

SAMSUNG

PRODUCT SELECTION GUIDE

Displays, Memory and Storage

2H 2014



DRAM

FLASH - SSD

MCP

STORAGE







DISPLAYS

CONTACTS

Samsung Semiconductor, Inc.

Samsung continues to lead the industry with the broadest portfolio of memory products and display technology. Its display panels, DRAM, flash, mobile and graphics memory are found in many computers – from ultrabooks to powerful servers – and in a wide range of handheld devices such as smartphones and tablets. Samsung is also a leader in TV displays. In addition, Samsung provides the industry’s widest line of storage products from the consumer to enterprise levels. These include optical disc drives as well as flash storage, such as Solid State Drives, and a range of embedded flash storage products.

Markets

	DRAM	SSD	FLASH	ASIC	LOGIC	TFT/LCD	ODD
 MOBILE/WIRELESS	●	N/A	●	●	●	●	●
 NOTEBOOK PCs/ ULTRABOOKS™	●	●	●	●	●	●	●
 DESKTOP PCs/ WORKSTATIONS	●	●	●	●	●	●	●
 SERVERS	●	●	●	●	●	●	●
 NETWORKING/ COMMUNICATIONS	●	●	●	●	●	N/A	●
 CONSUMER ELECTRONICS	●	N/A	●	●	●	●	●

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DDR4 SDRAM COMPONENTS

Density	Voltage	Organization	Part Number	# Pins-Package	Compliance	Speed (Mbps)	Dimensions	Production
4Gb	1.2V	1G x 4	K4A4G045WD-BCRC/PB	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x11mm	Now
		512M x8	K4A4G085WD-BCRC/PB	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	2400/2133	7.5x11mm	Now
		256Mx16	K4A4G165WD-BCRC/PB	96 Ball -FBGA	Lead Free & Halogen Free	2400/2133	7.5x13.3mm	Now
8Gb	1.2V	2G x 4	K4A8G045WB-BCRC/PB	78 ball FBGA	Lead Free & Halogen Free	2400/2133		2Q'15
		1G x 8	K4A8G085WB-BCRC/PB	78 ball FBGA	Lead Free & Halogen Free	2400/2133		2Q'15

DDR4 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.2V	1Gx 72	M393A1G40DB0-CPB/CRC	4Gb (1G x4) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	1	Now
			M393A1G43DB0-CPB/CRC	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	2133/2400	2	Now
16GB	1.2V	2Gx 72	M393A2G40DB0-CPB/CRC	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	2133/2400	2	Now
			M393A2K40BB0-CPB/CRC	8Gb (2G x4) * 18	Lead Free & Halogen Free	2133/2400	1	1Q'15
			M393A2K43BB0-CPB/CRC	8Gb (1G x8) * 18	Lead Free & Halogen Free	2133/2400	1	1Q'15
32GB	1.2V	4Gx 72	M393A4K40BB0-CPB/CRC	8Gb (2G x4) * 36	Lead Free & Halogen Free	2133/2400	2	1Q'15
64GB TSV	1.2V	8Gx 72	M393A8G40D40-CRB	4Gb (4Gx4)*36	Lead Free & Halogen Free	2133	4	Now

Notes: DDR4 4Gb based 0=IDT 2 =Montage PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)
 DDR4 8Gb based 0=IDT 4 =Montage PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM LOAD REDUCED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
32GB	1.2V	4Gx 72	M386A4G40DM0-CPB/CRC	4Gb DDP (2Gx4) * 36	Lead Free & Halogen Free	2133/2400	4	Now
64GB	1.2V	8Gx 72	M386A8K40BM0-CPB/CRC	8Gb DDP (4Gx4) * 36	Lead Free & Halogen Free	2133/2400	4	1Q'15

Notes: DDR4 4Gb based 0=IDT 2 =Montage PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)
 DDR4 8Gb based 0=IDT 4 =Montage PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.2V	512Mx 64	M378A5143DB0-CPB/CRC	4Gb (512M x8) *8	Lead Free & Halogen Free	2133/2400	1	Now
			M378A5144BB0-CPB/CRC	8Gb (1G x16) * 4	Lead Free & Halogen Free	2133/2400	1	2Q'15
8GB	1.2V	1Gx 64	M378A1G43DB0-CPB/CRC	4Gb (512M x8) *16	Lead Free & Halogen Free	2133/2400	2	Now
			M378A1K43BB0-CPB/CRC	8Gb (1G x8) * 8	Lead Free & Halogen Free	2133/2400	1	2Q'15
16GB	1.2V	2Gx 64	M378A2K43BB0-CPB/CRC	8Gb (1G x8) * 16	Lead Free & Halogen Free	2133/2400	2	2Q'15

Notes: PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM ECC UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.2V	1G x72	M391A1G43DB0-CPB/CRC	4Gb (512M x8) * 18	Lead Free & Halogen Free	2133/2400	2	Now
			M391A1K43BB0-CPB/CRC	8Gb (1G x8) * 9	Lead Free & Halogen Free	2133/2400	1	2Q'15
16GB	1.2V	2G x72	M391A2G43BB0-CPB/CRC	8Gb (1G x8) * 18	Lead Free & Halogen Free	2133/2400	2	2Q'15

Notes: PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
4GB	1.2V	512Mx 64	M471A5143DB0-CPB/CRC	4Gb (512M x8) * 8	Lead Free & Halogen Free	2133/2400	1	Now
			M471A5143BB0-CPB/CRC	8Gb (1G x16) * 4	Lead Free & Halogen Free	2133/2400	1	2Q'15
8GB	1.2V	1Gx 64	M471A1G43DB0-CPB/CRC	4Gb (512M x8) * 16	Lead Free & Halogen Free	2133/2400	2	Now
			M471A1K43BB0-CPB/CRC	8Gb (1G x8) * 8	Lead Free & Halogen Free	2133/2400	1	2Q'15
16GB	1.2V	2Gx 64	M471A2K43BB0-CPB/CRC	8Gb (1G x8) * 16	Lead Free & Halogen Free	2133/2400	2	2Q'15

Notes: PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR4 SDRAM ECC SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.2V	1G x72	M474A1K43BB0-CPB/RC	8Gb (1G x8) * 9	Lead Free & Halogen Free	2133/2400	1	2Q'15
			M474A1G43DB0-CPB/CRC	4Gb (512M x8) * 18	Lead Free & Halogen Free	2133/2400	2	Now
16GB	1.2V	2G x72	M474A2K43BB0-CPB/RC	8Gb (1G x8) * 18	Lead Free & Halogen Free	2133/2400	2	2Q'15

Notes: 0 =IDT 2 =Montage PB = DDR4-2133(15-15-15) RC = DDR4-2400(17-17-17)

DDR3 SDRAM REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1Gx72	M393B1K70QB0-CMA (08/09)	2Gb (512M x4) * 36	Lead Free & Halogen Free, Flip Chip	1866	2	Now
			M393B1G70QH0-CMA (08/09)	4Gb (1G x4) * 18	Lead Free & Halogen Free	1866	1	Now
			M393B1G73QH0-CMA (08/09)	4Gb (1G x4) * 18	Lead Free & Halogen Free	1866	2	Now
16GB	1.5V	2Gx72	M393B2G70QH0-CM (08/09)	4Gb (512M x8) * 36	Lead Free & Halogen Free	1866	2	Now
			M393B2G70DB0-CMA (02/03)	4Gb (1G x4) * 36	Lead Free & Halogen Free	1866	2	Now
8GB	1.35V	1Gx72	M393B1K70QB0-YK0 (08/09)	2Gb (512M x4) * 36	Lead Free & Halogen Free, Flip Chip	1600	2	Now
			M393B1G70QH0-YK0 (08/09)	4Gb (1G x4) * 18	Lead Free & Halogen Free	1600	1	Now
16GB	1.35V	2Gx72	M393B2G70QH0-YK0 (08/09)	4Gb (1G x4) * 36	Lead Free & Halogen Free	1600	2	Now
			M393B2G70DB0-YK0 (02/03)	4Gb (1G x4) * 36	Lead Free & Halogen Free, Flip Chip	1600	2	Now
32GB	1.35V	4Gx72	M393B4G70DM0-YH9(02/03)	8Gb DDP (2G x4) * 36	Lead Free & Halogen Free	1333	4	Now

Notes: 8 = IDT A1 Evergreen 2 = IDT Alpine F8 = DDR3-1066 (7-7-7) K0 = DDR3-1600 (11-11-11)
9 = Inphi UVGS02 3 = Inphi XV-GS02 H9 = DDR3-1333 (9-9-9) MA = DDR3-1866 (13-13-13)

