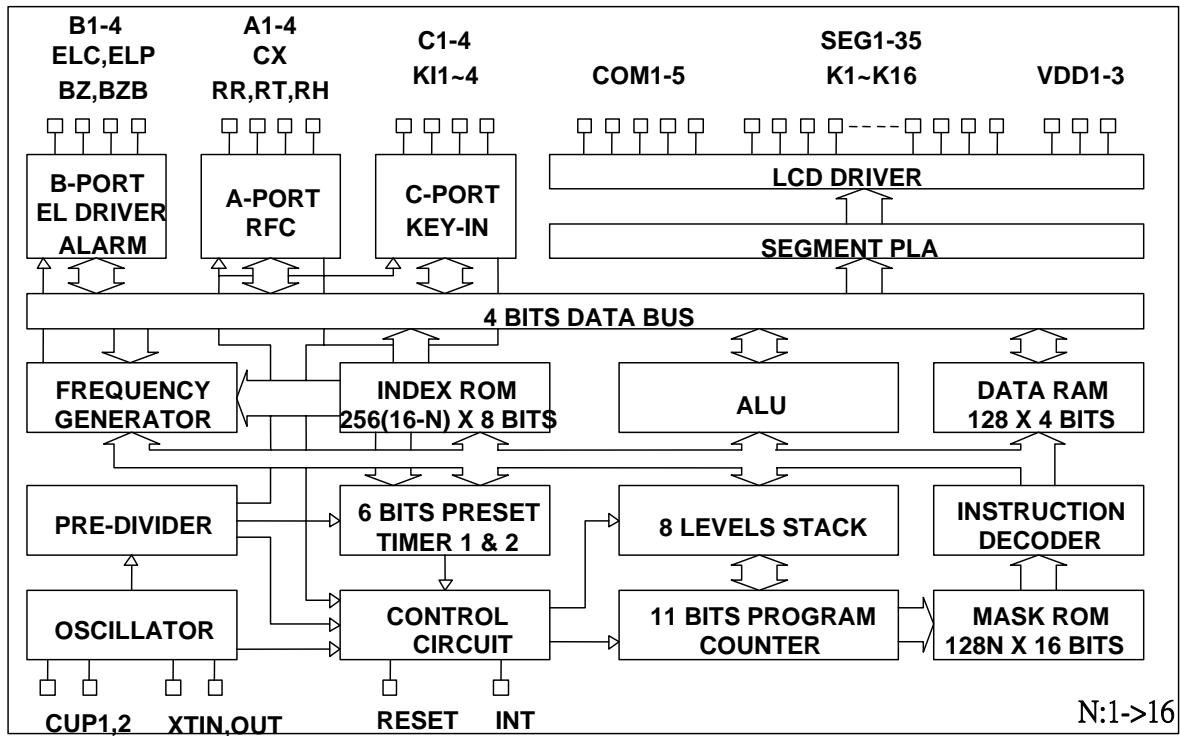


9. Built in Alarm, clock or single tone melody generator.
 - BZB, BZ (Muxed with SEG30, SEG31).
10. Built-in R to F Converter circuit.
 - CX, RR, RT, RH (Muxed with SEG24~SEG27).
11. Built in key matrix scanning function.
 - K1~K16 (Shared with SEG1~SEG16).
 - KI1~KI4 (Muxed with SEG32~SEG35).
12. Two 6-bit programmable timer with programmable clock source.
13. Watch dog timer.
14. Built-in Voltage doubler, halver, tripler charge pump circuit.
15. Dual clock operation
 - slow clock oscillation can be defined as X'tal or external RC type oscillator by mask option.
 - fast clock oscillation can be defined as internal R or external R type oscillator by mask option.
16. HALT function.
17. STOP function.

