



Function & Option

1. Memory

ROM

Project	TYPE	Total (word)	Instruction ROM Min./Max. (word)	Table ROM Min./Max. (byte)	Option Size Unit (word)	IAP
TM89PL39	OTP	64512	7168/64512	0 / 32768	1024/512/256	●
TM89PL59	MASK	32768	15360 / 32768	0 / 32768	512	
TM8959	MASK	32768	16384 / 32768	0 / 32768	512	
TM8957	MASK	24576	8192 / 24576	0 / 32768	512	
TM8955	MASK	16384	4192 / 16384	0 / 24576	512	
TM8952	MASK	16384	4096 / 16384	0 / 24576	512	
TM8951	MASK	8192	4096 / 8192	0 / 8192	256	
TM87ML28	MTP	8192	4096 / 8192	0 / 8192	256	●
TM87PL37	OTP <TTP>	15872 <7680>	7680 / 15872 <3584 / 7680>	0 / 16384 <0 / 8192>	256 <256>	
TM8727	MASK	12288	10240 / 12288	0 / 4096	256	
TM87PL36	OTP <TTP>	7680 <3584>	3584 / 7680 <1536 / 3584>	0 / 8192 <0 / 4096>	128 <128>	●
TM8726/ML26	MASK/MTP	4096	2048 / 4096	0 / 4096	128	
TM87PL35(B)/P32	OTP <TTP>	3840 <1792>	1792 / 3840 <128 / 1792>	0 / 4096 <0 / 3328>	128 <128>	●
TM8725/ML25	MASK/MTP	3072	1024 / 3072	0 / 4096	128	
TM8722/62/ML22	MASK/MTP	2048	128 / 2048	0 / 3840	128	
TM8723/63/M23	MASK/MTP	1536	128 / 1536	0 / 2816	128	
TM8724	MASK	1152	128 / 1152	0 / 2048	128	
TM8721/61	MASK	1024	128 / 1024	0 / 1792	128	
TM8720	MASK	1024	1024	-	-	

Note:

- TM87ML28 support Table ROM IAP by PTR & MRI instruction.
- TM87P32 & TM87PL35/36/37 & TM89PL39 support Table ROM IAP by PTR & MRI & SIAP instruction.
- TM87PL37 support total 7.5K word code option for twice-time programmable code(TTP).
- TM89PL39 "Option Size Unit" : 1024/512/256 for one/two/four program code.

RAM

Project	Total Data RAM Size(nibble)/ Max. Address/ Max. data bits	LCD RAM (Share Data RAM (0100h~01FFh) / PLA	STACK Share Data RAM 0200h~023Fh / Level	MHL/RHL/ MZR/RZR Share Data RAM (0080h~00FFh)
TM89PL39	8192 / 1FFFh / 16	RAM(R/W)/PLA(W)	Yes / 16	●
TM8959/57/PL59	6144 / 17FFh / 16	RAM(R/W)	Yes / 16	●
TM8955	4096 / 0FFFh / 16	RAM(R/W)	Yes / 16	●
TM8952	1280 / 04FFh / 16	RAM(R/W)	Yes / 16	●
TM8951	960 / 03FFh / 16	RAM(R/W)	Yes / 16	●
TM87PL37	2048 / 07FFh / 4	PLA(W)	No / 8	
TM8727/ML28/PL36	1024 / 03FFh / 4	PLA(W)	No / 8	
TM8726/ML26/PL35(B)	512 / 01FFh / 4	PLA(W)	No / 8	
TM8725/ML25	384 / 017Fh / 4	PLA(W)	No / 8	
TM87P32	256 / 00FFh / 4	PLA(W)	No / 8	
TM8722/62/ML22	128 / 007Fh / 4	PLA(W)	No / 8	
TM8723/63/M23	96 / 007Fh / 4	PLA(W)	No / 8	
TM8724	80 / 007Fh / 4	PLA(W)	No / 8	
TM8721/61	64 / 007Fh / 4	PLA(W)	No / 8	
TM8720	64 / 007Fh / 4	Fix PLA(W)	No / 4	

Note:

- TM8951 RAM address 01C0h~01FFh no use.
- TM87(M)23 RAM address 0050h~006Fh no use.



- (3) TM8724 RAM address 0040h~006Fh no use.
- (4) TM8721 & TM8720 RAM address 0000h~003Fh no use.
- (5) TM89PL39 option can select PLA(write only & no share with RAM)

BANK for Instruction ROM & Page for RAM & Lz

Project	CALL,JMP Jump range & BANK size	BANK jump instruction by complier insert	Rx/Ry/Lz Page Number	Single Page Lz Range	Single Page Ry range for LCT/B/P Lz,Ry instructions
TM89PL39	2K	SPBK	64/512/4	00~1Fh	00~1Fh
TM8959/57/PL59	2K	SPBK	48/384/4	00~1Fh	00~1Fh
TM8955	2K	SPBK	32/256/4	00~1Fh	00~1Fh
TM8952	2K	SPBK	10/80/4	00~1Fh	00~1Fh
TM8951	2K	SPBK	8/60/3	00~1Fh	00~1Fh
TM87ML28	2K	SPBK	8/64/2	00~1Fh	00~1Fh
TM8727/PL37/36	4K	SF2(X6=1)	1/1/1	00~3Fh	70~77h
TM8726/ML26	4K	-	1/1/1	00~3Fh	70~77h
TM8725/ML25/PL35(B)/ P32	4K	-	1/1/1	00~1Fh	70~7Fh
TM8722/62/ML22	-	-	1/1/1	00~1Fh	70~7Fh
TM8723/63/M23	-	-	1/1/1	00~1Fh	70~7Fh
TM8724	-	-	1/1/1	00~1Fh	70~7Fh
TM8721/61	-	-	1/1/1	00~0Fh	70~7Fh
TM8720	-	-	1/1/1	00~0Fh	70~7Fh

INDEX REGISTER (HL and ZR)

Project	HL Bits	ZR Bits	Instruction for set IDBF8~11	HL/ZR Read
TM89PL39	16	13	MVU	●
TM8959/57/PL59	15	13	MVU	●
TM8955	15	12	MVU	●
TM8952	15	11	MVU	●
TM8951	13	10	MVU	●
TM87ML28	13	-	MVU	●
TM87PL37	15<14>	-	MVU	
TM8727	12	-	MVU	
TM87PL36	14<13>	-	MVU	
TM8726/ML26	12	-	MVU	
TM8725/ML25/PL35(B)	12	-	MVU	
TM87P32	12	-	MVU	
TM8722/62/ML22	12	-	MVH(AC)	
TM8723/63/M23	12	-	MVH(AC)	
TM8724	11	-	MVH(AC)	
TM8721/61	11	-	MVH(AC)	
TM8720	-	-	-	

Note:

"<>": HL Bits For TTP.

2. Power
Power Pins

Project	VBAT	BAK	VL1	VL2	VL3	VL4	VL5
TM89PL39/59	●	●	●<VBAT>	●<VBAT>	●<VBAT>	●<VBAT>	
TM8959/57/55/52	●	●	●	●	●	●	●
TM8951	●	●	●	●	●	●	
TM87ML22/25/26/28	●	●	●	●	●		



TM87M23	●	●	●	●	●		
TM87PL37	●	●	●	●	●		
TM87PL35(B)/36	●	●	●<VBAT>	●<VBAT>	●<VBAT>		
TM87P32	●	●	●<VBAT>	●<VBAT>	●<VBAT>		
TM8727		●	●(VBAT)	●(VBAT)	●	●	
TM8726		●	●(VBAT)	●(VBAT)	●	●	
TM8725		●	●(VBAT)	●(VBAT)	●	●	
TM8722/62		●	●(VBAT)	●(VBAT)	●		
TM8723/63		●	●(VBAT)	●(VBAT)	●		
TM8724			●(VBAT)	●(VBAT)	●		
TM8721/61	●	●VL1		●			
TM8720	●VL1			●			

Note:

(VBAT) : Connect to Power Source follow mask option.

<VBAT> : Support VBAT driver output by Power Mode.

