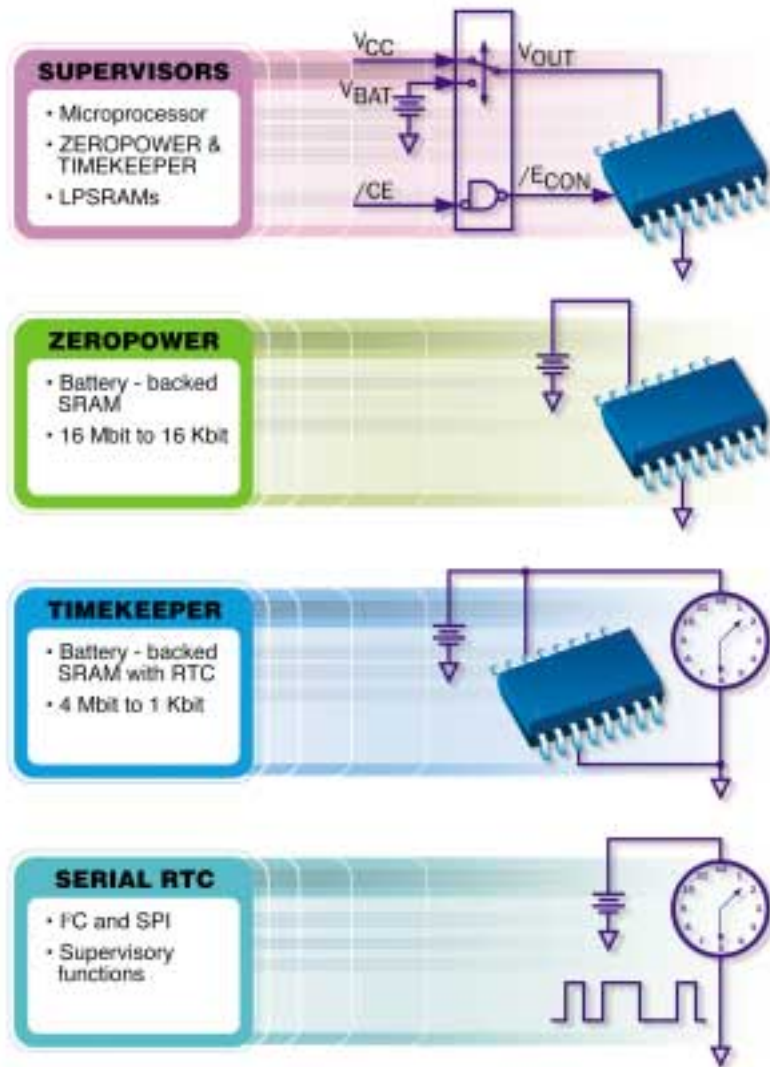


Non-Volatile RAM and RTC

www.st.com/nvram



Selection Guide

SUPERVISORs

- ZEROPOWER SUPERVISORs
- Control up to 4 LPSRAMs

ZEROPOWER SUPERVISORs non-volatize LPSRAMs

ZEROPOWER SUPERVISORs

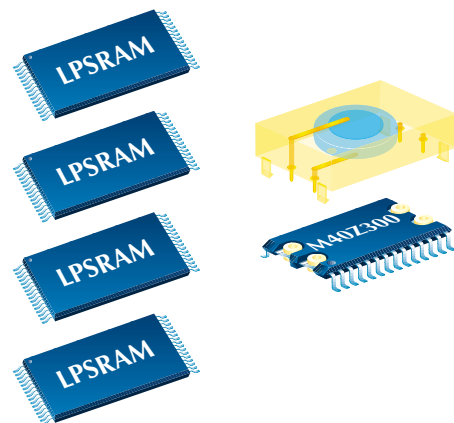
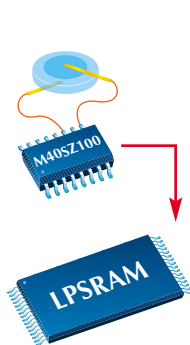
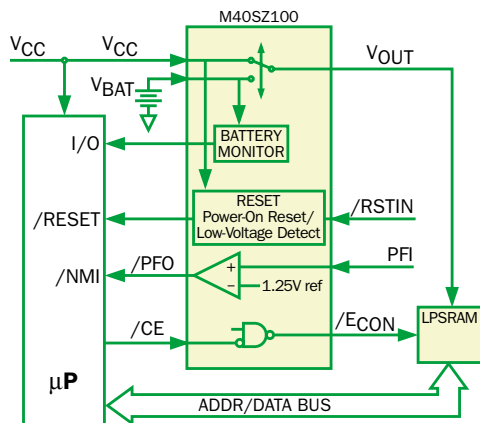
Part Number	#Chip Selects	V _{CC}	THS (1)	μP and System Supervisory Features				Chip Enable Gate	V _{out}	-40°C to +85°C	Package	
				POR-LVD (2) Output	/Reset Inputs	PFI-PFO (3)	Battery Monitor				Hatless	SNAPHAT®
M40Z300W	4	2.7-3.6V	2.60/2.90V	•			•	•	•	•	S016	SOH28
M40Z300	4	4.5-5.5V	4.35/4.60V	•			•	•	•	•	S016	SOH28
M40SZ100W (4)	1	2.7-3.6V	n/a	•	1	•	•	•	•	•	S016	
M40Z111W	1	2.7-3.6V	2.60/2.90V					•	•	•		SOH28
M40Z111	1	4.5-5.5V	4.35/4.60V					•	•	•		SOH28