DDR3 SDRAM Load Reduced REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
32GB	1.35V	4Gx72	M386B4G70DM0-YK0(3/4)	8Gb DDP (2G x4) * 36	Lead Free & Halogen Free	1600	4	Now
	1.5V		M386B4G70DM0-CMA(3/4)	8Gb DDP (2G x4) * 36	Lead Free & Halogen Free	1866	4	Now
64GB	1.35V	8Gx72	M386B8G70DE0-YH9(4)	16Gb QDP (4G x4) * 36	Lead Free & Halogen Free	1333	8	Now
	1.5V		M386B8G70DE0-CK0(4)	16Gb QDP (4G x4) * 36	Lead Free & Halogen Free	1600	8	Now

Notes: 3 = Inphi iMB GS02B 4 = Montage C1

DDR3 SDRAM VLP REGISTERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1Gx72	M392B1G70DB0-CMA (03/04)	4Gb(1Gx4) * 18	Lead Free & Halogen Free, Flip Chip	1866	1	Now
	1.35V		M392B1G70DB0-YK0(03/04)	4Gb(1Gx4) * 18	Lead Free & Halogen Free, Flip Chip	1600	1	Now
	1.5V		M392B1G73DB0-CMA (03/04)	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	1866	2	Now
	1.35V		M392B1G73DB0-YK0 (03/04)	4Gb (512M x8) * 18	Lead Free & Halogen Free, Flip Chip	1600	2	Now
16GB	1.5V	2Gx72	M392B2G70DM0-CMA (03/04)	4Gb DDP (2G DDP x4) * 18	Lead Free & Halogen Free, Flip Chip	1866	2	Now
	1.35V		M392B2G70DM0-YK0 (03/04)	4Gb DDP (2G DDP x4) * 18	Lead Free & Halogen Free, Flip Chip	1600	2	Now
32GB	1.35V	4Gx72	M392B4G70DE0-YH9 (03/04)	4Gb QDP (4G x4) * 18	Lead Free & Halogen Free, Flip Chip	1333	4	Now

Notes: 2 = IDT Alpine 3 = Inphi XV-GS02 K0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13)

DDR3 SDRAM UNBUFFERED MODULES (ECC)

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1024Mx72	M391B1G73QH0-CMA	4Gb (512M x8) * 18	Lead Free & Halogen Free	1866	2	Now
	1.35V		M391B1G73QH0-YK0	4Gb (512M x8) * 18	Lead Free & Halogen Free	1600	2	Now

Notes: H9 = DDR3-1333 (9-9-9) K0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13)

DDR3 SDRAM UNBUFFERED MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
2GB	1.5V	256Mx64	M378B5773QB0-CK0/MA	2Gb (256M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
4GB	1.5V	512Mx64	M378B5173QH0-CK0/MA	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
			M378B5173DB0-CK0/MA	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
			M378B5173EB0-CK0/MA	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600/1866	1	Now
	1.35V		M378B5173QH0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	2Q'15
			M378B5173EB0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	2Q'15
8GB	1.5V	1024Mx64	M378B1G73QH0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600/1866	2	Now
			M378B1G73DB0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600/1866	2	Now
			M378B1G73EB0-CK0/MA	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600/1866	2	Now
	1.35V		M378B1G73QH0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	2Q'15
			M378B1G73EB0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	2Q'15

Notes: K0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13)

DDR3 SDRAM COMPONENTS

Density	Voltage	Organization	Part Number	# Pins- Package	Compliance	Speed (Mbps)	Dimensions	Production
1Gb	1.5V	256M x4	K4B1G0446G-BC(H9/K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600/1866	7.5x11mm	Now
		128M x8	K4B1G0846G-BC(H9/K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600/1866	7.5x11mm	Now
		128M x16	K4B1G1646G-BC(H9/K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600/186/2133	7.5x13.3mm	Now
2Gb	1.5V	512M x4	K4B2G0446Q-BC(K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x11mm	Now
		256M x8	K4B2G0846Q-BC(K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x11mm	Now
		128M x16	K4B2G1646Q-BC(K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x13.3mm	Now
4Gb	1.5V	1G x4	K4B4G0446Q-HC(K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free	1600/1866	10x11mm	Now
		512M x8	K4B4G0846Q-HC(K0/MA)	78 Ball -FBGA	Lead Free & Halogen Free	1600/1866	10x11mm	Now
		512M x8	K4B4G0846D-BC(K0/MA/NB)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x11mm	Now
		256Mx16	K4B4G1646Q-HC(K0/MA)	96 Ball -FBGA	Lead Free & Halogen Free	1600/1866	10x13.3mm	Now
1Gb	1.35V	256Mx16	K4B4G1646D-BC(K0/MA/NB)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866/2133	7.5x13.3mm	Now
		256M x4	K4B1G0446G-BY(F8/H9/K0)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600	7.5x11mm	Now
		128M x8	K4B1G0846G-BY(H9/K0)	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600	7.5x11mm	Now
2Gb	1.35V	128M x16	K4B1G1646G-BY(H9/K0)	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1333/1600	7.5x13.3mm	Now
		512M x4	K4B2G0446Q-BYK0	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		256M x8	K4B2G0846Q-BYK0/MA	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x11mm	Now
		128M x16	K4B2G1646Q-BYK0/MA	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x13.3mm	Now
4Gb	1.35V	1G x4	K4B4G0446Q-HYK0	78 Ball -FBGA	Lead Free & Halogen Free	1600	10x11mm	Now
		512M x8	K4B4G0846Q-HYK0	78 Ball -FBGA	Lead Free & Halogen Free	1600	10x11mm	Now
		512M x8	K4B4G0846D-BYK0	78 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600	7.5x11mm	Now
		256Mx16	K4B4G1646Q-HYK0	96 Ball -FBGA	Lead Free & Halogen Free	1600	10x13.3mm	Now
		256Mx16	K4B4G1646D-BYK0/MA	96 Ball -FBGA	Lead Free & Halogen Free, Flip Chip	1600/1866	7.5x13.3mm	Now
8Gb	1.35V	512Mx16	K4B8G1646Q-MYK0	96 Ball -FBGA	Lead Free & Halogen Free	1600	11x13.3mm	Now

Notes: H9 = DDR3-1333 (9-9-9) K0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13) NB = DDR3-2133 (14-14-14)

DDR3 SDRAM ECC SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
8GB	1.5V	1024Mx64	M474B1G73QH0-CMA	4Gb x8*18	Lead Free & Halogen Free	1866	2	Now
	1.35V		M474B1G73QH0-YK0	4Gb x8*18	Lead Free & Halogen Free	1600	2	Now

DDR3 SDRAM SODIMM MODULES

Density	Voltage	Organization	Part Number	Composition	Compliance	Speed (Mbps)	Ranks	Production
2GB	1.35V	256Mx64	M471B5674QH0-YK0	4Gb (256M x16) * 4	Lead Free & Halogen Free	1600	1	Now
4GB	1.35V	512Mx64	M471B5173QH0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	Now
			M471B5173DB0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	Now
			M471B5173EB0-YK0	4Gb (512M x8) * 8	Lead Free & Halogen Free	1600	1	Now
8GB	1.35V	1024Mx64	M471B1G73QH0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	Now
			M471B1G73DB0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	Now
			M471B1G73EB0-YK0	4Gb (512M x8) * 16	Lead Free & Halogen Free	1600	2	Now

Notes: H9 = DDR3-1333 (9-9-9) K0 = DDR3-1600 (11-11-11) MA = DDR3-1866 (13-13-13)

DDR2 SDRAM COMPONENTS

Density	Organization	Part Number	# Pins-Package	Dimensions	Package	Speed (Mbps)	Production
512Mb	64M x8	K4T51083QQ-BC(E6/F7/E7/F8)	60-FBGA	7.5x9.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
	32M x16	K4T51163QQ-BC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
1Gb	128M x8	K4T1G084QG-BC(E6/F7/E7/F8)	60-FBGA	7.5x9.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now
	64M x16	K4T1G164QG-BC(E6/F7/E7/F8)	84-FBGA	7.5x12.5mm	Lead free & Halogen free , Flip chip	667/800/1066	Now

Notes: E6 = DDR2-667 (5-5-5) E7 = DDR2-800 (5-5-5) F7 = DDR2-800 (6-6-6) F8 = DDR2-1066 (7-7-7)