Power Mode

Project	EXT-V	3V Battery or higher (BCF=0:BAK<VBAT)	3V Battery or higher (BCF=0:BAK=VBAT)	1.5V Battery
TM89PL39/59		●(VBAT<=3.6V)	●(VBAT<=3.6V)	●
TM8959/57/55/52/51		●(VBAT<=3.6V)	●(VBAT<=3.6V)	●
TM87ML22/25/26/28		●(VBAT<=3.6V)	●(VBAT<=3.6V)	●
TM87PL35(B)/36/37		●(VBAT<=3.6V)	●(VBAT<=3.6V)	●
TM87P32		●(VBAT<=3.6V)	●(VBAT<=3.6V)	●
TM8727	●	●		●
TM8726	●	●		●
TM8725	●	●		●
TM8722/62	●	●		●
TM87M23		●(VBAT<=3.6V)	●(VBAT<=3.6V)	●
TM8723/63	●	●		●
TM8724	●		●	●
TM8721/61				●
TM8720				●

Note:

“BCF=0 : BAK<=VBAT” Mode :

(1) BAK=VREG : support by see “Regulator”(BAK=VREG)

(2) BAK=1/2 x VBAT : support by see “VL voltage generated structure”(Halver & Pump)

(3) BAK=VDL : support by see “Regulator”(VDL)

(4) BAK=2/3 x VABT : support by see “VL voltage generated structure”(Capacitive Voltage Divider)

Regulator

Project	BAK=VREG	VDL		LBD	LVR2/AUTO-LBD /AUTO-SWPWR
		2/3 x VL3	1/3 x VL3		
TM89PL39/59	●*1 (1.95~1.20V)	● (2.55~1.80V)	● (1.70~0.95V)	● (2.90~1.35V)	● (2.90~1.35V)
TM8959/57/55/52/51					
TM87ML28	● (2.75~1.20V)	● (2.55~1.80V)	● (1.70~0.95V)	● (2.75~2.00/2.10~1.35V)	
TM87ML22/25	● (1.95~1.20V)	● (2.55~1.80V)	● (1.70~0.95V)	● (2.75~2.00/2.10~1.35V)	
TM87ML26	●*1 (1.95~1.20V)	● (2.55~1.80V)	● (1.70~0.95V)	● (2.90~1.35V)	● (2.90~1.35V)
TM87PL35(B)/36/37	●*1 (1.95~1.20V)	● (2.55~1.80V)	● (1.70~0.95V)	● (2.90~1.35V)	● (2.90~1.35V)



TM8727					
TM8726					
TM8725					
TM87P32				●*2	
TM8722/62					
TM8723/63/M23					
TM8724					
TM8721/61					
TM8720					

Note:

*1 : (1) Support code option for STOP Mode :

a. Hold BCF=0 for BAK=VREG.

b. Enable VL1/2=VDL

(2) Support code option to set initial BCF=0 for BAK=VREG.

(3) Support code option to set initial VREG/VDL option.

*2 : 3.0~2.3/1.5~1.2V(step : 0.1V) for 3/1.5V Power Mode.

VL voltage generated structure

Project	Halver & Pump	Capacitive Voltage Divider	Resistive Voltage Divider
TM89PL39	●	●	
TM8959/57/55/52/51/PL59	●		
TM87ML22/25/26/28	●	●	
TM87M23	●	●	
TM87PL35(B)/36/37	●	●	
TM87P32	●	●	
TM8727	●		
TM8726	●		
TM8725	●		
TM8722/62	●		
TM8723/63	●		
TM8724	●		
TM8721/61	●		
TM8720	●		

“Halver & Charge Pump” or “Capacitive Voltage Divider” cycle

Project	Change by “MWM”	PH1	PH2	PH3	PH4	PH5	PH6
TM89PL39	●	●	●	●	●	●	●
TM89PL59		●	●	●	●	●	●
TM8959/57/55/52/51				●	●	●	
TM87ML22/25/26/28				●	●	●	●
TM87M23				●	●	●	●
TM87PL37				●	●	●	●
TM8727					●	●	
TM87PL35(B)/36		●	●	●	●	●	●
TM8726					●	●	
TM8725						●	
TM87P32	●	●	●	●	●	●	●
TM8722/62						●	
TM8723/63						●	
TM8724						●	
TM8721/61						●	
TM8720						●	

Note: TM8727/26 force PH4 cycle for 1/4Bias & force PH5 for 1/2 and 1/3 Bias



Charge Pump Pins & Driver/Sink

Project	CUPN	CUP0	CUP1	CUP2	Driver/Sink
TM89PL39/59	●	●	●	●	Notrml / Big
TM8959/57/55/52/51	●	●	●	●	Notrml
TM8727		●	●	●	Notrml
TM8726		●	●	●	Notrml
TM87PL37			●	●	Notrml
TM87PL35(B)/36			●	●	Notrml / Big
TM87P32			●	●	Notrml / Big
TM87ML26			●	●	Notrml
TM8725/ML25			●	●	Notrml
TM8722/62/ML22			●	●	Notrml
TM8723/63/M23			●	●	Notrml
TM8724			●	●	Notrml
TM8721/61			●	●	Notrml
TM8720			●	●	Notrml

Note: TM87P32 can change Driver/Sink by execute MWM instruction.

VL Bias

Project	No Bias	1/2Bias 1C2P	1/3Bias 1C2P	1/3Bias 2C4P	1/4Bias 2C3P	1/4Bias 2C4P	1/5Bias 2C4P	Force 1/2Bias
TM89PL39/59	●	●	●	●	●	●		●
TM8959/57/55/52			●	●	●	●	●	
TM8951			●	●	●	●		
TM87ML22/25/26/28	●	●	●					●
TM87PL35(B)/36/37	●	●	●					●
TM87P32	●	●	●					●
TM8726/27	●	●	●		●			
TM8724/23/22/25	●	●	●					
TM8763/62/M23	●	●	●					●
TM8721/61	●	●						
TM8720		●						

Note:

- (1) 1C2P : connect one Capacitor between CUP1 and CUP2.
- (2) 2C3P : connect one Capacitor between CUP1 and CUP2 & connect one Capacitor between CUP0 and CUP2.
- (3) 2C4P : connect one Capacitor between CUP1 and CUP2 & connect one Capacitor between CUPN and CUP0.
- (4) "Force 1/2Bias" : force COM & SEG 1/2Bias waveform for 1/1DUTY(STATIC) Mode , when CUPN,0,1,2 active with 1/3~1/5Bias.

3. LCD/LED
COM,SEG Pins

Project	COM x SEG by Max. COM / SEG pins	Total COM & SEG pins name	COM / SEG share pins	COM / SEG share to DC & Open- Drain pins
TM89PL39	16x64 / 1x105	COM1~16 , SEG1~64,1H~26H	- / -	1~16 / 1~64, 1H~20H,23H~26H
TM89PL59	16x64 / 16x64	COM1~16 , SEG1~64	- / -	2~16 / -
TM8959/57	16x64 / 16x64	COM1~16 , SEG1~64	- / -	5~16 / -
TM8955	16x60 / 12x64	COM1~16 , SEG1~60	13~16 / 64~61	5~16 / -
TM8952	16x52 / 12x56	COM1~16 , SEG1~32,41~60	13~16 / 64~61	5~16 / -
TM8951	9x48 / 9x48	COM1~9 , SEG1~28,41~60	- / -	5~9 / -