(1) THS pin selects Power-Fail Detect (V_{FPO}) threshold

(2) POR-LVD: Power-On Reset/Low-Voltage Detect

(3) PFI-PFO: Early Power-Fail Warning (Power-Fail In/Power-Fail Out)

(4) Contact ST sales office for availability of other voltage and package options



SUPERVISORs

- TIMEKEEPER SUPERVISORs
- LPSRAMs

TIMEKEEPER SUPERVISORs non-volatize LPSRAMs and add Real-Time Clock

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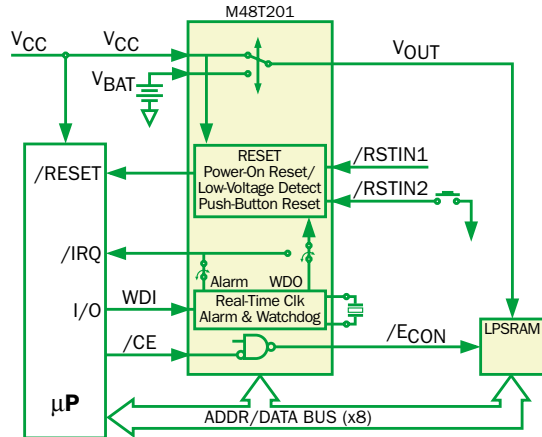
TIMEKEEPER SUPERVISORs

Part Number	RTC Bus	#Chip Selects	V _{CC}	µP and System Supervisory Features									V _{CC} Switch	-40°C to +85°C	Package	
				Alarm	Watchdog	POR-LVD (1) Output	PFI-PFO (2)	/Reset Inputs	Battery Monitor	Square Wave Output	Chip Enable Gate	V _{out}			Hatless	SNAPHAT®
M41ST85W	400kHz I ² C	1	2.7-3.6V	•	•	•	•	2	•	•	•	•	•	•	SO28 (3)	SOH28
M41ST85Y	400kHz I ² C	1	4.5-5.5V	•	•	•	•	2	•	•	•	•	•	•		SOH28
M48T201V	x8	1	3.0-3.6V	•	•	•		2	•	•	•	•	•	•		SOH44
M48T201Y	x8	1	4.5-5.5V	•	•	•		2	•	•	•	•	•	•		SOH44
M48T212V	x8	2	3.0-3.6V	•	•	•		2	•	•	•	•	•	•		SOH44
M48T212Y	x8	2	4.5-5.5V	•	•	•		2	•	•	•	•	•	•		SOH44

(1) POR-LVD: Power-On Reset/Low-Voltage Detect

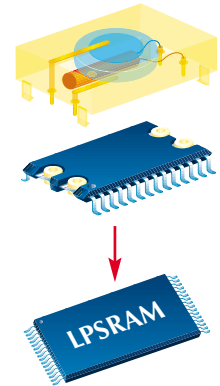
(2) PFI-PFO: Early Power-Fail Warning (Power-Fail In/Power-Fail Out)

(3) Contact ST sales office for availability of this package



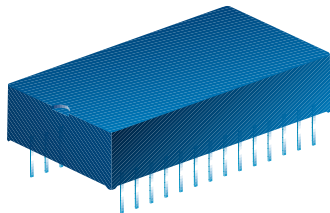
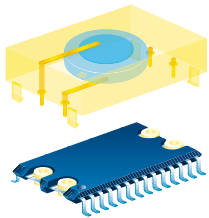
LPSRAM	Org.	V _{CC}	I _{CCDR}
M68Z128W-70N1	128K x8	3.0 V	0.1 µA
M68Z512W-70NC1	512K x8	3.0 V	0.4 µA