GRAPHICS DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	VDD/VDDQ	Speed Bin (MHz)	Production
GDDR5	8Gb	256Mx32	K4G80325FB-HC(04/03/28/25)	170-FCFBGA	1.5V/1.5V	5000/6000/7000/8000	CS: '15,1Q
			K4G80325FB-HC(04/03/28/25)	170-FCFBGA	1.35V/1.35V	4000/5000/(6000)/ (7000)	CS: '15,1Q
	4Gb	128Mx32	K4G41325FC-HC(04/03/28)	170-FCFBGA	1.5V/1.5V	5000/6000/7000	Now
			K4G41325FC-HC(04/03)	170-FCFBGA	1.35V/1.35V	4000/5000	Now
	2Gb	64Mx32	K4G20325FS-HC(04/03)	170-FBGA	1.5V/1.5V	5000/6000	Now
			K4G20325FS-HC(04/03)	170-FBGA	1.35V/1.35V	4000/5000	Now
			K4G20325FD-FC(04/03/28)	170-FBGA	1.5V/1.5V	5000/6000/7000	Now
			K4G20325FD-FC(04/03)	170-FBGA	1.35V/1.35V	4000/5000	Now
gDDR3	4Gb	256Mx16	K4W4G1646E-BC(1A/1B)	96-FCFBGA	1.5V/1.5V	2133/2400	CS: '14,0ct
			K4W4G1646E-BC(1A/1B)	96-FCFBGA	1.35V/1.35V	1866/2133	CS: '14,0ct
			K4W4G1646D-BC(12/11/1A)	96-FCFBGA	1.5V/1.5V	1600/1866/2133	Now
			K4W4G1646D-BC(1A)	96-FCFBGA	1.35V/1.35V	1866	Now
	2Gb	128Mx16	K4W4G1646D-BY(12)	96-FCFBGA	1.35V/1.35V	1600	Now
			K4W2G1646Q-BC(12/11/1A)	96-FCFBGA	1.5V/1.5V	1600/1866/2133	Now
			K4W2G1646Q-BC(1A)	96-FCFBGA	1.35V/1.35V	1866	Now
			K4W2G1646Q-BY(12)	96-FCFBGA	1.35V/1.35V	1600	Now

Notes: Package
(1) Speeds (clock cycle - speed bin)

H: FBGA (Halogen Free & Lead Free) (DDR3)
B: FCFBGA (Halogen Free & Lead Free) (DDR3)
H: FCFBGA (Halogen Free & Lead Free) (GDDR5)
F: FBGA (Halogen Free & Lead Free) (GDDR5)
25: 0.25ns (8000Mbps)
28: 0.28ns (7000Mbps)
03: 0.3ns (6000Mbps)
04: 0.4ns (5000Mbps)

05: 0.5ns (4000Mbps)
1B: 8.3ns (2400Mbps gDDR3)
1A: 1.0ns (2133Mbps gDDR3)
11: 1.1ns (1866Mbps)
12: 1.25ns (1600Mbps)

MOBILE DRAM COMPONENTS

Type	Density	Organization	Part Number	Package	Power	Production
LPDDR2	4Gb	1CH x32	K4P4G324EQ-AGC2	168-FBGA, 12x12 PoP, SDP, 1066Mbps	1.8V/1.2V/1.2V	Now
		1CH x32	K4P4G324EQ-FGC2	134-FBGA, 11x11.5 , SDP, 1066Mbps	1.8V/1.2V/1.2V	Now
	8Gb	1CH x32	K4P8G304EQ-AGC2	168-FBGA, 12x12 PoP, DDP, 1066Mbps	1.8V/1.2V/1.2V	Now
		1CH x32	K4P8G304EQ-PGC2	216-FBGA, 12x12 PoP, DDP, 1066Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3PE7E70QM-BGC2	216-FBGA, 12x12 PoP, DDP, 1066Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3PE7E70QM-CGC2	220-FBGA, 14x14 PoP, DDP, 1066Mbps	1.8V/1.2V/1.2V	Now
	12Gb	1CH x32	K4P2E304EQ-AGC2	168-FBGA, 12x12 PoP, TDP, 1066Mbps	1.8V/1.2V/1.2V	Now
	16Gb	1CH x32	K4PAG304EQ-AGC2	168-FBGA, 12x12 PoP, QDP, 1066Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3PE0E00QM-BGC2	216-FBGA, 12x12 PoP, QDP, 1066Mbps	1.8V/1.2V/1.2V	Now
2CH x32		K3PE0E00QM-CGC2	220-FBGA, 14x14 PoP, QDP, 1066Mbps	1.8V/1.2V/1.2V	Now	
LPDDR3	4Gb	1CH x32	K4E4E324EE-EGCE	178-FBGA, 11x11.5, SDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	8Gb	1CH x32	K4E8E304EE-EGCE	178-FBGA, 11x11.5, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		1CH x32	K4E8E304EE-AGCE	168-FBGA, 12x12, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3QF1F10EM-AGCE	253-FBGA, 11x11.5, DDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	12Gb	1CH x32	K4E2E304EE-AGCE	168-FBGA, 12x12, TDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	16Gb	1CH x32	K4E6E304EE-EGCE	178-FBGA, 11x11.5, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		1CH x32	K4E6E304EE-AGCE	168-FBGA, 12x12, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3QF2F20EM-AGCE	253-FBGA, 11x11.5, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3QF2F20EM-FGCE	256-FBGA, 14x14 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3QF2F20EM-QGCE	216-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3MF8F80DM-MGCE	504-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
	24Gb	2CH x32	K3QF6F60MM-FGCE	256-FBGA, 14x14 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
		2CH x32	K3QF6F60MM-QGCE	216-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now
2CH x32		K3MF9F90MM-MGCE	504-FBGA, 15x15 PoP, QDP, 1600Mbps	1.8V/1.2V/1.2V	Now	

COMPONENT DRAM ORDERING INFORMATION

	1	2	3	4	5	6	7	8	9	10	11
	K	4	T	XX	XX	X	X	X	X	X	XX
SAMSUNG Memory											Speed
DRAM											Temp & Power
DRAM Type											Package Type
Density											Generation
Bit Organization											Interface (VDD, VDDQ)
											Number of Internal Banks

1. Memory (K)

2. DRAM: 4

3. DRAM Type

B: DDR3 SDRAM
 D: GDDR SDRAM
 G: GDDR5 SDRAM
 H: DDR SDRAM
 J: GDDR3 SDRAM
 M: Mobile SDRAM
 N: SDDR2 SDRAM
 S: SDRAM
 T: DDR SDRAM
 U: GDDR4 SDRAM
 V: Mobile DDR SDRAM Power Efficient Address
 W: SDDR3 SDRAM
 X: Mobile DDR SDRAM
 Y: XDR DRAM
 Z: Value Added DRAM

4. Density

10: 1G, 8K/32ms
 16: 16M, 4K/64ms
 26: 128M, 4K/32ms
 28: 128M, 4K/64ms
 32: 32M, 2K/32ms
 50: 512M, 32K/16ms
 51: 512M, 8K/64ms
 52: 512M, 8K/32ms
 54: 256M, 16K/16ms
 55: 256M, 4K/32ms
 56: 256M, 8K/64ms
 62: 64M, 2K/16ms
 64: 64M, 4K/64ms
 68: 768M, 8K/64ms
 1G: 1G, 8K/64ms
 2G: 2G, 8K/64ms
 4G: 4G, 8K/64ms

5. Bit Organization

02: x2
 04: x4
 06: x4 Stack (Flexframe)
 07: x8 Stack (Flexframe)

08: x8
 15: x16 (2CS)
 16: x16
 26: x4 Stack (JEDEC Standard)
 27: x8 Stack (JEDEC Standard)
 30: x32 (2CS, 2CKE)
 31: x32 (2CS)
 32: x32

6. # of Internal Banks

2: 2 Banks
 3: 4 Banks
 4: 8 Banks
 5: 16 Banks

7. Interface (VDD, VDDQ)

2: LVTTTL, 3.3V, 3.3V
 4: LVTTTL, 2.5V, 2.5V
 5: SSTL-2 1.8V, 1.8V
 6: SSTL-15 1.5V, 1.5V
 8: SSTL-2, 2.5V, 2.5V
 A: SSTL, 2.5V, 1.8V
 F: POD-15 (1.5V, 1.5V)
 H: SSTL_2 DLL, 3.3V, 2.5V
 M: LVTTTL, 1.8V, 1.5V
 N: LVTTTL, 1.5V, 1.5V
 P: LVTTTL, 1.8V, 1.8V
 Q: SSTL-2 1.8V, 1.8V
 R: SSTL-2, 2.8V, 2.8V
 U: DRSL, 1.8V, 1.2V

8. Generation

A: 2nd Generation
 B: 3rd Generation
 C: 4th Generation
 D: 5th Generation
 E: 6th Generation
 F: 7th Generation
 G: 8th Generation
 H: 9th Generation
 I: 10th Generation
 J: 11th Generation
 K: 12th Generation
 M: 1st Generation
 N: 14th Generation
 Q: 17th Generation

9. Package Type

DDR2 DRAM

L: TSOP II (Lead-free & Halogen-free)
 H: FBGA (Lead-free & Halogen-free)
 F: FBGA for 64Mb DDR (Lead-free & Halogen-free)
 6: sTSOP II (Lead-free & Halogen-free)
 T: TSOP II
 N: sTSOP II
 G: FBGA
 U: TSOP II (Lead-free)
 V: sTSOP II (Lead-free)
 Z: FBGA (Lead-free)

DDR2 SDRAM

Z: FBGA (Lead-free)
 J: FBGA DDP (Lead-free)
 Q: FBGA QDP (Lead-free)
 H: FBGA (Lead-free & Halogen-free)
 M: FBGA DDP (Lead-free & Halogen-free)
 E: FBGA QDP (Lead-free & Halogen-free)
 T: FBGA DSP (Lead-free & Halogen-free, Thin)