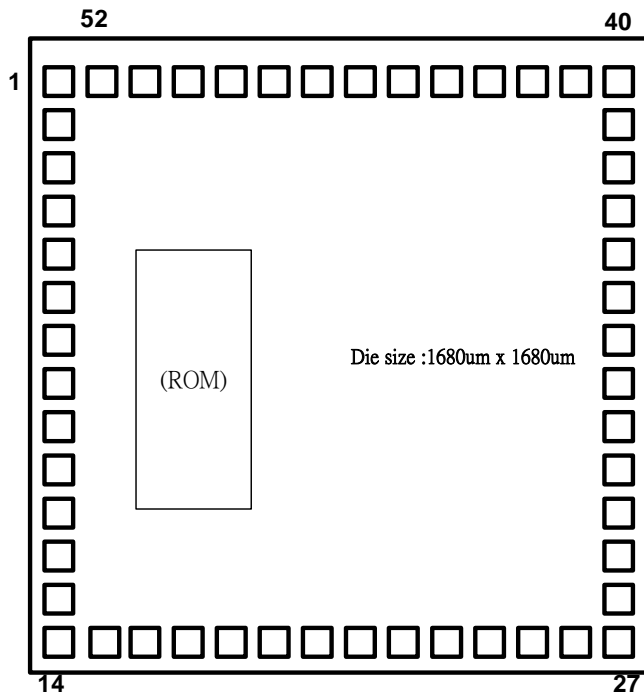
APPLICATION

- Timer / Calendar / Calculator / Thermometer

BLOCK DIAGRAM



PAD DIAGRAM



The substrate of chip should be connected to GND.

PAD COORDINATE

No	Name	X	Y	No	Name	X	Y
1	BAK	77.5	1602.5	27	SEG13/K13	1602.5	77.5
2	XIN	77.5	1472.5	28	SEG14/K14	1602.5	207.5
3	XOUT	77.5	1357.5	29	SEG15/K15	1602.5	322.5
4	GND	77.5	1242.5	30	SEG16/K16	1602.5	437.5
5	VDD1	77.5	1127.5	31	SEG17	1602.5	552.5
6	VDD2	77.5	1012.5	32	SEG18	1602.5	667.5
7	VDD3	77.5	897.5	33	SEG19	1602.5	782.5
8	CUP1	77.5	782.5	34	SEG20	1602.5	897.5
9	CUP2	77.5	667.5	35	SEG21	1602.5	1012.5
10	COM1	77.5	552.5	36	SEG22	1602.5	1127.5
11	COM2	77.5	437.5	37	SEG23	1602.5	1242.5
12	COM3	77.5	322.5	38	SEG24/IOA1/CX	1602.5	1357.5
13	COM4	77.5	207.5	39	SEG25/IOA2/RR	1602.5	1472.5
14	COM5	77.5	77.5	40	SEG26/IOA3/RT	1602.5	1602.5
15	SEG1/K1	207.5	77.5	41	SEG27/IOA4/RH	1472.5	1602.5
16	SEG2/K2	322.5	77.5	42	SEG28/IOB1/ELC	1357.5	1602.5
17	SEG3/K3	437.5	77.5	43	SEG29/IOB2/ELP	1242.5	1602.5
18	SEG4/K4	552.5	77.5	44	SEG30/IOB3/BZB	1127.5	1602.5
19	SEG5/K5	667.5	77.5	45	SEG31/IOB4/BZ	1012.5	1602.5
20	SEG6/K6	782.5	77.5	46	SEG32/IOC1/KI1	897.5	1602.5
21	SEG7/K7	897.5	77.5	47	SEG33/IOC2/KI2	782.5	1602.5
22	SEG8/K8	1012.5	77.5	48	SEG34/IOC3/KI3	667.5	1602.5
23	SEG9/K9	1127.5	77.5	49	SEG35/IOC4/KI4	552.5	1602.5
24	SEG10/K10	1242.5	77.5	50	RESET	437.5	1602.5
25	SEG11/K11	1357.5	77.5	51	INT	322.5	1602.5
26	SEG12/K12	1472.5	77.5	52	TEST	207.5	1602.5

