

SIEMENS

ICs for Consumer Electronics

MEGATEXT

DRAM

Edition 10.94

MEGATEXT® DRAM	
Revision History: Original Version 10.94	
Previous Releases:	
Page	Subjects (changes since last revision)

Data Classification

Maximum Ratings

Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit.

Characteristics

The listed characteristics are ensured over the operating range of the integrated circuit. Typical characteristics specify mean values expected over the production spread. If not otherwise specified, typical characteristics apply at $T_A = 25\text{ °C}$ and the given supply voltage.

Operating Range

In the operating range the functions given in the circuit description are fulfilled.

For detailed technical information about “**Processing Guidelines**” and “**Quality Assurance**” for ICs, see our “**Short Form Catalog**”.

Edition 10.94

This edition was realized using the software system FrameMaker®.

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Memory Address Formats

The internal and the external DRAM can be addressed using one of the two data ports.
The lower address part has the size of 1 kByte and can be in a row/column or a binary format.

	Higher Address Part “Chapter Address”										Lower Address Part in Row/Column or Binary Address Mode													
	13 bit										11 bit													
Data Port 0			R		4	8				R		4	9				R		5	0				
Data Port 1			R		5	6				R		5	7				R		5	8				
Ext. DRAM binary	1	0			C	h	a	p	t	e	r					b	i	n	a	r	y	x		
Ext. DRAM row/col	1	0			C	h	a	p	t	e	r					R	o	w			C	o	l	
Int. DRAM row/col	0	0	0	0	0			B	y	t	e		B	k			R	o	w			C	o	l
Int. DRAM binary	0	0	0	0	0			B	y	t	e		B	k			b	i	n	a	r	y	x	

Byte Position	0	0	0	0	0	0	1
	1	0	0	0	0	1	0
	2	0	0	0	1	0	0
	3	0	0	1	0	0	0
	4	0	1	0	0	0	0
	5	1	0	0	0	0	0

x = don't care

Selection of internal or external DRAM: MSB of Register 48 or Register 56.

Selection of Binary or Row/Col address format: Bit “BI_ADR” of the port control register R 53 and R 61.

Address Range (dezimal):

- Col: 0 ... 39
- Row: 0 ... 25
- Block: 0 ... 3
- Binary: 0 ... 1024
- Chapter: 0 ... 2048

Note: The **Byte Position** is addressed directly. So only one of the six bits may be set to “1”.

Relation of Binary and Row/Column Address

The internal DRAM is organized in a binary order. It is possible to use this address format for memory access.

If the row/column format is used, the internal Processing Unit transforms the addresses according to following table.

The Inner Screen Display Area is organized like a teletext page in the row/column format.

		Column 0 ... 31		Column 32 ... 39	
Row					
0	0	31	1016	1023	
1	32	63	1008	1015	
2	64	95	1000	1007	
3	96	127	992	999	
4	128	159	984	991	
5	160	191	976	983	
6	192	223	968	975	
7	224	255	960	967	
8	256	287	952	959	
9	288	319	944	951	
10	320	351	936	943	
11	352	383	928	935	
12	384	415	920	927	
13	416	447	912	919	
14	448	479	904	911	
15	480	511	896	903	
16	512	543	888	895	
17	544	575	880	887	
18	576	607	872	879	
19	608	639	864	871	
20	640	671	856	863	
21	672	703	848	855	
22	704	735	840	847	
23	736	767	832	839	
24	768	799	824	831	
25	800	823	➤	

Memory Allocation

The internal memory of 24 kByte can be controlled by the PU and the external controller using the serial bus interface.

The allocation of the memory can be adapted to the application.

The use of the internal memory areas depends on:

- the Display Features
- the size of the external memory.

Move Commands:

To reduce the setup time for Display Pages (e.g. menus), they can be downloaded into the external DRAM.