DDR3 SDRAM

Z: FBGA (Lead-free)
 H: FBGA (Halogen-free & Lead-free)

Graphics Memory

Q: TQFP
 U: TQFP (Lead Free)
 G: 84/144 FBGA
 V: 144 FBGA (Lead Free)
 Z: 84 FBGA (Lead Free)
 T: TSOP
 L: TSOP (Lead Free)
 A: 136 FBGA
 B: 136 FBGA (Lead Free)
 H: FBGA (Hologen Free & Lead Free)
 E: 100 FBGA (Hologen Free & Lead Free)

SDRAM

L TSOP II (Lead-free & Halogen-free)
 N: STSOP II
 T: TSOP II
 U: TSOP II (Lead-free)
 V: sTSOP II (Lead-free)

COMPONENT DRAM ORDERING INFORMATION

	1	2	3	4	5	6	7	8	9	10	11
	K	4	T	XX	XX	X	X	X	X	X	XX
SAMSUNG Memory											Speed
DRAM											Temp & Power
DRAM Type											Package Type
Density											Generation
Bit Organization											Interface (VDD, VDDQ)
											Number of Internal Banks

XDR DRAM

J: BOC(LF) P: BOC

Mobile DRAM

Leaded/Lead Free

G/A: 52balls FBGA Mono

R/B: 54balls FBGA Mono

X/Z: 54balls BOC Mono

J/V: 60(72)balls FBGA Mono 0.5pitch

L /F: 60balls FBGA Mono 0.8pitch

S/D: 90balls FBGA

Monolithic (11mm x 13mm)

F/H: Smaller 90balls FBGA Mono

Y/P: 54balls CSP DDP

M/E: 90balls FBGA DDP

10. Temp & Power - COMMON (Temp, Power)

C: Commercial, Normal (0°C – 95°C) & Normal Power

C: (Mobile Only) Commercial (-25 ~ 70°C), Normal Power

J: Commercial, Medium

L: Commercial, Low (0°C – 95°C) & Low Power

L: (Mobile Only) Commercial, Low, i-TCSR

F: Commercial, Low, i-TCSR & PASR & DS

E: Extended (-25~85°C), Normal

N: Extended, Low, i-TCSR

G: Extended, Low, i-TCSR & PASR & DS

I: Industrial, Normal (-40°C – 85°C) & Normal Power

P: Industrial, Low (-40°C – 85°C) & Low Power

H: Industrial, Low, i-TCSR & PASR & DS

11. Speed (Wafer/Chip Biz/BGD: 00)

DDR SDRAM

CC: DDR400 (200MHz @ CL=3, tRCD=3, tRP=3)

B3: DDR333 (166MHz @ CL=2.5, tRCD=3, tRP=3) *1

A2: DDR266 (133MHz @ CL=2, tRCD=3, tRP=3)

B0: DDR266 (133MHz @ CL=2.5, tRCD=3, tRP=3)

Note 1: "B3" has compatibility with "A2" and "B0"

DDR2 SDRAM

CC: DDR2-400 (200MHz @ CL=3, tRCD=3, tRP=3)

D5: DDR2-533 (266MHz @ CL=4, tRCD=4, tRP=4)

E6: DDR2-667 (333MHz @ CL=5, tRCD=5, tRP=5)

F7: DDR2-800 (400MHz @ CL=6, tRCD=6, tRP=6)

E7: DDR2-800 (400MHz @ CL=5, tRCD=5, tRP=5)

DDR3 SDRAM

F7: DDR3-800 (400MHz @ CL=6, tRCD=6, tRP=6)

F8: DDR3-1066 (533MHz @ CL=7, tRCD=7, tRP=7)

G8: DDR3-1066 (533MHz @ CL=8, tRCD=8, tRP=8)

H9: DDR3-1333 (667MHz @ CL=9, tRCD=9, tRP=9)

K0: DDR3-1600 (800MHz @ CL=11, tRCD=11, tRP=11)

MA: DDR3-1866 (933MHz @ CL=13, tRCD=13, tRP=13)

NB: DDR3-2133 (1067MHz @ CL=14, tRCD=14, tRP=14)

Graphics Memory

18: 1.8ns (550MHz)

04: 0.4ns (2500MHz)

20: 2.0ns (500MHz)

05: 0.5ns (2000MHz)

22: 2.2ns (450MHz)

5C: 0.56ns (1800MHz)

25: 2.5ns (400MHz)

06: 0.62ns (1600MHz)

2C: 2.66ns (375MHz)

6A: 0.66ns (1500MHz)

2A: 2.86ns (350MHz)

07: 0.71ns (1400MHz)

33: 3.3ns (300MHz)

7A: 0.77ns (1300MHz)

36: 3.6ns (275MHz)

08: 0.8ns (1200MHz)

40: 4.0ns (250MHz)

09: 0.9ns (1100MHz)

45: 4.5ns (222MHz)

1 : 1.0ns (1000MHz)

50/5A: 5.0ns (200MHz)

1 : 1.1ns (900MHz)

55: 5.5ns (183MHz)

12: 1.25ns (800MHz)

60: 6.0ns (166MHz)

14: 1.4ns (700MHz)

16: 1.6ns (600MHz)

SDRAM (Default CL=3)

50: 5.0ns (200MHz CL=3)

60: 6.0ns (166MHz CL=3)

67: 6.7ns

75: 7.5ns PC133 (133MHz CL=3)

XDR DRAM

A2: 2.4Gbps, 36ns, 16Cycles

B3: 3.2Gbps, 35ns, 20Cycles

C3: 3.2Gbps, 35ns, 24Cycles

C4: 4.0Gbps, 28ns, 24Cycles

DS: Daisychain Sample

Mobile-SDRAM

60: 166MHz, CL 3

75: 133MHz, CL 3

80: 125MHz, CL 3

1H: 105MHz, CL 2

1L: 105MHz, CL 3

15: 66MHz, CL 2 & 3

Mobile-DDR

C3: 133MHz, CL 3

C2: 100MHz, CL 3

C0: 66MHz, CL 3

Note: All Lead-free and Halogen-free products are in compliance with RoHS

MODULE DRAM ORDERING INFORMATION

	1	2	3	4	5	6	7	8	9	10	11	12	13
	M	X	XX	T	XX	X	X	X	X	X	X	XX	X
SAMSUNG Memory													AMB Vendor
DIMM													Speed
Data bits													Temp & Power
DRAM Component Type													PCB Revision
Depth													Package
Number of Banks													Generation
Bit Organization													

1. Memory Module: M

2. DIMM Type

- 3: DIMM
- 4: SODIMM

3. Data bits

- 12: x72 184pin Low Profile Registered DIMM
- 63: x63 PC100/PC133 μSODIMM with SPD for 144pin
- 64: x64 PC100/PC133 SODIMM with SPD for 144pin (Intel/JEDEC)
- 66: x64 Unbuffered DIMM with SPD for 144pin/168pin (Intel/JEDEC)
- 68: x64 184pin Unbuffered DIMM
- 70: x64 200pin Unbuffered SODIMM
- 71: x64 204pin Unbuffered SODIMM
- 74: x72/ECC Unbuffered DIMM with SPD for 168pin (Intel/JEDEC)
- 77: x72/ECC PLL + Register DIMM with SPD for 168pin (Intel PC100)
- 78: x64 240pin Unbuffered DIMM
- 81: x72 184pin ECC unbuffered DIMM
- 83: x72 184pin Registered DIMM
- 90: x72/ECC PLL + Register DIMM
- 91: x72 240pin ECC unbuffered DIMM
- 92: x72 240pin VLP Registered DIMM
- 93: x72 240pin Registered DIMM
- 95: x72 240pin Fully Buffered DIMM with SPD for 168pin (JEDEC PC133)

4. DRAM Component Type

- B: DDR3 SDRAM (1.5V VDD)
- L: DDR SDRAM (2.5V VDD)
- S: SDRAM
- T: DDR2 SDRAM (1.8V VDD)

5. Depth

- 09: 8M (for 128Mb/512Mb)
- 17: 16M (for 128Mb/512Mb)
- 16: 16M
- 28: 128M
- 29: 128M (for 128Mb/512Mb)
- 32: 32M
- 33: 32M (for 128Mb/512Mb)
- 51: 512M
- 52: 512M (for 512Mb/2Gb)
- 56: 256M
- 57: 256M (for 512Mb/2Gb)
- 59: 256M (for 128Mb/512Mb)
- 64: 64M
- 65: 64M (for 128Mb/512Mb)
- 1G: 1G
- 1K: 1G (for 2Gb)

6. # of Banks in Comp. & Interface

- 1: 4K/64mxRef., 4Banks & SSTL-2
- 2: 8K/64ms Ref., 4Banks & SSTL-2
- 2: 4K/64ms Ref., 4Banks & LVTTL (SDR Only)
- 5: 8K/64ms Ref., 4Banks & LVTTL (SDR Only)
- 5: 4Banks & SSTL-1.8V
- 6: 8Banks & SSTL-1.8V

7. Bit Organization

- 0: x 4
- 3: x 8
- 4: x16
- 6: x 4 Stack (JEDEC Standard)
- 7: x 8 Stack (JEDEC Standard)
- 8: x 4 Stack
- 9: x 8 Stack

8. Generation

- A: 2nd Gen.
- B: 3rd Gen.
- C: 4th Gen.
- D: 5th Gen.
- E: 6th Gen.
- F: 7th Gen.
- G: 8th Gen.
- M: 1st Gen.
- Q: 17th Gen.