TM87ML28	9x47 / 4x52	COM1~9 , SEG1~47	5~9 / 52~48	1~9 / 1~47
TM87PL37	9x51 / 9x51	COM1~9 , SEG1~51	1~9(9~1) / 31~39	1~9 / 1~51
TM8727	9x41 / 9x41	COM1~9 , SEG1~41	- / -	5~9 / 1~41
TM87PL36	9x43 / 9x43	COM1~9 , SEG1~43	1~9(9~1) / 31~39	1~9 / 1~43
TM87ML26	9x41 / 9x41	COM1~9 , SEG1~41	1~9(9~1) / 31~39	1~9 / 1~41
TM8726	9x41 / 9x41	COM1~9 , SEG1~41	- / -	5~9 / 1~41
TM87PL35(B)	6x40 / 6x40	COM1~6 , SEG1~40	1~6(6~1) / 31~36	1~6 / 1~40
TM87ML25	6x40 / 6x40	COM1~6 , SEG1~40	- / -	1~6 / 1~40
TM8725	6x40 / 6x40	COM1~6 , SEG1~40	- / -	5~6 / 1~40
TM87ML22	5x35 / 5x35	COM1~5 , SEG1~35	- / -	1~5 / 1~35
TM87P32	5x35 / 5x35	COM1~5 , SEG1~35	1~5(5~1) / 31~35	1~5 / 1~35
TM8722/62	5x35 / 5x35	COM1~5 , SEG1~35	- / -	- / 1~35
TM87M23	5x27 / 5x27	COM1~5 , SEG1~12,21~35	- / -	1~5 / 1~12,21~35
TM8723/63	5x27 / 5x27	COM1~5 , SEG1~12,21~35	- / -	- / 1~12,21~35
TM8724	5x24 / 5x24	COM1~5 , SEG1~12,24~35	- / -	- / 1~12,24~35
TM8721/61	4x9 / 4x9	COM1~4 , SEG1~9	- / -	- / 1~9
TM8720	4x12 / 4x12	COM1~4 , SEG1~12	- / -	- / -

Note:

- TM87ML26, TM87PL37 support COM1~9 mirror pins.
- TM87PL37/TM87ML26/TM87ML22/TM87M23 : force same PSTB & DBUS with SEG24/24/35/35 for COM1 set to DC/Open-Drain output.

LCD/LED Active Type

Project	LCD	LED-H	LED-L	O/P	LED(DIRECT DRIVER)
TM89PL39	●			●	●
TM89PL59	●				
TM8959/57/55/52/51	●				
TM87ML22/25/26/28	●			●	●
TM87M23/P32	●			●	●
TM87PL35(B)/36/37	●			●	●
TM8727	●			●	
TM8726	●			●	
TM8725	●			●	
TM8722/62	●	●	●	●	
TM8723/63	●	●	●	●	
TM8724	●			●	
TM8721/61	●			●	
TM8720	●				

LCD/LED duty

Project	O	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
	P	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
		D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	U
		T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
TM89PL39	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TM89PL59		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TM8959/57/55/52					●	●	●	●	●	●	●	●	●	●	●	●	●
TM8951					●	●	●	●	●	●							
TM87PL36/37	●	●	●	●	●	●	●	●	●	●							
TM8727	●		●	●	●	●	●	●	●	●							
TM87ML26	●	●	●	●	●	●	●	●	●	●							
TM8726	●		●	●	●	●	●	●	●	●							
TM8725/ML25/PL35(B)	●	●	●	●	●	●	●										



TM8722	●		●	●	●	●													
TM8762/ML22/P32	●	●	●	●	●	●													
TM8723	●		●	●	●	●													
TM8763/M23	●	●	●	●	●	●													
TM8724	●	●	●	●	●	●													
TM8721/61	●				●														
TM8720					●														

Clock Source of LCD/LED Alternating Frequency

Project	Select Mode	PH1	PH2	PH3	PH4	PH5	PH6	PH7	PH8	PH9	PH10	O/P
TM89PL39	D	●	●	●	●	●	●	●	●	●	●	●
TM89PL59	D	●	●	●	●	●	●	●	●	●	●	
TM8959/57/55/52/51	D			●	●	●	●	●	●	●	●	
TM87ML28	D			●	●	●	●	●	●	●	●	●
TM8727/PL37	I					●	●	●	●	●	●	●
TM8726/ML26/PL36	I					●	●	●	●	●	●	●
TM8725/ML25/PL35(B)	I						●	●	●	●	●	●
TM8722/62/ML22/P32	I						●	●	●	●	●	●
TM8723/63/M23	I						●	●	●	●	●	●
TM8724	I						●	●	●	●	●	●
TM8721/61	I							●	●	●		●
TM8720	I							●	●	●		

Note:

- (1) TM89 series & TM87ML28 set clock source directly
- (2) 'D': select clock source directly.
- 'I': select clock source is combined with code option "LCD FRAME FREQUENCY" & "LCD DUTY CYCLE" & "LCD ALTERNATING FREQUENCY FROM CLOCK SOURCE" indirectly:

LCD DUTY CYCLE	LCD FRAME FREQUENCY		FAST	TYPICAL	SLOW
1/1 DUTY(STATIC)			PH9	PH10	PH10
1/2 DUTY(DUPLEX)			PH8	PH9	PH10
1/3 , 1/4 DUTY			PH7	PH8	PH9
1/5 , 1/6 , 1/7 DUTY			PH6	PH7	PH8
1/8 , 1/9 DUTY			PH5	PH6	PH7

LCD/LED Alternating Frequency from Clock Source

Project	x 1/1	x 1/3	x 2/3	x 4/3
TM89PL39/59	●	●		
TM8959/57/55/52/51	●			
TM87ML28	●	●		
TM87ML22/25/26	●		●	●
TM87M23/P32	●		●	●
TM87PL35(B)/36/37	●		●	●
TM8727	●			
TM8726	●			
TM8725	●			
TM8722/62	●			
TM8723/63	●			
TM8724	●			



TM8721/61	●			
TM8720	●			

LCD/LED OFF Waveform in RESET & OFF Mode by execute SF2 X2=1

Project	RESET Mode		SF2 X2=1		LCD Display in Reset Mode
	Normal OFF waveform	COM & SEG STOP	Normal OFF waveform	COM & SEG STOP	
TM89PL39		●		●	On/Off
TM8959/57/55/52/51/PL59		●		●	OFF only
TM87ML22/25/26/28		●		●	On/Off
TM87M23/P32		●		●	On/Off
TM87PL35(B)/36/37		●		●	On/Off
TM8727	●		●		On/Off
TM8726	●		●		On/Off
TM8725		●		●	On/Off
TM8722	●		●		On/Off
TM8762		●		●	On/Off
TM8723	●		●		On/Off
TM8763		●		●	On/Off
TM8724		●		●	On/Off
TM8721/61	●		●		On/Off
TM8720	●			●	OFF only

Note:

- (1) If have option : "LCD DISPLAY IN RESET CYCLE" need select "OFF"
- (2) LED Mode force "OFF" in RESET Mode.

4. I/O

I/O Port

Project	R/W with Rx & set by directly value					Execute set & R/W all with Ry & Rm			
	IOA1~4	IOB1~4	IOC1~4	IOD1~4	IOE1~4	IOF1~4	IOG1~4	IOH1~4	IOI1~4
TM89PL39	●	●	●	●	●	●	●	●	●
TM8959/57/55/PL59	●	●	●	●	●				
TM8952/51	●	●	●	●					
TM87ML28	●	●	●	●	●	●			
TM87PL37	●	●	●	●	●	●	●		
TM8727	●	●	●	●					
TM87PL36	●	●	●	●	●				
TM87ML26	●	●	●	●	●(IOE1,2)				
TM8726	●	●	●	●					
TM8725/ML25/PL35(B)	●	●	●	●					
TM8722/62/ML22/P32	●	●	●						
TM8723/63/M23	●	●	●						
TM8724	●	●	●						
TM8721/61	IOA4	IOB3,4	●						
TM8720	●	IOB2~4							

Note:

- (1) TM87ML28 IOA&IOE can select share pins with SEG24~27,40~43 or CX,RFC0~5,CX2 by code option.
- (2) Only TM87ML28/TM89PL39 support SIO(SPI/ UART/I2C) pins :
SDA,SCL,SIOX(MISO/TXD/SDA),SIOY(MOSI/RXD/SCL),SCK/SSB.