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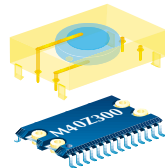
ZEROPOWER

- Battery-backed SRAM
- 16 Mbit to 16 Kbit



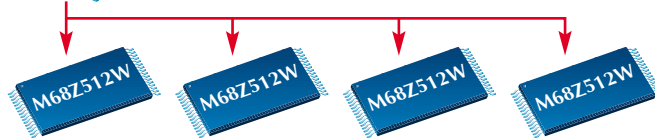
ZEROPOWER NVRAMs

Density	Part Number	V _{CC}	Battery Check	Package			-40°C to +85°C	Comments
				SNAPHAT®	DIP	Other		
16Mb (2Mx8)	M48Z2M1	5.0V			36			
4Mb (512Kx8)	M48Z512AY	5.0V			32			
1Mb (128Kx8)	M48Z129V	3.3V	•		32			Reset Output
	M48Z128Y	5.0V			32			
	M48Z35AY	5.0V	•		28			
	M48Z35AV	3.3V	•	SOH28	28		•	
256Kb (32Kx8)	M48Z35	5.0V		SOH28	28			
	M48Z32V	3.3V				SO44		Low profile package
	M48Z58	5.0V		SOH28	28		•	
	M48Z18	5.0V			28			5V±10%
64Kb (8Kx8)	M48Z08	5.0V			28			5V+10/-5%
	M48Z12	5.0V			24			5V±10%
	M48Z02	5.0V			24		•	5V+10/-5%

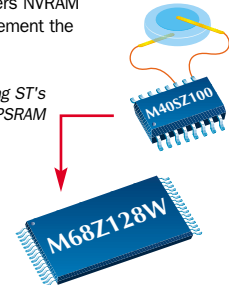


For high density (1Mb and up) surface mount ZEROPOWER NVRAM solutions, ST offers NVRAM Supervisors and Low-Power SRAMs. Users can mix and match these devices to implement the variety of configurations.

A 16Mb solution using ST's M40Z300 and four 4Mb LPSRAMs



A 1Mb solution using ST's M40SZ100W and a 1Mb LPSRAM



TIMEKEEPER

- Battery-backed SRAM with RTC
- 4 Mbit to 1 Kbit

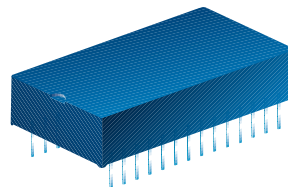
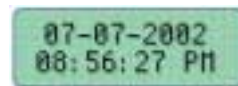
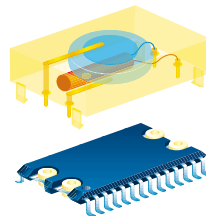
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TIMEKEEPER NVRAMs

Density	Part Number	V _{CC}	Clock	µP and System Supervisory Features				Package		-40°C to +85°C	Comments
				Alarm	Watchdog	POR-LVD (1) Output	Battery Monitor	SNAPHAT®	DIP		
4Mb (512Kx8)	M48T512Y	5.0V	8B						32		
1Mb (128Kx8)	M48T129V	3.3V	16B	•	•	•	•		32		
	M48T129Y	5.0V	16B	•	•	•	•		32		
	M48T128Y	5.0V	8B						32		
256Kb (32Kx8)	M48T37V	3.3V	16B	•	•	•	•	SOH44		•	
	M48T37Y	5.0V	16B	•	•	•	•	SOH44		•	
	M48T35AV	3.3V	8B				•	SOH28	28	•	
	M48T35	5.0V	8B					SOH28	28	•	
64Kb (8Kx8)	M48T59	5.0V	16B	•	•	•	•	SOH28	28	•	
	M48T559	5.0V	16B	•	•	•	•	SOH28			Multiplexed Bus
	M48T58	5.0V	8B				•	SOH28	28		
	M48T18	5.0V	8B					(2)	28		5V±10% Power-Fail Interrupt
	M48T08	5.0V	8B						28		5V±10/-5% Power-Fail Interrupt
	M48T08Y	5.0V	8B					SOH28			Replaces M48T18-100MH1
16Kb (2Kx8)	M48T12	5.0V	8B				•		24		5V±10%
	M48T02	5.0V	8B				•		24		5V±10/-5%
1Kb (128x8)	M48T86	5.0V	16B	•	•	•	•	SOH28	24		Multiplexed Bus; Square Wave Out