9. Package

- E: FBGA QDP (Lead-free & Halogen-free)
- G: FBGA
- H: FBGA (Lead-free & Halogen-free)
- J: FBGA DDP (Lead-free)
- M: FBGA DDP (Lead-free & Halogen-free)
- N: sTSOP
- Q: FBGA QDP (Lead-free)
- T: TSOP II (400mil)
- U: TSOP II (Lead-Free)
- V: sTSOP II (Lead-Free)
- Z: FBGA (Lead-free)

10. PCB Revision

- 0: Mother PCB
- 1: 1st Rev
- 2: 2nd Rev.
- 3: 3rd Rev.
- 4: 4th Rev.
- A: Parity DIMM
- S: Reduced PCB
- U: Low Profile DIMM

11. Temp & Power

- C: Commercial Temp. (0°C ~ 95°C) & Normal Power
- L: Commercial Temp. (0°C ~ 95°C) & Low Power

12. Speed

- CC: (200MHz @ CL=3, tRCD=3, tRP=3)
- D5: (266MHz @ CL=4, tRCD=4, tRP=4)
- E6: (333MHz @ CL=5, tRCD=5, tRP=5)
- F7: (400MHz @ CL=6, tRCD=6, tRP=6)
- E7: (400MHz @ CL=5, tRCD=5, tRP=5)
- F8: (533MHz @ CL=7, tRCD=7, tRP=7)
- G8: (533MHz @ CL=8, tRCD=8, tRP=8)
- H9: (667MHz @ CL=9, tRCD=9, tRP=9)
- K0: (800MHz @ CL=10, tRCD=10, tRP=10)
- 7A: (133MHz CL=3/PC100 CL2)

13. AMB Vendor for FBDIMM

- 0, 5: Intel
 - 1, 6, 8: IDT
 - 9: Montage
- Note: All Lead-free and Halogen-free products are in compliance with RoHS

DDR4 SDRAM MODULE ORDERING INFORMATION

	1	2	3	4	5	6	7	8	9	10	11	12
	M	X	XX	A	XX	X	X	X	X	X	X	XX
Memory Module											Speed	
DIMM Type											Temp & Power	
Data bits											PCB Revision	
DRAM Component Type											Package	
Depth											Component Revision	
# of Banks in Comp. & Interface												
Bit Organization												

1. Memory Module: M

2. DIMM Type

3: R/LRDIMM
4: SODIMM

3. Data bits

74: x72 260pin SODIMM
86: x72 288pin Load Reduced DIMM
93: x72 288pin Registered DIMM

4. DRAM Component Type

A: DDR4 SDRAM (1.2V VDD)

5. Depth

1G: 1G
2G: 2G
4G: 4G
8G: 8G
1K: 1G (for 8Gb)
2K: 2G (for 8Gb)

6. # of Banks in Comp. & Interface

4: 16Banks & POD-1.2V

7. Bit Organization

0: x 4
3: x 8

8. Component Revision

M: 1st Gen.
A: 2nd Gen.
B: 3rd Gen.
C: 4th Gen.
D: 5th Gen.
E: 6th Gen.
F: 7th Gen.
G: 8th Gen.

9. Package

B: FBGA (Halogen-free & Lead-free, Flip Chip)
M: FBGA (Halogen-free & Lead-free, DDP)

10. PCB Revision

0: None
1: 1st Rev.
2: 2nd Rev.
3: 3rd Rev.
4: 4th Rev.

11. Temp & Power

C: Commercial Temp. (0°C ~ 85°C) & Normal Power

12. Speed

PB: DDR4-2133
(1066MHz @ CL=15, tRCD=15, tRP=15)

DDR4 SDRAM MEMORY ORDERING INFORMATION

	1	2	3	4	5	6	7	8	9	10	11
	K	4	A	XX	XX	X	X	X	X	X	XX
Samsung Memory											Speed
DRAM											Temp & Power
DRAM Type											Package Type
Density											Revision
Bit Organization											Interface (VDD, VDDQ)
											#of Internal Banks

1. Samsung Memory: K

2. DRAM: 4

3. DRAM Type

A: DDR4 SDRAM

4. Density

4G: 4Gb
8G: 8Gb

5. Bit Organization

04: x4
08: x8

6. # of Internal Banks

5: 16Banks

7. Interface (VDD, VDDQ)

W: POD (1.2V, 1.2V)

8. Revision

M: 1st Gen.
A: 2nd Gen.
B: 3rd Gen.
C: 4th Gen.
D: 5th Gen.
E: 6th Gen.
F: 7th Gen.
G: 8th Gen.
H: 9th Gen.

9. Package Type

B: FBGA (Halogen-free & Lead-free, Flip Chip)
M: FBGA (Halogen-free & Lead-free, DDP)

10. Temp & Power

C: Commercial Temp. (0°C ~ 85°C) &
Normal Power

11. Speed

PB: DDR4-2133
(1066MHz @ CL=15, tRCD=15, tRP=15)
RC: DDR4-2400
(1200MHz @ CL=17, tRCD=17, tRP=17)

New 10nm-class eMMC

MAINSTREAM eMMC

Density	Flash	MMC*	Class	Part Number	Seq R/W Perf (MB/s)	Random R/W IOPS	Package Size (mm)	Status
8GB	64Gb*1	5	200	KLM8G1WEPD-B0310**	130/7	5000/600	11.5 x 13.0 x 0.8	MP
16GB	64Gb*2	5	700	KLMAG2WEPD-B0310**	150/12	5000/1200	11.5 x 13.0 x 0.8	MP
32GB	64Gb*4	5	1500	KLMBG4WEBD-B0310**	250/45	TBD	11.5 x 13.0 x 1.0	Sampling Q1'15
64GB	64Gb*8	5	1500	KLMCG8WEBD-B0310**	250/45	TBD	11.5 x 13.0 x 1.0	Sampling Q1'15
128GB	64Gb*16	5	TBD	TBD	TBD	TBD	11.5 x 13.0 x 1.4	Sampling Q1'15

*MMC5.0 is backwards compatible with 4.51 & 4.4 eMMC EVO > 1000 RW IOPS, eMMC PRO > 1000 RW IOPS

HIGH-PERFORMANCE eMMC

Density	Flash	MMC*	Class	Part Number	Seq R/W Perf (MB/s)	Random R/W IOPS	Package Size (mm)	Status
4GB	32Gb*1	5	700	KLM4G1FEPD-B0310**	TBD	TBD	11.0 x 10.0 x 0.8	Sampling Q1'15
8GB	64Gb*1	5	700	KLM8G1GEND-B0310**	160/25	5000/2500	11.5 x 13.0 x 1.0	MP
16GB	64Gb*2	5	2000	KLMAG2GEND-B0310**	230/50	6000/6000	11.5 x 13.0 x 1.0	MP
32GB	64Gb*4	5	2000	KLMBG4GEND-B0310**	250/100	6000/12000	11.5 x 13.0 x 1.0	MP
64GB	64Gb*8	5	2000	KLMCG8GEND-B0310**	250/100	6000/12000	11.5 x 13.0 x 1.0	MP

*MMC5.0 is backwards compatible with 4.51 & 4.41

***Denotes bucket code for latest firmware patch

eMMC Key Features

- Industry's fastest eMMC
- Fully-managed NAND
- Low active & standby power
- High density in small form factor (11.5x13mm pkg)
- 4GB to 128GB capacities
- JEDEC standard MMC 4.51/5.0
- Leading edge 10nm-class NAND Flash

Performance Specs

32GB, 64GB	eMMC 4.5	eMMC 5.0
Interface Speed	200MB/s	400MB/s
Random R/W	3500/2000 IOPS	6000/12000 IOPS
Sequential R/W	150/50 MB/s	250/100 MB/s

* Device performance condition: x8 Bus, Cache-On mode, without host overhead.

Applications

Samsung offers a compact eMMC solution to fit the needs of any mobile application category, ranging from high-end tablets and smartphones to 4K gaming devices, set-top boxes, and Internet of Things (IoT) devices.