PIN DESCRIPTION

Name	I/O	Description
BAK	P	Positive Back-up voltage. At Li power Mode, connect a 0.1u capacitor to GND.
VDD1,2,3	P	LCD supply voltage, and positive supply voltage. . In Ag Mode, connect positive power to VDD1. . In Li or ExtV power mode, connect positive power to VDD2.
RESET	I	Input pin for external reset request signal, built-in internal pull-down resistor.
INT	I	Input pin for external INT request signal. . Falling edge or rising edge triggered is defined by mask option. . Internal pull-down or pull-up resistor is defined by mask option.
TESTA		Test signal input pin.
CUP1,2	O	Switching pins for supply the LCD driving voltage to the VDD1,2,3 pins. . Connect the CUP1 and CUP2 pins with non-polarized electrolytic capacitor when chip operated in 1/2 or 1/3 bias mode. . In no BIAS mode application, leave these pins opened.
XIN XOUT	I O	Time base counter frequency (clock specified. LCD alternating frequency. Alarm signal frequency) or system clock oscillation. . 32KHz Crystal oscillator. . In FAST mode, connect an external resistor could compose the RC oscillator(mask option). . In SLOW mode, connect an external resistor could compose the RC oscillator(mask option).
COM1~5	O	Output pins for driving the common pins of the LCD or LED panel.
SEG1-35	O	Output pins for driving the LCD or LED panel segment.
IOA1-4	I/O	Input / Output port A. (Muxed with SEG24~SEG27)
IOB1-4	I/O	Input / Output port B. (Muxed with SEG28~SEG31)
IOC1-4	I/O	Input / Output port C. (Muxed with SEG32~SEG35)
CX RR/RT/RH	I O	1 input pin and 3 output pins for RFC application. (Muxed with SEG24~SEG27)
ELC/ELP	O	Output port for EL panel driver. (Muxed with SEG28,SEG29)
BZB/BZ	O	Output port for alarm, clock or single tone melody generator. (Muxed with SEG30~SEG31)
K1~K16	O	Output port for key matrix scanning.(Shared with SEG1~SEG16)
K11~4	I	Input port for key matrix scanning.(Muxed with SEG32~SEG35)
GND	P	Negative supply voltage.

ABSOLUTE MAXIMUM RATINGS

GND= 0V

Name	Symbol	Range	Unit
Maximum Supply Voltage	VDD1	-0.3 to 5.5	V
	VDD2	-0.3 to 5.5	V
	VDD3	-0.3 to 8.5	V
Maximum Input Voltage	Vin	-0.3 to VDD1/2+0.3	V
Maximum output Voltage	Vout1	-0.3 to VDD1/2+0.3	V
	Vout2	-0.3 to VDD3+0.3	V
Maximum Operating Temperature	Topg	-20 to +70	°C
Maximum Storage Temperature	Tstg	-25 to +125	°C

POWER CONSUMPTION

at Ta=-20°C to 70°C, GND= 0V

Name	Sym.	Condition	Min.	Typ.	Max.	Unit
HALT mode	IHALT1	Only 32.768KHz Crystal oscillator operating, without loading. Ag mode, VDD1=1.5V, BCF = 0		2	5	uA
	IHALT2	Only 32.768KHz Crystal oscillator operating, without loading. Li mode, VDD2=3.0V, BCF = 0		2	5	uA
STOP mode	ISTOP				1	uA

Note : When RC oscillator function is operating, the current consumption will depend on the frequency of oscillation.

ALLOWABLE OPERATING CONDITIONS

at Ta=-20°C to 70°C, GND= 0V

Name	Symb.	Condition	Min.	Max.	Unit
Supply Voltage	VDD1		1.2	5.25	V
	VDD2		2.4	5.25	V
	VDD3		2.4	8.0	V
Oscillator Start-Up Voltage	VDDB	Crystal Mode	1.3		V
Oscillator Sustain Voltage	VDDB	Crystal Mode	1.2		V
Supply Voltage	VDD1	Ag Mode	1.2	1.65	V
Supply Voltage	VDD2	EXT-V, Li Mode	2.4	5.25	V
Input "H" Voltage	Vih1	Ag Battery Mode	VDD1-0.7	VDD1+0.7	V
Input "L" Voltage	Vil1		-0.7	0.7	V
Input "H" Voltage	Vih2	Li Battery Mode	VDD2-0.7	VDD2+0.7	V
Input "L" Voltage	Vil2		-0.7	0.7	V
Input "H" Voltage	Vih3	OSCIN at Ag Battery Mode	0.8xVDD1	VDD1	V
Input "L" Voltage	Vil3		0	0.2xVDD1	V
Input "H" Voltage	Vih4	OSCIN at Li Battery Mode	0.8xVDD2	VDD2	V
Input "L" Voltage	Vil4		0	0.2xVDD2	V
Input "H" Voltage	Vih5	CFIN at Li Battery or EXT-V Mode	0.8xVDD2	VDD2	V
Input "L" Voltage	Vil5		0	0.2xVDD2	V
Input "H" Voltage	Vih6	RC Mode	0.8xVDDO	VDDO	V
Input "L" Voltage	Vil6		0	0.2xVDDO	V
Operating Freq	Fopg1	Crystal Mode	32		KHZ
	Fopg2	RC Mode	10	1000	KHZ