(1) POR-LVD: Power-On Reset/Low-Voltage Detect

(2) M48T18-100MH1 (SNAPHAT® Package) replaced by M48T08Y-10MH1



SERIAL RTC

- I²C AND SPI
- Supervisory functions

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Serial Real-Time Clocks

Part Number	NVRAM	Bus	Package		V _{CC}	Internal Switchover and Write Protect	µP and System Supervisory Features					Square Wave Output	Chip Enable Gate	Vout	-40°C to +85°C	Comments
			SNAPHAT®	Other			Alarm & Watchdog	POR-LVD (1)	PFI-PFO (2)	/Reset Inputs	Battery Monitor					
M41ST95 (4)	44B	SPI		SO28	2.7-5.5V	•	•	•	•	2	•	•	•	•	•	500 nA Ibat THS Pin (3)
M41ST85Y	44B	400kHz I²C	SOH28		4.5-5.5V	•	•	•	•	2	•	•	•	•	•	500 nA Ibat NV Supervisor
M41ST85W	44B	400kHz I²C	SOH28	SO28 (4)	2.7-3.6V	•	•	•	•	2	•	•	•	•	•	500 nA bat NV Supervisor
M41T94	44B	SPI	SOH28	SO16	2.7-5.5V	•	•	•		2	•	•			•	500 nA Ibat THS Pin (3)
M41ST84Y	44B	400kHz I²C	(4)	SO16	4.5-5.5V	•	•	•	•	1	•	•			•	500 nA Ibat
M41ST84W	44B	400kHz I²C	(4)	SO16	2.7-3.6V	•	•	•	•	1	•	•			•	500 nA Ibat
M41T81		400kHz I²C		SO8	2.0-5.5V	•	•					•			•	
M41T56	56B	I²C	SOH28	SO8	4.5-5.5V	•									•	500 nA Ibat
M41T11	56B	I²C	SOH28	SO8	2.0-5.5V	•									•	
M41T00		I²C		SO8	2.0-5.5V	•									•	
M41T80		400kHz I²C		SO8	2.0-5.5V		• (5)					•			•	32kHz output
M41T0		I²C		SO8	2.0-5.5V										•	

(1) POR-LVD: Power-On Reset/Low-Voltage Detect

(2) PFI-PFO: Power-Fail In/Power-Fail Output: Early Power-Fail Warning

(3) THS pin: Selects Power-Fail Detect Threshold (2.65V or 4.40V for 3V or 5V operation)

(4) Contact ST sales office for availability

(5) Alarm only. No watchdog on the M41T80

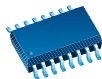
Serial RTCs provide day-date-time and small amounts of NVRAM accessed over SPI or I²C bus.

These devices are rich in microprocessor supervisor features such as Power-On Reset/Low-Voltage Detect, Watchdog, Early Power-Fail Warning, Push-Button Reset and more.

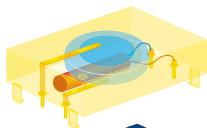
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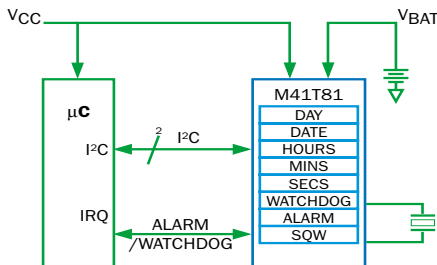
SO8



SO16

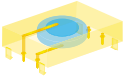
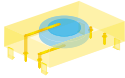
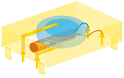
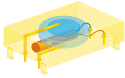


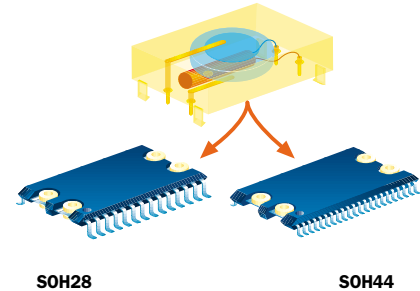
SNAPHAT®



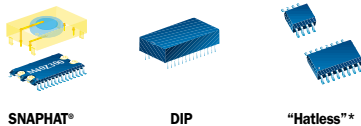
SNAPHAT® Battery/Crystal Tops

Use same hat for both package types

	48 mAh	120 mAh -40°C to +85°C
ZEROPOWER and SUPERVISOR		
	M4Z28-BR00SH1	M4Z32-BR00SH1
TIMEKEEPER, RTC and SUPERVISOR		
	M4T28-BR12SH1	M4T32-BR12SH1/6