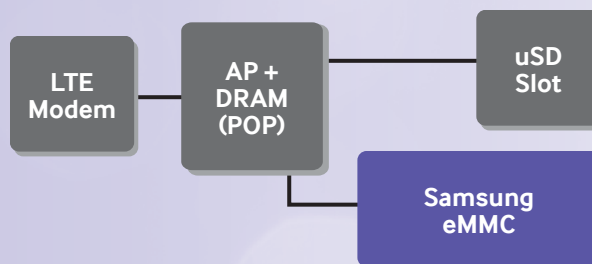
Industry-Leading Smartphone and Tablet Design

Specifications

- Density: 4GB to 128GB
- Class: 200/700/1500/2000*
- Flash: 32Gb/64Gb
- Package Type: FBGA
- Package Size: 11x10mm, 11.5x13mm
- eMMC: 4.5/5.0

* Class = Random Write IOPS

Simple Block Diagram



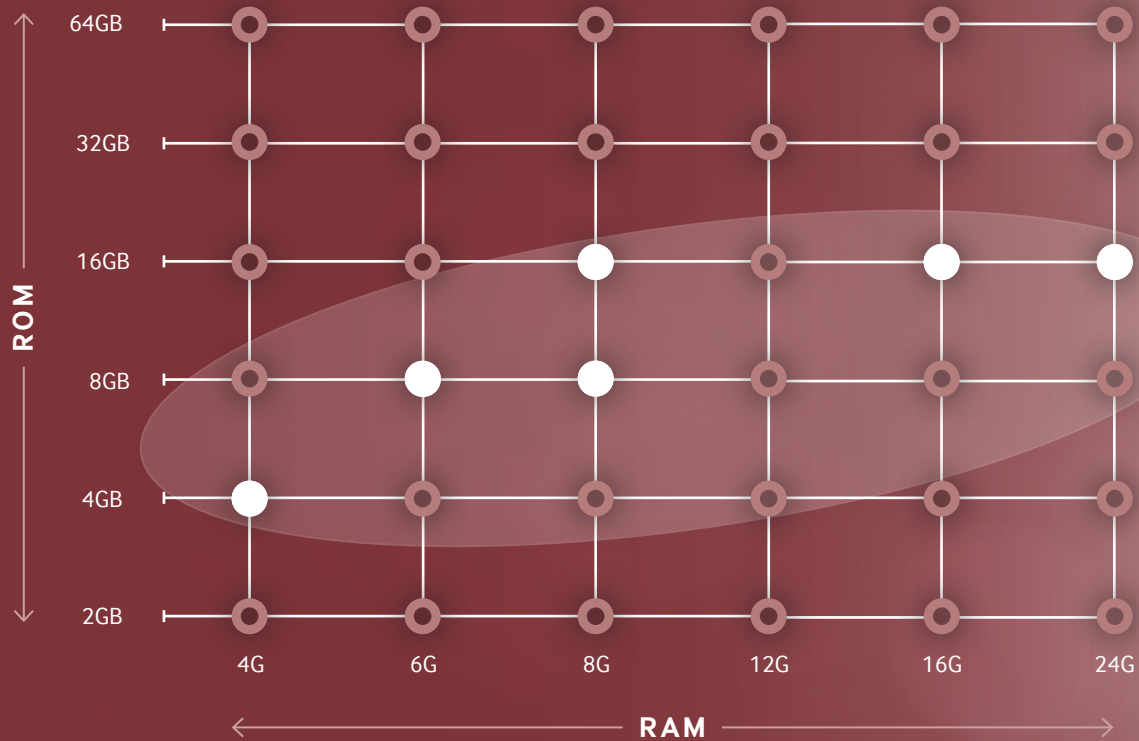
SOLID STATE DRIVES (SSD)

Drive Type	Drive Name	Interface	Form Factor	Connector	Power-loss Protection	Write Endurance	Density	Part Number
Client PC/ Embedded	CM851	SATA III - 6Gb/s	mSATA (MZM) M.2 (MZA)	Mini PCIe M.2	No	PC Workload	16GB	MZAPF016HCDD-00000
							32GB	MZMPF032HCFV-00000
								MZAPF032HCFV-00000
	64GB	MZMPF032HCFV-00000						
	PM851	SATA III - 6Gb/s	mSATA (MZM) M.2 (MZN) 2.5" (MZ7)	Mini PCIe M.2 SFF-8223	No	PC Workload	128GB	MZMTE128HMGR-00000
								MZNTE128HMGR-00000
								MZ7TE128HMGR-00000
							256GB	MZMTE256HMHP-00000
								MZNTE256HMHP-00000
								MZ7TE256HMHP-00000
							512GB	MZMTE512HMHP-00000
								MZNTE512HMJH-00000
								MZ7TE512HMHP-00000
	1024GB	MZMTE1T0HMJH-00000						
	XP941	PCIe - SATAe	M.2	M.2	No	PC Workload	128GB	MZHPU128HCGM-00004
256GB							MZHPU256HCGL-00004	
512GB							MZHPU512HCGL-00004	
Data Center	PM853T	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	0.3 DWPD	240GB	MZ7GE240HMGR-00003
							480GB	MZ7GE480HMHP-00003
							960GB	MZ7GE960HMHP-00003
	SM843Tn	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	1.8 DWPD	120GB	MZ7WD120HCFV-00003
							240GB	MZ7WD240HCFV-00003
							480GB	MZ7WD480HCGM-00003
	SV843	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	3.6 DWPD	480GB	MZ7WD480HMHP-00003
960GB							MZ7WD960HMHP-00003	
Enterprise	SM1635	SAS - 12Gb/s	2.5" 15mmT	SFF-8680	Yes	10 DWPD	400GB	MZIES400HMGR-00003
							800GB	MZIES800HMHP-00003
							1600GB	MZIES1T6HMJH-00003
	XS1715	PCIe - NVMe	2.5" 15mmT	SFF-8639	Yes	7.0 DWPD	400GB	MZWEI400HAGM-00003
							800GB	MZWEI800HAGM-00003
						1600GB	MZWEI1T6HAGP-00003	

Samsung has a portfolio of eMCP products for a variety of devices, such as mobile phones and tablets. The following illustration shows Samsung's lineup of eMCP memory solutions, which can be deployed in almost any application.

→ Samsung eMCP product suite with different densities and types of Mobile DRAM and eMMC

eMCP = eMMC + LPDDR2 or LPDDR3



eMCP: eMMC + LPDDR3

Memory	eMMC Density	DRAM Density/Organization	Voltage (eMMC-DRAM)	Package
eMMC & MDRAM	4GB	4Gb (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm
		6Gb (x32)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm
	8GB	4Gb*2 (x32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm
		6Gb*2 (x32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm
	16GB	4Gb*2 (x32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm
		4Gb*4 (x32, 1CH, 2CS)	3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm
6Gb*4 (x32, 1CH, 2CS)		3.3V/1.8V - 1.8V/1.2V	221FBGA 11.5x13mm	

eMCP: eMMC + LPDDR2

Memory	eMMC Density	DRAM Density/Organization	Voltage (eMMC-DRAM)	Package
eMMC & MDRAM	4GB	4Gb (x32)	3.3V/1.8V - 1.8V/1.2V	162FBGA 11.5x13mm

Samsung Solid State Drives

	SATA		SAS	PCIe
	STANDARD DATA CENTER SERIES Read-Intensive Environments	DELUXE ENTERPRISE SERIES High-Write Environments	ENTERPRISE STORAGE SERIES High Redundancy Environments	EXTREME PERFORMANCE SERIES Data Cache Environments
	Samsung PM853T	Samsung SV843	Samsung SM1635	Samsung XS1715
Form Factor	2.5 inches	2.5 inches	2.5 inches	2.5 inches
Capacity (GB)	240/480/960	480/960	400/800/1600	400/800/1600
Host Interface	Serial ATA 3 (6 Gb/s)	Serial ATA 3 (6 Gb/s)	SAS 3 (12 Gb/s)	PCIe Gen3 x4
MTBF	1.5 Million Hours	2.0 Million Hours	2.0 Million Hours	2.0 Million Hours
Uncorrectable Bit Error Rate (UBER)	1x10 ¹⁶	1x10 ¹⁷	1x10 ¹⁷	1x10 ¹⁷
Power Consumption (Active)	3.4W	2.9W	11.0W	25.0W
Power Consumption (Idle)	1.1W	1.0W	4.0W	8.0W
Random Read	Up to 87,000 IOPS	Up to 88,000 IOPS	Up to 215,000 IOPS	Up to 750,000 IOPS
Random Write	Up to 15,000 IOPS (28% O/P: up to 35,000 IOPS)	Up to 14,000 IOPS (28% O/P: up to 35,000 IOPS)	Up to 47,000 IOPS	Up to 115,000 IOPS
Sequential Read	Up to 530 MB/s	Up to 530 MB/s	Up to 1380 MB/s	Up to 3000 MB/s
Sequential Write	Up to 410 MB/s	Up to 430 MB/s	Up to 1300 MB/s	Up to 1400 MB/s
Terabytes Written (TBW)	Up to 665 TBW Up to 0.3 DWPD	Up to 6,728 TBW Up to 3.6 DWPD	Up to 29,200 TBW Up to 10 DWPD	Up to 16,700 TBW Up to 7 DWPD
Physical Dimensions	100 x 70 x 7mm	100 x 70 x 7mm	100 x 70 x 15mm	100 x 70 x 15mm
Weight	63g	62g	140g	210g

→ Which SSD is right for you?

