

This document uses the Graphic Processors Data Book from March 1989

([http://www.bitsavers.org/components/stMicroelectronics/\\_dataBooks/Graphic\\_Processors\\_Data\\_Book\\_Mar89.pdf](http://www.bitsavers.org/components/stMicroelectronics/_dataBooks/Graphic_Processors_Data_Book_Mar89.pdf))

instead of the datasheet from September 1993 (<https://www.goto10.fr/minitel/specifications/ts9347.pdf>) as his basis because there are less blatant errors (mainly with the format and the order of bits of MP and AP).

Notes on command execution (p29/42 datasheet / 91 graphic processors databook 1<sup>st</sup> edition)

1. The execution of any command starts at the trailing edge of AS\* when (and only when) :

- TS9347 has been selected,

- XQR has been set,

at the previous AS falling edge.

\* if DS, it would execute commands with a 6800 but not a 8051 (see timings).

# TS9347 Command Table (p32/42 datasheet / 94 graphic processors databook 1<sup>st</sup> edition)

Type	Memo	Code				Parameter				Status			Arguments							Execution Time (1)	
		7	6	5	4	3	2	1	0	Ai	LX <sub>m</sub>	LX <sub>a</sub>	R1	R2	R3	R4	R5	R6	R7	Write	Read
40 Characters - 24 Bits	TLM	0	0	0	0	R/ $\bar{w}$	0	0	I	X	X	0	C	B	A	-	-	MP		4	7.5
	TLM	0	0	0	0	R	0	1	I	X	X	0	C	B	A	-	-	MP		4	7.5
Clear Page - 24 Bits (3)	CLL	0	0	0	0	0	1	0	1	X	X	0	C	B	A	-	-	MP		<4700	
40 Characters - 16 Bits*	TSM	0	0	0	0	$\bar{w}$	0	1	I	X	X	0	A*	B*	-	-	-	MP		3	5.5
Clear Page - 16 Bits (3)*	CLS	0	0	0	0	0	1	1	1	X	X	0	A*	B*	-	-	-	MP		<3500	
40 Characters - 24 Bits*	TLA	0	0	1	0	R/ $\bar{w}$	U	U	I	X	0	X	C	B	A	AP	-	-		4	7.5
	TSM	0	1	1	0	R/ $\bar{w}$	0	1	I	X	X	0	A*	B*	-	-	-	MP		3	5.5
	CLS	0	1	1	0	0	U	0	1	X	X	0	A*	B*	-	-	-	MP		<3500	
40 Characters - 16 Bits*	TSA	0	1	1	1	R/ $\bar{w}$	U	U	I	X	0	X	A*	B*	-	AP	-	-		3	5.5
80 Characters - 8 Bits	KRS	0	1	0	0	R/ $\bar{w}$	U	U	I	X	X	0	C	-	-	-	-	MP		9	9.5
80 Characters - 12 Bits	KRL	0	1	0	1	R/ $\bar{w}$	U	U	I	X	X	0	C	-	A	-	-	MP		12.5	11.5
Byte	TBM	0	0	1	1	R/ $\bar{w}$	0	U	I	X	X	0	D	-	-	-	-	MP		4	4.5
Byte	TBA	0	0	1	1	R/ $\bar{w}$	1	U	I	X	0	X	D	-	-	AP	-	-		4	4.5
Move Buffer	MVB	1	1	0	1	s	$\bar{s}$	$\bar{a}$	a	0	0	0	W	-	-	AP		MP		2+4n (2)	
Move Double Buffer	MVD	1	1	1	0	s	$\bar{s}$	$\bar{a}$	a	0	0	0	W	-	-	AP		MP		2+8n (2)	
Move Triple Buffer	MVT	1	1	1	1	s	$\bar{s}$	$\bar{a}$	a	0	0	0	W	-	-	AP		MP		2+12n (2)	
Indirect	IND	1	0	0	0	R/ $\bar{w}$		r		0	0	0	D	-	-	-	-	-		2	3.5
Increment Y	INY	1	0	1	1	0	0	0	0	0	0	0	-	-	-	-	-	Y	-	2	
Vertical Sync Mask Reset	VRM	1	0	0	1	0	1	0	1	0	0	0	-	-	-	-	-	-		1	
Vertical Sync Mask Set	VSM	1	0	0	1	1	0	0	1	0	0	0	-	-	-	-	-	-		1	
No Operation	NOP	1	0	0	1	0	0	0	1	-	-	-	-	-	-	-	-	-		1	

s,  $\bar{s}$  : Source, Destination

01 : Source=MP; Destination=AP

10 : Source=AP; Destination=MP

$\bar{a}$ , a : Stop Condition

01 : Stop at End of Buffer

10 : No Stop

r : Indirect Register Number

- : Not Affected

U : Undefined – does not matter

W : Used as Working Register

X : Set or Reset Status Bit

I : Pointer Incrementation

D : Data

MP : Main Pointer


AP : Auxiliary Pointer


(1) Unit : 12 clock periods without possible suspension

(2) n : Total Number of Words  $\leq 40$

(3) These commands repeat TLM or TSM with Y incrementation when X overflows. When the last position is reached in a row Y is incremented and progress starts again on the next row if the stop condition is not reached. They can also be used to initialize the page 80 char/row by writing character pairs. The execution time takes into account the memory cycle allocation.

\* 40 Characters – 16 Bits commands should be compatible with the EF9345 (<https://www.alldatasheet.fr/datasheet-pdf/download/22203/STMICROELECTRONICS/EF9345.html>) but they use the code for the expansion and Compression command. Copy error? The commands are deduced by making them orthogonal with one another.

 X : correction with evidence

 X : correction by deduction – no evidence