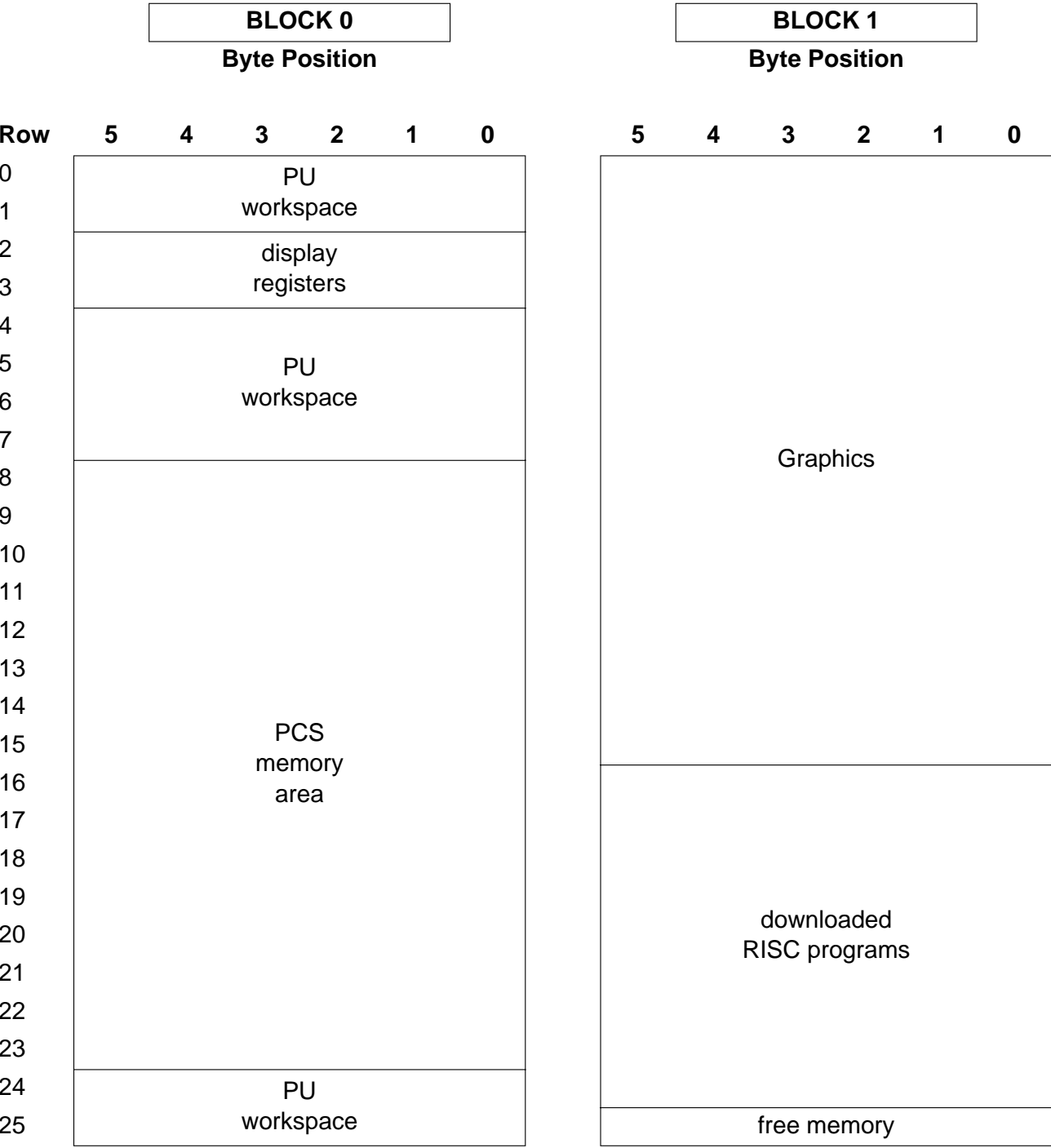
The move commands ("move memory segment") copy them nearly instantly into the internal Display memory.

Examples

The following examples show two extreme versions of memory allocations.
But it is also possible to configure the memory for feature levels between these configurations.

Full Featured Display

This configuration can be used for teletext display up to level 3 with external DRAM for page memory. For OSD applications like menus, no external DRAM is required. So the cheap single chip solution can generate a high performed display.



Typical Use of the Internal DRAM

BLOCK 2							BLOCK 3						
Byte Position							Byte Position						
Row	5	4	3	2	1	0	5	4	3	2	1	0	
0	p a g e t r a c e	Teletext in the Inner Screen Display Area					a c q u i s i t i o n b u f f e r	2nd Teletext page in the 80 character mode <i>or</i> Menu in the Outer Screen Display Area					
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
21													
22													
23													
24													
25	free memory						free memory						

Single Chip Solution

For lower class applications, MEGATEXT can be used without external DRAM.
The teletext page is displayed in Level 1 format.
The page trace gives an overview over transmitted pages.
The display of PCS characters (e.g. hebrew) instead of the ROM characters is possible.
Up to 12 pages can be stored in the IRAM.

BLOCK 0							BLOCK 1						
Byte Position							Byte Position						
Row	5	4	3	2	1	0	5	4	3	2	1	0	
0	PU workspace												
1													
2													
3													
4													
5							t	t	t	t	t	t	
6							e	e	e	e	e	e	
7							l	l	l	l	l	l	
8							e	e	e	e	e	e	
9	optional: PCS characters and/or downloaded RISC programs						t	t	t	t	t	t	
10							e	e	e	e	e	e	
11							x	x	x	x	x	x	
12							t	t	t	t	t	t	
13							p	p	p	p	p	p	
14							a	a	a	a	a	a	
15							g	g	g	g	g	g	
16							e	e	e	e	e	e	
17							s	s	s	s	s	s	
18							t	t	t	t	t	t	
19							o	o	o	o	o	o	
20							r	r	r	r	r	r	
21							e	e	e	e	e	e	
22													
23													
24	PU workspace												
25							free memory						

Examples for the Use of the IRAM

BLOCK 2						BLOCK 3														
Byte Position						Byte Position														
Row	5	4	3	2	1	0	5	4	3	2	1	0								
0	a c q u i s i t i o n b u f f e r	d i s p l a y o f P C S c h a r	p a g e t r a c e	Display of a Level 1 teletext page			a c q u i s i t i o n b u f f e r	t e l e t e x t p a g e s t o r e	t e l e t e x t p a g e s t o r e	t e l e t e x t p a g e s t o r e	t e l e t e x t p a g e s t o r e	t e l e t e x t p a g e s t o r e								
1																				
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20	free memory						free memory													
21																				
22																				
23																				
24																				
25																				

Application:
Use of MEGATEXT INTERNAL DRAM