Packaging Options



	SNAPHAT®	DIP	"Hatless"*
ZEROPOWER	✓	✓	✓
TIMEKEEPER	✓	✓	
Supervisor	✓		✓
Serial RTC	✓		✓

* "Hatless" devices use batteries supplied by the customer

SNAPHAT® packaging technology provides surface mount ICs with removable/replaceable lithium batteries. The SNAPHAT® tops are inserted after the ICs are reflow soldered thereby avoiding exposure to high temperatures.

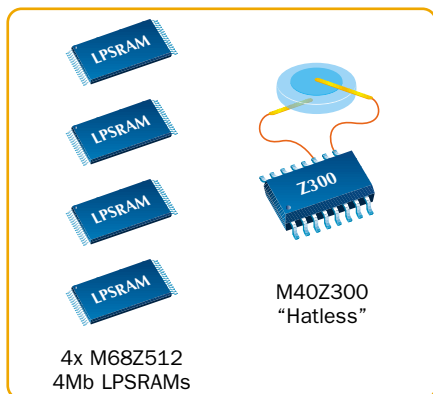
The ZEROPOWER SNAPHAT® tops are for use with all ZEROPOWER ICs, while the TIMEKEEPER SNAPHAT® tops include crystals for use with TIMEKEEPER products. Two battery life ratings are available.

The SNAPHAT® tops can be used with both the SOH28 and the SOH44 SNAPHAT® IC packages—separate types are not required.

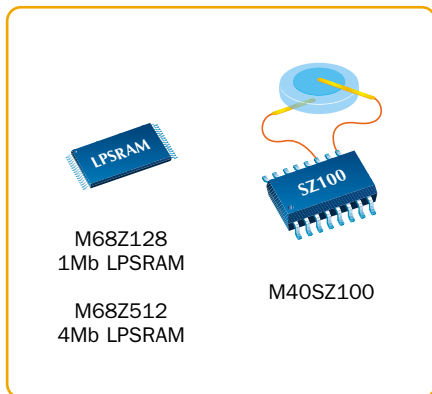
The Lithium Battery Cell is non-corrosive, non-toxic and non-explosive. It has a limited self-discharge rate of 0.3% - 0.5% per year.

High Density Surface Mount Solutions

16Mb NVRAM

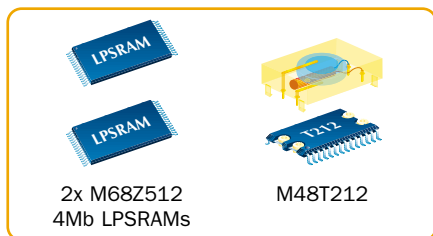


1Mb or 4Mb with PFI-PFO

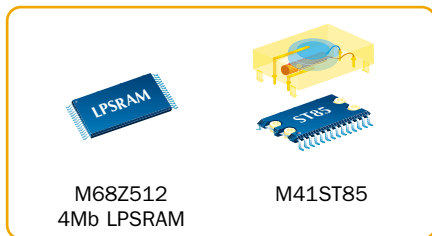


Mix and match ST Supervisors, LPSRAMs and SNAPHAT® tops for a surface mount ZEROPOWER or TIMEKEEPER solution customized to your unique specifications.

8Mb with Parallel RTC



4Mb with Serial RTC and µP Supervisor



www.st.com/nvram

SUPERVISORS

- Microprocessor
- ZEROPOWER & TIMEKEEPER
- LPSRAMs

ZEROPOWER

- Battery - backed SRAM
- 16 Mbit to 16 Kbit

TIMEKEEPER

- Battery - backed SRAM with RTC
- 4 Mbit to 1 Kbit

SERIAL RTC

- I²C and SPI
- Supervisory functions

Visit our website for:

- Battery Life Data and Calculators
- Industrial Temperature Selector
- Application Notes
- FAQs

- Clock Calibration Tools
- PDF NVRAM Selector
- UL Information
- Email Technical Support



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Full product information at www.st.com

ORDER CODE: SCGNVRAM0702