I/O Release



Project	IOA	IOC	IOD	Chattering Prevention	
				USE	NO USE
TM89PL39/59	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●
TM87ML28	●	●	●	●	●
TM87ML25/26		●	●	●	●
TM87PL35(B)/36/37		●	●	●	●
TM8727		●	●	●	
TM8726		●	●	●	
TM8725		●	●	●	
TM87P32	●	●		●	●
TM87ML22/M23		●		●	●
TM8722/62		●		●	
TM8723/63		●		●	
TM8724		●		●	
TM8721/61	●			●	
TM8720	●			●	

IOC port Input Resistor

Project	No Use	Pull-Low	LLH	Pull-High
TM89PL39/59	●	●	●	
TM8959/57/55/52/51	●	●	●	
TM87ML28	●	●	●	
TM8727/PL37	●	●	●	
TM8726/ML26/P36	●	●	●	
TM8725/ML25/PL35(B)	●	●	●	
TM8722/62/ML22/P32	●	●	●	
TM8723/63/M23	●	●	●	
TM8724	●	●		
TM8721/61		●	●	
TM8720	-	-	-	-

Other I/O ports Pull-Low Resistor

Project	IOA	IOB	IOD	IOE	IOF	IOG	IOH	IOI
TM87PL39	OPT	OPT	OPT	OPT	OPT	OPT	OPT	OPT
TM8959/57/55/PL59	OPT	OPT	OPT	OPT	-	-	-	-
TM8952/51	OPT	OPT	OPT	-	-	-	-	-
TM87ML26/PL36	OPT	OPT	OPT	OPT	-	-	-	-
TM87ML28	OPT	OPT	OPT	OPT	OPT	-	-	-
TM87PL37	OPT	OPT	OPT	OPT	OPT	OPT	-	-
TM8727	OPT	OPT	OPT	-	-	-	-	-
TM8726	OPT	OPT	OPT	-	-	-	-	-
TM8725/ML25/PL35(B)	OPT	OPT	OPT	-	-	-	-	-
TM8722/62/ML22/P32	OPT	OPT	-	-	-	-	-	-
TM8723/63/M23	OPT	OPT	-	-	-	-	-	-
TM8724	No Use	OPT	-	-	-	-	-	-
TM8721/61	Use	Use	-	-	-	-	-	-
TM8720	Use	Use	-	-	-	-	-	-

Note:

(1) OPT : "Use" or "No Use" by Code Option.

(2) TM87ML28/TM89PL39 support "Pull-High Resistor" for IOA,IOE share pins with SIO.

INT



Project	INT PIN INTERNAL RESISTOR			INT PIN TRIGGER MODE	
	PULL HIGH	PULL LOW	OPEN	RISING EDGE	FALLING EDGE
TM89PL39/59	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●
TM87ML28	●	●	●	●	●
TM8727/PL37	●	●	●	●	●
TM8726/ML26/PL36	●	●	●	●	●
TM8725/ML25/PL35(B)	●	●	●	●	●
TM8722/62/ML22/P32	●	●	●	●	●
TM8723/63/M23	●	●	●	●	●
TM8724	●	●	●	●	●
TM8721/61	-	-	-	-	-
TM8720	-	-	-	-	-

5. CLOCK

CLOCK SOURCE & O.S.C Pins

Project	CLOCK SOURCE			O.S.C. Pins	
	FAST ONLY	SLOW ONLY	DUAL	XIN/XOUT	CFIN/CFOUT
TM89PL39	●	●	●*1	●	●
TM89PL59	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●
TM87ML28	●	●	●*1	●	●
TM8727/PL37	●	●	●	●	●
TM87PL35(B)/36	●	●	●*2	●	●
TM8726/ML26	●	●	●	●	●
TM8725/ML25	●	●	●	●	●
TM87P32	●	●	●*2	●	
TM8722/62/ML22	●	●	●	●	
TM8723/63/M23	●	●	●	●	
TM8724	●	●	●	●	
TM8721/61	●	●		●	
TM8720	●	●		●	

Note:

- (1) if O.S.C. Pins only support XIN&XOUT, force Internal-RC for Dual Mode
- (2) *1 : Dual Mode add. hold FAST Mode after enter HALT Mode code option & hold enable CFOSC after enter HALT Mode code option.
- (3) *2 : Dual Mode add. hold FAST Mode after enter HALT Mode code option

SLOW CLOCK TYPE FOR SLOW ONLY OR DUAL

Project	32K X'tal	Ext-RC	Int-RC
TM89PL39	●	●	●(48KHz)
TM8959/57/55/52/51/PL59	●	●	
TM87ML28	●	●	
TM8727/PL37	●	●	
TM8726/ML26/PL36	●	●	
TM8725/ML25/PL35(B)	●	●	
TM8722/62/ML22/P32	●	●	
TM8723/63/M23	●	●	
TM8724	●	●	
TM8721/61	●		
TM8720	●		



FAST CLOCK TYPE FOR FAST ONLY OR DUAL

Project	INTERNAL RESISTOR	INTERNAL RESISTOR (TEMPERATURE COMPENSATION)	EXTERNAL RESETOR	3.58MHz CERAMIC RESONATOR
TM89PL39	2000/1000/500/250/125KHz	4000/2000/1000/500/250KHz	●	●
TM89PL59	500/250KHz		●	●
TM8959/57/55/52/51	500/250KHz		●	●
TM87ML28	2000/1000/500/250/125KHz	4000/2000/1000/500/250KHz	●	●
TM87ML25/26	2000/1000/500/250/125KHz		●	●
TM87M23/ML22/P32	2000/1000/500/250/125KHz		●*1	
TM87PL35(B)/36/37	2000/1000/500/250/125KHz		●	●
TM8727	500/250KHz		●	●
TM8726	500/250KHz		●	●
TM8725	500/250KHz		●	●
TM8722/62	500/250KHz		●*1	
TM8723/63	500/250KHz		●*1	
TM8724	500/250KHz		●*1	
TM8721/61	500/250KHz		●*1	
TM8720	500KHz		●*1	

Note:

- (1) Frequency value of internal resistor is based on VBAT=3.0V
- (2) Frequency value of internal resistor(TEMPERATURE COMPENSATION) is based on VBAT=1.8V
- (3) *1 : support for "FAST ONLY" only.

PH0<->FTOSC FOR FAST ONLY

Project	FTOSC	FTOSC /4	FTOSC /8	FTOSC /16	FTOSC /32	FTOSC /64	FTOSC /128	FTOSC /256
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML22/25/26/28	●	●	●	●	●	●	●	●
TM87M23/P32	●	●	●	●	●	●	●	●
TM87PL35(B)/36/37	●	●	●	●	●	●	●	●
TM8727	●	●	●	●				
TM8726	●	●	●	●				
TM8725	●	●	●	●				
TM8722/62	●	●	●	●				
TM8723/63	●	●	●	●				
TM8724	●	●	●	●				
TM8721/61	●	●	●	●				
TM8720	●	●	●	●				

BCLK<->FTOSC by FAST instruction for FAST ONLY or DUAL mode

Project	FTOSC	FTOSC /2	FTOSC /4	FTOSC /8	FTOSC /16	FTOSC /32	FTOSC /64	FTOSC /128
TM89PL39	●	●	●	●	●	●	●	●
TM89PL59	●							
TM8959/57/55/52/51	●							
TM87ML22/25/26/28	●	●	●	●	●	●	●	●
TM87M23/P32	●	●	●	●	●	●	●	●
TM87PL35(B)/36/37	●	●	●	●	●	●	●	●
TM8727	●							
TM8726	●							
TM8725	●							



TM8722/62	●							
TM8723/63	●							
TM8724	●							
TM8721/61	●							
TM8720	●							

BCLK<->SOSC by SLOW instruction for SLOWONLY or DUAL mode

Project	SOSC	SOSC /2	SOSC /4	SOSC /8	SOSC /16	SOSC /32	SOSC /64	SOSC /128
TM89PL39	●	●	●	●	●	●	●	●
TM89PL59	●							
TM8959/57/55/52/51	●							
TM87ML22/25/26/28	●							
TM87M23/P32	●							
TM87PL35(B)/36/37	●							
TM8727	●							
TM8726	●							
TM8725	●							
TM8722/62	●							
TM8723/63	●							
TM8724	●							
TM8721/61	●							
TM8720	●							

6. RESET

RESET Function

Project	REST Time		POWER ON RESET	RESET PIN RESET			WATCH DOG TIMER RESET	KEY RESET	LVR1	LVR2
	PH15/2	PH12/2		Reset Level	LEVEL Type	PULSE Type				
TM89PL39/59	●	●	*5,6	LOW	●*7	●*7	●	●*8	●	●
TM8951/52/55/57/59	●	●	*1,6	LOW	●*7	●*7	●	●*8		
TM87ML22/25/28	●	●	*4,5,6	HIGH	●*7	●*7	●	●*8	●	
TM87M23	●	●	*4,5,6	HIGH	●*7	●*7	●	●*8	●	
TM87ML26	●	●	*5,6	HIGH	●*7	●*7	●	●*8	●	●
TM87PL35(B)/36/37	●	●	*5,6	HIGH	●*7	●*7	●	●*8	●	●
TM87P32	●	●	*5,6	HIGH	●*7	●*7	●	●*8	●	
TM8727	●	●	*2	HIGH	●	●	●	●		
TM8726	●	●	*2	HIGH	●	●	●	●		
TM8725	●	●	*2	HIGH	●	●	●	●		
TM8722/62	●	●	*2	HIGH	●		●	●		
TM8723/63	●	●	*2	HIGH	●	●	●	●		
TM8724	●	●	*2	HIGH	●	●				
TM8721/61		●	*3	HIGH		●				
TM8720		●	*3	HIGH		●				

Note:

- (1) *1 : no any power on reset if “NO USE” is selected to option of “POWER ON RESET”
- *2 : still have power on reset (need discharge completely) if “NO USE” is selected for option of “POWER ON RESET”
- *3 : power on reset need discharge completely.
- *4 : power on reset fix use.
- *5 : power on reset support 10ms Spec.
- *6 : powr on reset have higher power noise reject filter.