For more information, email: SSD@ssi.samsung.com

SOLID STATE DRIVES (SSD)

Drive Type	Drive Name	Interface	Form Factor	Connector	Power-loss Protection	Write Endurance	Density	Part Number
Client PC/ Embedded	CM851	SATA III - 6Gb/s	mSATA (MZM) M.2 (MZA)	Mini PCIe - M.2	No	PC Workload	16GB	MZAPF016HCDD-00000
							32GB	MZMPF032HCFV-00000
								MZAPF032HCFV-00000
	PM851	SATA III - 6Gb/s	mSATA (MZM) M.2 (MZN) 2.5" (MZ7)	Mini PCIe M.2 SFF-8223	No	PC Workload	128GB	MZMTE128HMGR-00000
								MZNTE128HMGR-00000
								MZ7TE128HMGR-00000
							256GB	MZMTE256HMHP-00000
								MZNTE256HMHP-00000
								MZ7TE256HMHP-00000
							512GB	MZMTE512HMHP-00000
								MZNTE512HMJH-00000
								MZ7TE512HMHP-00000
	1024GB	MZMTE1T0HMJH-00000						
	XP941	PCIe - SATAe	M.2	M.2	No	PC Workload	128GB	MZHPU128HCGM-00004
							256GB	MZHPU256HCGL-00004
512GB							MZHPU512HCGL-00004	
Data Center	PM853T	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	0.3 DWPD	240GB	MZ7GE240HMGR-00003
							480GB	MZ7GE480HMHP-00003
							960GB	MZ7GE960HMHP-00003
	SM843Tn	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	1.8 DWPD	120GB	MZ7WD120HCFV-00003
							240GB	MZ7WD240HCFV-00003
							480GB	MZ7WD480HCGM-00003
	SV843	SATA III - 6Gb/s	2.5" 7mmT	SFF-8223	Yes	3.6 DWPD	480GB	MZ7WD480HMHP-00003
							960GB	MZ7WD960HMHP-00003
							400GB	MZIES400HMGR-00003
Enterprise	SM1635	SAS - 12Gb/s	2.5" 15mmT	SFF-8680	Yes	10 DWPD	800GB	MZIES800HMHP-00003
							1600GB	MZIES1T6HMJH-00003
							400GB	MZWEI400HAGM-00003
	XS1715	PCIe - NVMe	2.5" 15mmT	SFF-8639	Yes	5.4 DWPD	800GB	MZWEI800HAGM-00003
							1600GB	MZWEI1T6HAGP-00003

Blu-ray SLIM

Interface	Speed	Type	Loading	Model
SATA	BD Writer 6X	Slim	Tray	SN-506BB

Blu-ray Writer SLIM EXTERNAL

Interface	Speed	Type	Loading	Model
USB 2.0	BD Writer 6X	Slim	Tray	SE-506CB

DVD-W H/H

Interface	Speed	Type	Loading	Model
SATA	DVD Write 24X	H/H	Tray	SH-224FB

DVD-ROM H/H

Interface	Speed	Type	Loading	Model
SATA	DVD Read 18X	H/H	Tray	SH-118CB

DVD-W SLIM

Interface	Speed	Type	Loading	Model
SATA	DVD Write 8X	Slim (12.7mm)	Tray	SN-208FB
	DVD Write 8X	Slim (9.5mm)	Tray	SU-208GB
	DVD Write 8X	Slim (9.0mm)	Tray	SU-228GB

DVD-W SLIM EXTERNAL

Interface	Speed	Type	Loading	Model
USB 2.0	DVD Write 8X	Ultra Slim	Tray	SE-218GN
				SE-208GB

Public Information Display (PID) Product Classification

Outdoor PID	» High Brightness	» Full High Definition	» 110°C Clearing Point
Super Narrow Bezel (SNB)/ Ultra Narrow Bezel (UNB)	» Video Wall	» UNB: 3.9mm A-to-A » SNB: 5.9mm A-to-A	» 500 - 700 nits Brightness » AGAR Surface Treatment
Indoor PID	» Narrow Bezel	» 40"/46"/55"/75"	» 700 nits Brightness
E-Board PID	» Landscape Orientation	» 55"/70"/82" Edge LED	» AGAR Surface Treatment

Why PID instead of TV?

	COMMERCIAL (PID)	CONSUMER (TV)
WARRANTY	18 months to 2 years	90 days to 1 year
RELIABILITY	Public environments 20+ hours daily duty cycle Variety of temperatures & location	5-8 hour daily duty cycle Designed for in-home use in controlled environment In-home living room
PRODUCTION LIFECYCLE	24-36 months	12-15 months
PICTURE QUALITY	Designed to resist image retention LCD backlight covers a wider color spectrum necessary for PC source integration, giving better picture quality AGAR coating for public viewing	120Hz / 240Hz for full-motion video Designed for TV signals Gloss surface treatment
LOCATION	Most models portrait capable	Can only be oriented in landscape mode

Product Segmentation

HEAVY USE   LIGHT USE	Outdoor PID	Restaurant <ul style="list-style-type: none"> • QSR Menu Boards • Outdoor TV 	Retail <ul style="list-style-type: none"> • Wayfinding • Outdoor Mall 	Digital Signage <ul style="list-style-type: none"> • Street Furniture • Mobile Signage 	
	SNB / UNB	Professional <ul style="list-style-type: none"> • Control Room • Simulation 	Indoor Events <ul style="list-style-type: none"> • Scoreboard • Sports Broadcasting 	Billboard <ul style="list-style-type: none"> • Dynamic Signage • Flagship Retail 	
	Indoor PID	Entertainment <ul style="list-style-type: none"> • Casino • Theatre 	Transportation <ul style="list-style-type: none"> • Airport • Train/Bus Station 	Communication <ul style="list-style-type: none"> • Conference Room 	Rental <ul style="list-style-type: none"> • Rental • Staging
	E-Board PID	Commercial <ul style="list-style-type: none"> • Kiosk • Conference Systems 	Education <ul style="list-style-type: none"> • Interactive FPD 	Hospitality <ul style="list-style-type: none"> • Hotel Signage 	

Product Segmentation

Type	Class	Warranty	Bezel	Suggested Run Time	Brightness	Usage	Applications	Value Tier
Outdoor PID	High Bright, Wide Temp	2 years	Normal	20+ hours	2500-5000 nits	Heavy	Outdoor	Premium commercial range
SNB / UNB	Super / Ultra Narrow Bezel	2 years	3.9mm - 5.9mm A-to-A	20+ hours	500-700 nits	Heavy	Video Walls	Premium commercial range
Indoor PID	Indoor Commercial Panels	2 years	Narrow	20+ hours	600/700 nits	Medium	Semi-Outdoor	Mid-price range
E-Board	Value, Large Format	18 months	Normal	12 hours	450 nits	Daily	Indoor, e-Board	High-value commercial range

SAMSUNG PUBLIC INFORMATION DISPLAY (PID) PANEL LINEUP

Type	Model	Size	Model Resolution	Bezel	Backlight	Brightness (typical)	Contrast Ratio	Response Time	Frequency	MP*	Comment
Outdoor PID	LTI460HZ01	46"	FHD	Narrow	D-LED	5,000 nits	4,000:1	8ms	60Hz	Now	High Bright, Hi Temp LC, 1/4λ Pol.
	LTI460HF01	46"	FHD	Narrow	D-LED	2,500 nits	5,000:1	8ms	60Hz	Q4, '14	High Bright, Hi Temp LC, 1/4λ Pol.
	LTI550HF04	55"	FHD	Narrow	D-LED	2,500 nits	5,000:1	8ms	60Hz	Q4, '14	High Bright, Hi Temp LC, 1/4λ Pol.
	LTI750HF01	75"	FHD	Narrow	D-LED	2,500 nits	5,000:1	8ms	60Hz	Q4, '14	High Bright, Hi Temp LC, 1/4λ Pol.
SNB / UNB	LTI460HN01	46"	FHD	Super narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI460HN09	46"	FHD	Super narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI460HN10	46"	FHD	Ultra narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
	LTI460HN12	46"	FHD	Ultra narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Q4, '14	3.9mm Active to Active, LED
	LTI550HN01	55"	FHD	Super narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	5.9mm Active to Active, LED
	LTI550HN08	55"	FHD	Super narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Now	5.7mm Active to Active, LED
	LTI550HN09	55"	FHD	Ultra narrow	D-LED	700 nits	3,000:1	8ms	60Hz	Now	3.9mm Active to Active, LED
	LTI550HN10	55"	FHD	Ultra narrow	D-LED	500 nits	3,000:1	8ms	60Hz	Q4, '14	3.9mm Active to Active, LED
Indoor PID	LTI400HA10	40"	FHD	Narrow	eLED	700 nits	3,000:1	8ms	60Hz	Now	eLED, Landscape / Portrait
	LTI460HN08	46"	FHD	Narrow	eLED	700 nits	4,000:1	8ms	60Hz	Now	eLED, Landscape / Portrait
	LTI550HN06	55"	FHD	Narrow	eLED	700 nits	4,000:1	8ms	60Hz	Now	eLED, Landscape / Portrait
	LTI550HN07	55"	FHD	Narrow	eLED	450 nits	4,000:1	8ms	60Hz	Now	E-Board; Landscape/Portrait
	NEW	75"	FHD	Normal	D-LED	500 nits	3,500:1	8 ms	120Hz	Q4, '14	120Hz, Landscape / Portrait
	NEW	75"	UHD	Normal	D-LED	500 nits	3,500:1	8 ms	240Hz	Q4, '14	240Hz, Landscape / Portrait
E-Board	LTI700HA02	70"	FHD	Normal	eLED	400 nits	4,000:1	8ms	60Hz	Now	E-Board; Landscape/Portrait
	LTI820HA01	82"	FHD	Normal	eLED	450 nits	3,000:1	8ms	60Hz	Now	E-Board; Landscape mode only