ALLOWABLE OPERATING FREQUENCY

at Ta=-20°C to 70°C, GND= 0V

Condition	Max, Operating Frequency
BAK=1.5V (VDD1)	800KHz
BAK=3V (VDD2)	4MHz

ELECTRICAL CHARACTERISTICS

at#1:VDD1=1.2V(Ag);

at#2:VDD2=2.4V(Li);

at#3:VDD2=4V(Ext-V);

Input Resistance

Name	Symb.	Condition	Min.	Typ.	Max.	Unit
“L” Level Hold Tr(IOC)	Rllh1	Vi=0.2VDD1,#1	10	40	100	Kohm
	Rllh2	Vi=0.2VDD2,#2	10	40	100	Kohm
	Rllh3	Vi=0.2VDD2,#3	5	20	50	Kohm
IOA/B/C Pull-Down Tr	Rmad1	Vi=VDD1,#1	200	500	1000	Kohm
	Rmad2	Vi=VDD2,#2	200	500	1000	Kohm
	Rmad3	Vi=VDD2,#3	100	250	500	Kohm
INT Pull-up Tr	Rintu1	Vi=VDD1,#1	200	500	1000	Kohm
	Rintu2	Vi=VDD2,#2	200	500	1000	Kohm
	Rintu3	Vi=VDD2,#3	100	250	500	Kohm
INT Pull-Down Tr	Rintd1	Vi=GND,#1	200	500	1000	Kohm
	Rintd2	Vi=GND,#2	200	500	1000	Kohm
	Rintd3	Vi=GND,#3	100	250	500	Kohm
RES Pull-Down R	Rres1	Vi=GND or VDD1,#1	10	40	100	Kohm
	Rres2	Vi=GND or VDD2,#2	10	40	100	Kohm
	Rres3	Vi=GND or VDD2,#3	10	40	100	Kohm

DC Output Characteristics

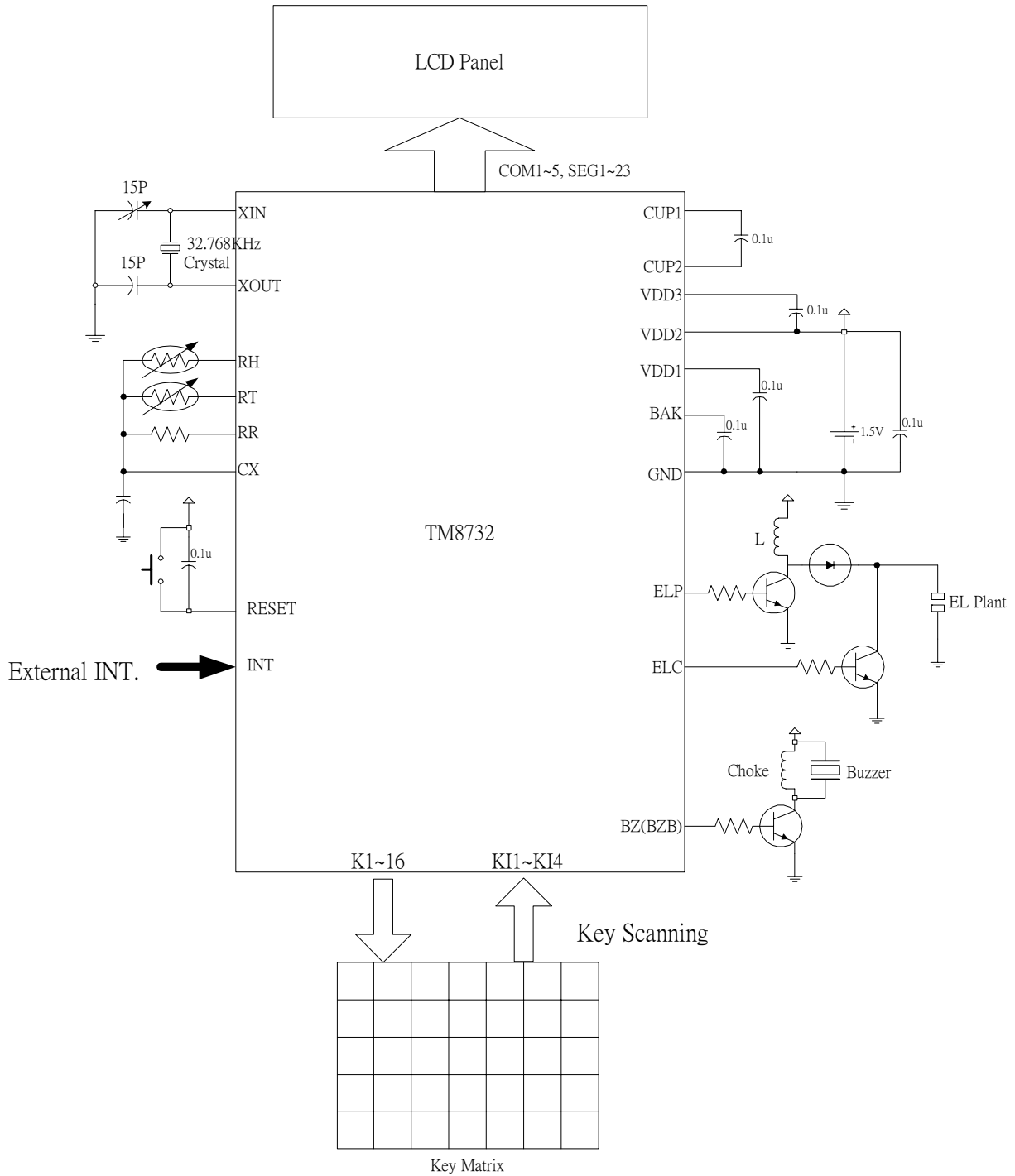
Name	Symb.	Condition	Port	Min.	Typ.	Max.	Unit
Output “H” Voltage	Voh1c	Ioh=-200uA,#1	SEG1~35	0.8	0.9	1.0	V
	Voh2c	Ioh=-1mA,#2		1.5	1.8	2.1	V
	Voh3c	Ioh=-3mA,#3		2.5	3.0	3.5	V
Output “L” Voltage	Vol1c	Iol=400uA,#1		0.2	0.3	0.4	V
	Vol2c	Iol=2mA,#2		0.3	0.6	0.9	V
	Vol3c	Iol=6mA,#3		0.5	1.0	1.5	V