*7 : RESET(B) pin have higher power & input noise reject filter.

*8 : Key-Reset have higher input noise reject filter.

- (2) TM87ML25/28 : reset by WDT or Key-Reset can't initial LCD/LED, CMOS, and P_open_drain output data! Suggest select "OFF" for option of "LCD DISPLAY IN RESET CYCLE" to avoid error display in reset cycle.

Watch Dog Timer Reset

Project	Type for W.D.T. use		No Use	Overflow Time Interval			Support restart by SF instruction directly
	Always Enable	Enable and Disable by Software		8 x PH10	64 x PH10	512 x PH10	
TM89PL39/59	●	●	●	●	●	●	●
TM8959		●	●	●	●	●	
TM8957		●	●	●	●	●	●
TM8955		●	●	●	●	●	
TM8952		●	●	●	●	●	
TM8951		●	●	●	●	●	●
TM87ML22/25/26/28	●	●	●	●	●	●	●
TM87M23/P32	●	●	●	●	●	●	●
TM87PL35(B)/36/37	●	●	●	●	●	●	●
TM8727		●	●	●	●	●	
TM8726		●	●	●	●	●	
TM8725		●	●	●	●	●	
TM8722		●	●	●	●	●	
TM8762	●	●	●	●	●	●	●
TM8723		●	●	●	●	●	
TM8763	●	●	●	●	●	●	●
TM8724	-	-	-	-	-	-	-
TM8721/61	-	-	-	-	-	-	-
TM8720	-	-	-	-	-	-	-

7. Timer

Timer Function

Project	TMR1	TMR2	TMR3	Repeat load set value (SRP)	Timer Merge (STM)	Timer Extend (STE)	Stop Timer (DISTM)	Timer Counter Read	Timer Counter Latch (S/RF)	Used as RFC counter
TM89PL39	●	●	●	●	●	●	●	●	●	●
TM89(PL)59	●	●	●		●		●	●	●	●
TM8957	●	●	●		●		●	●	●	●
TM8955	●	●	●		●		●	●	●	●
TM8952	●	●	●		●		●	●	●	
TM8951	●	●	●		●		●	●	●	
TM87ML28	●	●	●	●	●	●	●	●	●	
TM87ML25/26	●	●					●	●	●	
TM87ML22/M23	●	●						●	●	
TM87PL35(B)/36/37	●	●		●			●	●	●	
TM87P32	●	●		●			●	●	●	
TM8727	●	●								
TM8726	●	●								
TM8725	●	●								
TM8722/62	●	●								



TM8723/63	●											
TM8724	●											
TM8721/61		●										
TM8720		●										

Note:

TM87ML28/TM89PL39 auto-set SRP X3/2 = 1 when TMR3/2 set Ctm3/2=XCLK.

Timer Clock Source

Project	PH9	PH3	PH15	FREQ	PH5	PH7	PH11	PH13	CX	CX2	INT	XCLK
TM89PL39	●	●	●	●	●	●	●	●	●	●	●	●
TM8959/57/55/PL59	●	●	●	●	●	●	●	●	●	●	●	
TM8952/51	●	●	●	●	●	●	●	●	●		●	
TM87ML28	●	●	●	●	●	●	●	●	●	●	●	●
TM8727/PL37	●	●	●	●	●	●	●	●				
TM8726/ML26/PL36	●	●	●	●	●	●	●	●				
TM8725/ML25/PL35(B)	●	●	●	●	●	●	●	●				
TM87P32	●	●	●	●	●	●	●	●				
TM8722/62/ML22	●	●	●	●	*1	*1	*1	*1				
TM87M23	●	●	●	●	*1	*1	*1	*1				
TM8723/63	●	●	●	●								
TM8724	●	●	●									
TM8721/61	●	●	●	●	●	●	●	●				
TM8720	●	●	●	●	●	●	●	●				

Note:

(1) CX/CX2/INT only can be set by instructions : T1RH/T1XH/T1TH/T2RH/T2XH/T2TH/T3RH/T3XH/T3TH/T2M3X

(2) TMS/TM2/TM3 Rx & TMS/TM2/TM3(#) @HL only can set PH9,PH3,PH15,and FREQ

(3) TM87ML28/TM89PL39 : TMR1 no support XCLK, TMR2&TMR3 support XCLK & control by SIO.

(4) *1 : support for Timer2 only

8. RFC

RFC structions structure & Pins Type

Project	RFC instructions STRUCTURE	RFC Overflow no disable Counter	CX/2 P-L for RFC not active	RFC0~5 output type	
				Resistance	Capacitance
TM89PL39/59	B	●	●	●	●
TM8959/57/55/52/51	B	●	●	●	●
TM87ML28	A/B	●	●	●	●
TM87ML25/26	A	●	●	●	●
TM87ML22/M23	A	●	●	●	
TM87PL35(B)/36/37	A	●	●	●	●
TM87P32	A	●	●	●	●
TM8727	A	●		●	
TM8726	A	●		●	
TM8725	A		●	●	
TM8722	A	●		●	
TM8762	A	●	●	●	
TM8723/63	-		-	-	-
TM8724	-		-	-	-
TM8721/61	A			●	
TM8720	-		-	-	-

Note:

(1) STRUCTURE:

A : set & enable RFC only by SRF instruction(support RFC0~2 only).



B : set & enable RFC is combined with SRF(only set RFC0~5 output), SCX,SCNT, SF2,RF2 instructions, read SCF11(CX),12(CX2) by MAF instruction & read CX,CX2 input by MDX instruction.

(2) RFC0,1,2 = RR,RT,RH

RFC Mode

Project	SOFTWARE CONTROL	Timer2 Control	CX/2 - One Cycle	CX/2 - High LEVEL	CX/2 - Rising Edge	Counter clock source=FRE Q for not CX/2 control mode	Force Crfc=XCLK by SXCLK (X1=1)
TM89PL39	●	●	●	●	●	●	●
TM89PL59	●	●	●	●		●	
TM8959/57/55/52/51	●	●	●	●		●	
TM87ML26	●	●	●	●	●	●	
TM87PL35/36/37	●	●	●	●	●	●	
TM87PL35B	●	●	●	●	●	●	●
TM87P32	●	●	●	●	●	●	●
TM87ML28	●	●	●	●		●(B Type)	
TM87ML22/25	●	●	●	●			
TM87M23	●	●	●	●			
TM8727	●	●*1	●				
TM8726	●	●*1	●				
TM8725	●	●	●				
TM8722/62	●	●*1	●				
TM8723/63	-	-	-	-		-	
TM8724	-	-	-	-		-	
TM8721/61	●	●*1	●				
TM8720	-	-	-	-		-	

Note:

*1' : still can't execute Timer2(count value=00h) before execute RFC by Timer2 control Mode

RFC Counter

Project	RFC(16bits)	Timer1	Timer2	Timer3
TM89PL39/59	●	●	●	●
TM8959/57/55	●	●	●	●
TM8952/51	●			
TM87ML28/M23	●			
TM8727/PL37	●			
TM8726/ML26/PL36	●			
TM8725/ML25/PL35(B)	●			
TM8722/62/ML22/P32	●			
TM8723/63	-	-	-	-
TM8724	-	-	-	-
TM8721/61	●			
TM8720	-	-	-	-