TABLETS

Size	PN	Mode	Resolution	H(RGB)	V	Aspect Ratio	PPI	Brightness (nits)	MP
7"	LTN070AL01	PLS	WXGA	1280	800	16:10	216	400	EOL
	LTL070NL01	PLS	WSVGA	1024	600	16:9	170	400	Now
8.0" Open Cell	LTL080AL01	PLS	WXGA	1280	800	16:9	189	Open Cell	Now
10.1"	LTL101AL06	PLS	WXGA	1280	800	16:10	149	400	Now
	LTL101DL03	PLS	WQXGA	2560	1600	16:10	300	370	Now

MONITORS

Size	PN	Mode	Resolution	H(RGB)	V	Aspect Ratio	PPI	Brightness (nits)	MP
23"	LTM230HL07	PLS	FHD	1920	1080	16:9	96	300	Now
27"	LTM270HT03	TN	FHD	1920	1080	16:9	82	300	Now
	LTM270DL02	PLS	QHD	2560	1440	16:9	109	300	Now
	LTM270HL02	PLS	FHD	1920	1080	16:9	82	350	Now
31.5"	LTM315FL01	PLS	UHD	3840	2160	16:9	140	350	Now

Contacts

Feel free to contact your local distributor or sales representative with any Samsung sales inquiries.

Adelsa | www.adelectronics.com.mx

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Mexico Guadalajara Monterrey Cd. Juarez Reynosa	MEXICO Hacienda Corralejo #80 Bosque de Echeagaray Naucalpan, Mexico 53310	52-555-560-5002	52-555-363-1010
		GUADALAJARA El Rosario #643 Jardines de Los Arcos Guadalajara, Jal, CP 44500	52-333-122-3054	52-333-647-9611
		MONTERREY Lince #113 Cumbre Elite 8vo. Sector Monterrey, NL, CP 64349	52-818-214-0011	52-818-214-0012
		CD. JUAREZ Rio Magdalena #4425 Fovissste Chamizal Cd. Juarez, CH, CP 32310	52-656-613-3517	
		REYNOSA Bravo #1040 Centro Reynosa, Tam, CP 88500	52-899-922-5540	

ATMI Sales | www.atmisales.com

PRODUCTS	MAIN PHONE	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	British Columbia Washington Oregon	OREGON 4900 S.W. Griffith Drive Suite 253 Beaverton, OR 97005	1-800-898-2446 503-643-8307	503-643-4364
		WASHINGTON 8581 154th Ave. NE Redmond WA 98052	425-869-7636	425-869-9841

Bear VAI Technology | www.bearvai.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Michigan Ohio Western Pennsylvania Kentucky	MAIN OFFICE - BRECKSVILLE, OHIO 6910 Treeline Drive Unit H Brecksville, OH 44141	440-526-1991	440-526-5426
		MAIN OFFICE - INDIANA 11451 Overlook Drive Fishers, IN 46037	440-832-7637	317-845-8650
		SOUTHERN OHIO OFFICES 2676 Longwood Dr. Beavercreek, OH 45431	440-526-1991	440-526-5426
		58 E California Ave Columbus, OH 43202	440-526-1991	440-526-5426
		PITTSBURGH OFFICE 1975 Menold Dr. Allison Park, PA 15101	440-526-1991	412-364-8776
		MICHIGAN OFFICES 5506 Alpine Ridge Stevensville, MI 49127	440-526-1991	440-526-5426
		17426 Willow Ridge Northville, MI 48168		
		312 Woodward Ave Rochester, MI 48307		
600 Broadway Ave NW #617 Grand Rapids, MI 49504				
3120 Edgewood Park Dr. Commerce Twp, MI 48382				

Core Sales, Inc. | www.coresales.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Chicago Milwaukee	901 Warrenville Road Suite 211 Lisle, IL 60532	847-843-8888	

Crestone Technology Group | www.crestonegroup.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Idaho Montana Wyoming Utah Colorado	COLORADO 7108 S. Alton Way Building L Centennial, CO 80112	303-280-7202	720-482-2220
		UTAH (home office based)		

Customer 1st | www.customer1st.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	North Dakota South Dakota Nebraska Kansas Minnesota Iowa Missouri Wisconsin (exclude Milwaukee) Illinois (exclude Chicago)	MINNESOTA 2950 Metro Drive Suite 101 Bloomington, MN 55425	952-851-7909	952-851-7907
		KANSAS 2111 E. Crossroad Lane #202 Olathe, KS 66062		

InTELaTECH | www.intelatech.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI	Canada (exclude BC)	ONTARIO - CANADA 5225 Orbitor Drive Suite 2	905-629-0082	905-624-6909 905-629-1795 905-629-8910
		21 Concourse Gate Suite 12 Ottawa, ONT K2E 7S4	905-629-0082	613-221-9160
		ALBERTA - CANADA 1925-18th Ave NE Suite #115 Calgary, Alberta T2E 7T8	905-629-0082	403-686-6926
		QUEBEC - CANADA 620 St-Jean Blvd Suite 202 Pointe Claire Quebec H9R 3K2	905-629-0082	905-629-0082
		BRITISH COLUMBIA - CANADA 5811 Cooney Road Suite 305, South Tower Vancouver, BC V5X 3M1	905-629-0082	905-629-1795

I-Squared Incorporated | www.isquared.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Northern California Nevada	2635 N. 1st Street Suite 128 San Jose, CA 95134	408-988-3400	408-988-2079
		1250 B Street Petaluma, CA 94952		

Neptune Electronics (necco) | www.neccoelect.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Southern New York Eastern Pennsylvania West Virginia Virginia Maryland Delaware New Jersey Washington D.C.	11 Oval Drive Suite 169 Islandia, NY 11749	631-234-2525	631-234-2707

New Elpis, Inc. | www.newelpis.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
LCD	Canada (exclude BC)	2550 Matheson Blvd. E. Unit 129 Mississauga, ONT Canada L4W 4Z1		905-275-4109

New Tech Solutions

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Maine New Hampshire Vermont Massachusetts Rhode Island Connecticut	26 Ray Avenue Burlington, MA 01803	781-229-8888 585-204-2183	781-229-1614

Rep One Associates, Inc. | www.repone.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	North Carolina South Carolina Georgia Alabama Mississippi Florida	ALABAMA 303 Williams Ave Suite 1011 Huntsville, AL 35801		
		GEORGIA 3000 Langford Rd Bldg 300 Norcross, GA 30071	770-209-9242 678-591-6753	770-209-9245
		NORTH CAROLINA 5540 Centerview Dr Suite 200 Raleigh, NC 27606		919-424-3866
		10800 Sikes Place Suite 300 Charlotte, NC 28277	704-846-5744	
		FLORIDA (home office based)		

Tech Coast Sales | www.tc-sales.com

PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Arizona/New Mexico Los Angeles, CA Orange County Area, CA San Diego, CA Southern Nevada	MAIN OFFICE 23121 Verdugo Drive Suite 101 Laguna Hills, CA 92653	949-305-6869	949-305-4073 818-715-1012 818-597-1770

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PRODUCTS	TERRITORY	ADDRESS	MAIN PHONE	FAX
Memory SLSI LCD	Oklahoma Texas Louisiana Arkansas	AUSTIN / SAN ANTONIO 4100 Duval Rd Bld 1, Ste 102 Austin, TX 78759	512-343-1199	512-343-1922
		DALLAS / OKLAHOMA / ARKANSAS 2745 Dallas Pkwy Ste 460 Plano, TX 75093	972-680-2800	972-699-0330
		HOUSTON / VALLEY / LOUISIANA 24624 Interstate 45 North Ste 200 Spring, TX 77386	512-343-1199	512-343-1922

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