RFC Pins

Project	CX	RFC0 (RR)	RFC1 (RT)	RFC2 (RH)	RFC3	RFC4	RFC5	CX2
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55	●	●	●	●	●	●	●	●
TM8952/51	●	●	●	●				
TM87ML28	●	●	●	●	●	●	●	●



TM8727/PL37	●	●	●	●				
TM8726/ML26/PL36	●	●	●	●				
TM8725/ML25/PL35(B)	●	●	●	●				
TM8722/62/ML22/P32	●	●	●	●				
TM87M23	●	●	●	●				
TM8723/63	-	-	-	-	-	-	-	-
TM8724	-	-	-	-	-	-	-	-
TM8721/61	●	●	●					
TM8720	-	-	-	-	-	-	-	-

9. EL(Only ELP have difference)/FREQ/ALM

Project	ELP Clock Source			ELP DUTY			FRQ	ALM
	BCLK BCLK/2 BCLK/4 BCLK/8	PH0	FREQB	1/1,1/2	1/3,1/4	2/3,3/4		
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML25/26/28	●	●	●	●	●	●	●	●
TM87PL35(B)/36/37	●	●	●	●	●	●	●	●
TM87P32	●	●	●	●	●	●	●	●
TM8727	●	●		●	●	●	●	●
TM8726	●	●		●	●	●	●	●
TM8725	●	●		●	●	●	●	●
TM8722/62/ML22	●	●		●		●	●	●
TM8723/63/M23	●	●		●		●	●	●
TM8724	-	-	-	-	-	-		●
TM8721/61	-	-	-	-	-	-	●	●
TM8720	-	-	-	-	-	-		●

10. Key-Scan & Non-overlap

Key-Scan

Project	Key-Scan cycle	KI <-> IOC		
		Pad Share to IOC by Code Option	Instruction for Read Input Data	Need set SPC output for KI pins to avoid Affect CSR
TM89PL39	1/2 Alternating cycle / Fix PH6 cycle		MKI	
TM8959/57/55/52/51/PL59	Fix PH6 cycle		MKI	
TM87ML28	1/2 Alternating cycle	●	IPC , MKI	
TM87ML25/26	1/2 Alternating cycle	●	IPC	
TM87PL35(B)/36/37	1/2 Alternating cycle	●	IPC	
TM87P32	1/2 Alternating cycle	●	IPC	
TM8727	1/2 Alternating cycle	●	IPC	●
TM8726	1/2 Alternating cycle	●	IPC	●
TM8725	1/2 Alternating cycle	●	IPC	●
TM8722/62/ML22	1/2 Alternating cycle	●	IPC	●
TM8723/63/M23	1/2 Alternating cycle	●	IPC	●
TM8724	-	-	-	-
TM8721/61	-	-	-	-



TM8720	-	-	-	-
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Non-overlap

Project	NON-OVERLAP FOR COM&SEG OUTPUT				NON-OVERLAP WIDTH for key-scan use		
	ALL USE	ONLY COM, SEG1-16 USE	ALL HI-Z	ALL NO USE	PH0	PH1	PH2
TM89PL39/59	●		●	●	●	●	
TM8959/57/55/52/51	●		●	●	●	●	
TM87ML22/25/26/28	●		●	●	●	●	
TM87M23/P32	●		●	●	●	●	
TM87PL35(B)/36/37	●		●	●	●	●	
TM8727	●	●		●		●	
TM8726	●	●		●		●	
TM8725	●	●		●		●	
TM8722	●					●	
TM8762	●			●		●	
TM8723	●					●	●
TM8763	●			●		●	
TM8724				●		-	-
TM8721/61			●			-	-
TM8720			●			-	-

Note:

(1) TM8723 : “NON-OVERLAP WIDTH”=PH2 for FAST-Only Mode

Instruction Table

1. Basic fix instructions :

NOP/HALT/STOP	
ADC/SBC/ADC/SUB/AND/AND/EOR/OR(*)	Rx
ADCI/SBCI/ADCI/SUBI/ANDI/ANDI/EORI/ORI(*)	Ry,D
INC*/DEC*	Rx
MAF/MSB/MSB	Rx
SR0/SR1/SL0/SL1	Rx
DAA/DAS	
DAA*/DAS*	Rx
LDS	Rx,D
STA/LDA	Rx
MRA	Rx
MRW	Ry,Rx
MWR	Rx,Ry
JB0/JB1/JB2/JB3/JNZ/JNC/JZ/JC/CALL/JMP	X
SHE/SIE*/SRE/PLC/SCC/SCA	X
FAST/SLOW	X
SF/RF/SF2/RF2	X



TM89PL39 support set RXDA&RXHM by Rm.

2. &,%,\$ for INDEX REGISTER (HL and ZR) & “@ZR,Ry”

Project	IDC&/%/\$ IDC8&/%/\$ IDCH&/%/\$	LID&/%/\$ LID8&/%/\$ LIDH&/%/\$	LID&/%/\$ LID8&/%/\$ LIDH&/%/\$	LCD(H)/&/%/\$ LCT&/%/\$ LCB&/%/\$ LCP&/%/\$	LCT(#) LCB(#) LCP(#)
		@ZR,@HL	@HL,@ZR	@ZR,@HL	@ZR,Ry
TM89PL39/59	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●
TM87ML22/25/26	IDC&				
TM87M23/P32	IDC&				
TM87PL35(B)/36/37	IDC&				
TM8727					
TM8726					
TM8725					
TM8722/62					
TM8723/63					
TM8724					
TM8721/61					
TM8720					

Note: TM89PL39 support LIDAC by Rm.

3. Lz

Project	LCT/B/P	LCD/T/B/P(#)	LCDX/TX/BX/PX	LCE	LCE
	Lz,Ry	Lz,@HL	D	Lz,@HL	Lz,@ZR
TM89PL39/59	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●
TM87ML28	●	LCD/T/B/P	●		
TM8727/PL37	●	LCD/T/B/P	●		
TM8726/ML26/PL36	●	LCD/T/B/P	●		
TM87ML25/PL35(B)	●	●	●		
TM8725	●	LCD/T/B/P	●		
TM87ML22/P32	●	●	●		
TM8722/62	●	LCD/T/B/P			
TM87M23	●	●	●		
TM8723/63	●	LCD/T/B/P			
TM8724	●	LCD/T/B/P			
TM8721/61	●	LCD/T/B/P			
TM8720	LCP Lz,Ry			-	-

4. IOA~E

Project	IOA			IOB	IOC	IOD	IOE
	OPA Rx IPA Rx SPA X	OPAS Rx,D	SPAXH SPARH SPATH	OPB Rx IPB Rx SPB X	OPC Rx IPC Rx SPC X	OPD Rx IPD Rx SPD X	OPE Rx IPE Rx SPE X
TM89PL39	●	●	●	●	●	●	●
TM8959/57/55/PL59	●	●		●	●	●	●
TM8952/51	●	●		●	●	●	
TM87ML28	●	●		●	●	●	●
TM87PL36/37	●	●		●	●	●	●
TM87ML26	●	●		●	●	●	IOE1,2
TM8727	●	●		●	●	●	
TM8726/ML25/PL35(B)	●	●		●	●	●	
TM8725	●	●		●	●	●	



TM8722/62/ML22/P32	●	●		●	●		
TM8723/63/M23	●	●		●	●		
TM8724	●	●		●	●		
TM8721/61	●			●	●		
TM8720	●			●			

Note: TM89PL39 support set HMIOA for OPA&IPA by Rm.

5. FRQ/ELC/ALM/SBZ

Project	FRQ D,Rx FRQX D,X	FRQ D,@HL	FRQ# D,HL	ELC	ALM	SBZ
TM89PL39/59	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●
TM87ML28	●	●	●	●	●	●
TM87ML25/26	●	●	●	●	●	●
TM87ML22/M23	●	●	●	●	●	
TM87PL35(B)/36/37	●	●	●	●	●	●
TM87P32	●	●	●	●	●	●
TM8727	●	●		●	●	
TM8726	●	●		●	●	
TM8725	●	●		●	●	
TM8722/62	●	●		●	●	
TM8723/63	●	●		●	●	
TM8724					●	
TM8721/61	●	●			●	
TM8720					●	

6. Set/Read Index address of HL & ZR

Project	MVL Rx	MVH Rx	MVU Rx	MVV Rx	RVL Rx	RVH Rx	RVU Rx	RVV Rx
TM895PL39	●	●	●	●	●	●	●	●
TM895PL59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML28	●	●	●	●				
TM87PL36/37	●	●	●	●				
TM87P32/PL35(B)	●	●	●					
TM8727	●	●	●					
TM8726/ML26	●	●	●					
TM8725/ML25	●	●	●					
TM8722/62/ML22	●	●*1						
TM8723/63/M23	●	●*1						
TM8724	●	●*1						
TM8721/61	●	●*1						
TM8720								

Note:

*1 : Set IDBF8~11 by AC

TM89PL39 support set HMIDV for MVV & RVV by Rm.

Project	MRL Rx	MRH Rx	MRU Rx	MRV Rx	RRL Rx	RRH Rx	RRU Rx	RRV Rx
TM89PL39	●	●	●	●	●	●	●	●
TM8959/PL59	●	●	●	●	●	●	●	●
TM8957	●	●	●	●	●	●	●	●
TM8955	●	●	●		●	●	●	
TM8952	●	●	●		●	●	●	
TM8951	●	●	●		●	●	●	



TM87ML28								
TM8727/PL37								
TM8726/ML26/PL36								
TM8725/ML25/PL35(B)								
TM8722/62/ML22/P32								
TM8723/63/M23								
TM8724								
TM8721/61								
TM8720								

Note: TM89PL39 support set HMIDV for MRV & RRV by Rm.

Project	SHL X	SZR X	MHL X RHL X	MZR X RZR X
TM89PL39/59	●	●	●	●
TM8959/57/55/52/51	●	●	●	●
TM87ML28				
TM8727/PL37				
TM8726/ML26/PL36				
TM8725/ML25/PL35(B)				
TM8722/62/ML22/P32				
TM8723/63/M23				
TM8724				
TM8721/61				
TM8720				

7. Arithmetic/Logic Operation Instructions

Project	ADC(*)	ADC(*)#	ADC(*)#	ADC(H)(*)(&/%/\$)	ADC(*)#	ADC(H)^(*)(&/%/\$)	
	SBC(*)	SBC(*)#	SBC(*)#	SBC(H)(*)(&/%/\$)	SBC(*)#	SBC(H)^(*)(&/%/\$)	
	ADD(*)	ADD(*)#	ADD(*)#	ADD(H)(*)(&/%/\$)	ADD(*)#	ADD(H)^(*)(&/%/\$)	
	SUB(*)	SUB(*)#	SUB(*)#	SUB(H)(*)(&/%/\$)	SUB(*)#	SUB(H)^(*)(&/%/\$)	
	ADN(*)	AND(*)#	AND(*)#	AND(H)(*)(&/%/\$)			
	AND(*)	AND(*)#	AND(*)#	AND(H)(*)(&/%/\$)			
	EOR(*)	EOR(*)#	EOR(*)#	EOR(H)(*)(&/%/\$)			
	OR(*)	OR(*)#	OR(*)#	OR(H)(*)(&/%/\$)			
	@HL		@ZR	@HL/ZR.@ZR/HL	@HL,DA	@ZR,DA	@HL/ZR.@ZR/HL
TM89PL39	●	●	●	●	●	●	●
TM89PL59	●	●	●		●	●	
TM8959/57/55/52/51	●	●	●		●	●	
TM87ML22/25/26/28	●	●			●		
TM87M23/P32	●	●			●		
TM87PL35(B)/36/37	●	●			●		
TM8727	●	●					
TM8726	●	●					
TM8725	●	●					
TM8722/62	●						
TM8723/63	●						
TM8724	●						
TM8721/61	●						
TM8720							

Note: TM89PL39 support set ALUHLZR by Rm for "@HL/ZR.@ZR/HL".

Project	ADCM(*)#	ADCMH(*)#	ADCM(H)^(*)(&/%/\$)	ADNM(H)(*)(&/%/\$)
	SBCM(*)#	SBCM(H)^(*)(&/%/\$)	SBCM(H)^(*)(&/%/\$)	ANDM(H)(*)(&/%/\$)
	ADDM(*)#	ADDMH(*)#	ADDM(H)^(*)(&/%/\$)	EORM(H)(*)(&/%/\$)
	SUBM(*)#	SUBMH(*)#	SUBM(H)^(*)(&/%/\$)	ORM(H)(*)(&/%/\$)
	@HL/ZR,(DA)	@HL/ZR,(DA)	@HL/ZR.@ZR/HL	@HL/ZR,@ZR/HL
TM89PL39	●	●	●	●



TM8959/57/55/52/51/PL59	●			
TM87ML28				
TM8727/PL37				
TM8726/ML26/PL36				
TM8725/ML25/PL35(B)				
TM8722/62/ML22/P32				
TM8723/63/M23				
TM8724				
TM8721/61				
TM8720				

Note: TM89PL39 support set ALUMUI by Rm.

Project	SMUI MMH	SMUI(#) MMH(#)	SMUI(#) MMH(#)	MULH MULD	MULH(#) MULD(#)	MULHH(#) MULDH(#)
	Rx	@HL	@ZR	Rx	@HL/ZR	@HL/ZR
TM89PL39	●	●	●	●	●	●
TM8959/57/55/52/51/PL59	●	●	●	●	●	
TM87ML28						
TM8727/PL37						
TM8726/ML26/PL36						
TM8725/ML25/PL35(B)						
TM8722/62/ML22/P32						
TM8723/63/M23						
TM8724						
TM8721/61						
TM8720						

Note: TM89PL39 support set RXHM by Rm.

Project	INC* DEC* DAA* DAS*		INC*# DEC*# DAA*# DAS*#		INCH*# DECH*# DAAH*# DASH*#	DAAH DASH
	@HL	@ZR	@HL	@ZR	@HL/ZR	
TM89PL39	●	●	●	●	●	●
TM8959/57/55/52/51/PL59	●	●	●	●		
TM87ML22/ML28	●		●			
TM87M23/P32	●		●			
TM8727/PL37	●		●			
TM8726/ML26/PL36	●		●			
TM8725/ML25/PL35(B)	●		●			
TM8722/62	●					
TM8723/63	●					
TM8724	●					
TM8721/61	●					
TM8720						

Note: TM89PL39 support set RXHM by Rm.

Project	RRC RLC	RRC(#) RLC(#)		RRCH(#) RLCH(#)
	Rx	@HL	@ZR	@HL/ZR
TM89PL39	●	●	●	●
TM8959/57/55/52/51/PL59	●	●	●	
TM87ML22/25/26/28	●	●		
TM87M23/P32	●	●		
TM87PL35(B)/36/37	●	●		
TM8727				



TM8726				
TM8725				
TM8722/62				
TM8723/63				
TM8724				
TM8721/61				
TM8720				

Note: TM89PL39 support set RXHM by Rm.

8. LDS/8/H for INDEX REGISTER (HL and ZR)

Project	LDS(#)		LDS8(#)		LDSH(#)	
	@HL,D	@ZR,D	@HL,D	@ZR,D	@HL	@ZR
TM89PL39	●	●	●	●	●	●
TM89PL59	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●
TM87ML22/25/26/28	●					
TM87M23/P32	●					
TM87PL35(B)/36/37	●					
TM8727						
TM8726						
TM8725						
TM8722/62						
TM8723/63						
TM8724						
TM8721/61						
TM8720						

Note: TM89PL39 support set LDSHAC for LDSH(#) by Rm.

9. LDA/STA/MMW/MWM

Project	LDA STA	LDA# STA#	LDA(#) STA(#)	LDAH(#) STAH(#)	MMW	MWM
	@HL	@HL	@ZR	@HL/ZR	Ry,Rm	Rm,Ry
TM89PL39	●	●	●	●	●	●
TM89PL59	●	●	●			
TM8959/57/55/52/51	●	●	●			
TM87PL35(B)/36/37	●	●			●	●
TM87P32	●	●			●	●
TM87ML22/25/26/28	●	●			●	●
TM87M23	●	●				
TM8727	●	●				
TM8726	●	●				
TM8725	●	●				
TM8722/62	●					
TM8723/63	●					
TM8724	●					
TM8721/61	●					
TM8720						

10. MRW/MWR with INDEX REGISTER (HL and ZR)

Project	MRW		MWR		MRW#		MWR#	
	@HL,Rx	@ZR,Rx	Rx,@HL	Rx,@ZR	@HL,Rx	@ZR,Rx	Rx,@HL	Rx,@ZR
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML22/28	●		●		●		●	
TM87M23/P32	●		●		●		●	



TM8727/PL37	●		●		●		●	
TM8726/ML26/PL36	●		●		●		●	
TM8725/ML25/PL35(B)	●		●		●		●	
TM8722/62	●		●					
TM8723/63	●		●					
TM8724	●		●					
TM8721/61	●		●					
TM8720								

Note: TM89PL39 support set RXHM by Rm.

11. STACK POINT & STS Read

Project	LSP Rx	MCX Rx	MSD Rx	MDX Rx	MKI Rx
TM89PL39/59	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●
TM87ML28		●	●	●	●
TM87ML26/P32		●	●	●(INT Only)	
TM87PL35(B)/36/37		●	●	●(INT Only)	
TM8727		●	●		
TM8726		●	●		
TM8725/ML25		●	●		
TM8722/62/ML22		●	●		
TM8723/63/M23		●	●		
TM8724			●		
TM8721/61		●	●		
TM8720		●			

12. Compare with INDEX REGISTER (HL and ZR)/LDL/LDH/CAC/JAC

Project	CPHL	CPZR	CPHLH	CPZRH	LDL/H(*)	CAC	JAC
	X	X			Rx,@HL		X
TM89PL39/59	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●
TM87ML28	●		●		●	●	●
TM8727/PL37	●				●		
TM8726/ML26/PL36	●				●		
TM8725/ML25/PL35(B)	●				●		
TM87P32	●				●		
TM8722/62/ML22					●		
TM8723/63/M23					●		
TM8724					●		
TM8721/61					●		
TM8720							

Note:

(1) TM8726 still can't auto-mask interrupt release when execute CPHL instruction.
TM89PL39 support set HMLDH for LDH(*) by Rm.

13. Page & BANK

Project	SRX X ERX X	SRY X ERY X	SLZ X ELZ X	CLPG	SPBK	SF2 X6=1 (X5,4 for set BANK)
TM89PL39/59	●	●	●	●	●	
TM8959/57/55/52/51	●	●	●	●	●	
TM87ML28	●	●	●	●	●	
TM8727/PL37/PL36						●
TM8726/ML26						



TM8725/ML25/PL35(B)							
TM8722/62/ML22/P32							
TM8723/63/M23							
TM8724							
TM8721/61							
TM8720							

14. Timer

Project	TMS	TMS	TMS	TMS#	T1RH	T1XH	T1TH	T1TH#
	Rx	X	@HL	@HL			@HL	@HL
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML28	●	●	●	●		●	●	●
TM87ML22/25/26	●	●	●	●				
TM87M23/P32	●	●	●	●				
TM87PL35(B)/36/37	●	●	●	●				
TM8727	●	●	●					
TM8726	●	●	●					
TM8725	●	●	●					
TM8722/62	●	●	●					
TM8723/63	●	●	●					
TM8724	●	●	●					
TM8721/61								
TM8720								

Project	TM2	TM2	TM2	TM2#	T2RH	T2XH	T2TH	T2TH#	T2M3X
	Rx	X	@HL	@HL			@HL	@HL	X
TM89PL39/59	●	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●	●
TM87ML28	●	●	●	●		●	●	●	●
TM87ML22/25/26	●	●	●	●					
TM87M23/P32	●	●	●	●					
TM87PL35(B)/36/37	●	●	●	●					
TM8727	●	●	●						
TM8726	●	●	●						
TM8725	●	●	●						
TM8722/62	●	●	●						
TM8723/63									
TM8724									
TM8721/61	●	●	●						
TM8720	●	●							

Project	TM3	TM3	TM3	TM3#	T3RH	T3XH	T3TH	T3TH#
	Rx	X	@HL	@HL			@HL	@HL
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML28	●	●	●	●		●	●	●
TM8727/PL37								
TM8726/ML26/PL36								
TM8725/ML25/PL35(B)								
TM8722/62/ML22/P32								
TM8723/63/M23								
TM8724								
TM8721/61								
TM8720								



Project	RTM2L	RTM2I	RTMIH	RTM3L	RTM3I	STM	DISTM	SRP	STE
TM89PL39	●	●	●	●	●	●	●	●	●
TM89PL59	●	●	●	●	●	●	●		
TM8959/57/55/52/51	●	●	●	●	●	●	●		
TM87ML28	●	●	●	●	●	●	●	●	●
TM87PL35(B)/36/37	●	●	●				●	●	
TM87P32	●	●	●				●	●	
TM87ML25/26	●	●	●				●		
TM87ML22/M23	●	●	●						
TM8727									
TM8726									
TM8725									
TM8722/62									
TM8723/63									
TM8724									
TM8721/61									
TM8720									

Note: TM89PL39 support set HMRTM for RTM2L & RTM3L by Rm

15. Key-scan

Project	SPK	SPKX	SPK	SPK#	SPKRH	SPKXH	SPKTH	SPKTH#
	Rx	X	@HL	@HL			@HL	@HL
TM89PL39/59	●	●	●	●	●	●	●	●
TM8959/57/55/52/51	●	●	●	●	●	●	●	●
TM87ML28	●	●	●	●		●	●	●
TM87ML25/26	●	●	●	●				
TM87PL35(B)/36/37	●	●	●	●				
TM87P32	●	●	●	●				
TM8727	●	●	●					
TM8726	●	●	●					
TM8725	●	●	●					
TM8722/62/ML22		●*1						
TM8723/63/M23		●*1						
TM8724								
TM8721/61								
TM8720								

Note:

- (1) *1 : instruction name is SPX X not SPKX X
- (2) TM8722/62/23/63/25/26/27 : exe. SPK(X) ionstruction no clear HRF5(by PLC5 only).

16. RFC

Project	STRUCTURE A	STRUCTURE B				MRF1~4
	SRF	SRF	SCNT	SCX	SF2/RF2 X6,5	
TM89PL39		●	●	●	●	●*1
TM89PL59		●	●	●	●	●
TM8959/57/55/52/51		●	●	●	●	●
TM87ML28	●	●	●	●	●	●
TM8727/PL37	●					●
TM8726/ML26/PL36	●					●
TM8725/ML25/PL35(B)	●					●
TM8722/62/ML22/P32	●					●
TM87M23	●					●



TM8723/63						
TM8724						
TM8721/61	●					●
TM8720						

Note:

- (1) STRUCTURE A : SRF instruction can control all set & enable.
- (2) STRUCTURE B : SRF instruction only can control enable RFC0~5
- TM89PL39 add. chip option select CX/2 control mode : “ONE CYCLE” or “RISING EDGE”.
- TM87ML26/PL37/PL36/PL35(B)/P32 support Crc=FREQ for not CX control mode & CX-Rising Edge mode.
- TM89PL39 & TM87P32/PL35B support force Crc=XCLK by execute SXCLK:X1=1
- TM89PL39 support set HMMRF for MRF1 by Rm.

17. IAP & UTILITY

Project	IAP			UTILITY			
	SIAP	MRI(#)	PTR	ST3OV	ADJ	SXCLK	SWPWR
TM89PL39	●	●	●*1	●	●	●	●
TM89PL59							
TM8959/57/55/52/51							
TM87ML28		●	●	●	●	●	
TM87PL37							●
TM87P32/PL35(B)/PL36	●	●	●*1			●	●
TM8727							
TM8726/ML26							
TM8725/ML25							
TM8722/62/ML22							
TM8723/63/M23							
TM8724							
TM8721/61							
TM8720							

Note:

- *1 : Need set Timer2 & HEF4=1 before execute each PTR in IAP mode for control program time & enable release after execute PTR.