Segment Driver Output Characteristics

Name	Symb.	Condition	For	Min.	Typ.	Max.	Unit.
Static Display Mode							
Output "H" Voltage	Voh1d	Ioh=-1uA,#1	SEG-n	1.0			V
	Voh2d	Ioh=-1uA,#2		2.2			V
	Voh3d	Ioh=-1uA,#3		3.8			V
Output "L" Voltage	Vol1d	Iol=1uA,#1				0.2	V
	Vol2d	Iol=1uA,#2				0.2	V
	Vol3d	Iol=1uA,#3				0.2	V
Output "H" Voltage	Voh1e	Ioh=-10uA,#1	COM-n	1.0			V
	Voh2e	Ioh=-10uA,#2		2.2			V
	Voh3e	Ioh=-10uA,#3		3.8			V
Output "L" Voltage	Vol1e	Iol=10uA,#1				0.2	V
	Vol2e	Iol=10uA,#2				0.2	V
	Vol3e	Iol=10uA,#3				0.2	V
1/2 Bias Display Mode							
Output "H" Voltage	Voh12f	Ioh=-1uA,#1,#2	SEG-n	2.2			V
	Voh3f	Ioh=-1uA,#3		3.8			V
Output "L" Voltage	Vol12f	Iol=1uA,#1,#2				0.2	V
	Vol3f	Iol=1uA,#3				0.2	V
Output "H" Voltage	Voh12g	Ioh=-10uA,#1,#2	COM-n	2.2			V
	Voh3g	Ioh=-10uA,#3		3.8			V
Output "M" Voltage	Vom12g	Iol/h=+/-10uA,#1,#2	COM-n	1.0		1.4	V
	Vom3g	Iol/h=+/-10uA,#3		1.8		2.2	V
Output "L" Voltage	Vol12g	Iol=10uA,#1,#2			0.2	V	
	Vol3g	Iol=10uA,#3			0.2	V	
1/3 Bias display Mode							
Output "H" Voltage	Voh12i	Ioh=-1uA,#1,#2	SEG-n	3.4			V
	Voh3i	Ioh=-1uA,#3		5.8			V
Output "M1" Voltage	Vom12i	Iol/h=+/-10uA,#1,#2		1.0		1.4	V
	Vom13i	Iol/h=+/-10uA,#3		1.8		2.2	V
Output "M2" Voltage	Vom22i	Iol/h=+/-10uA,#1,#2		2.2		2.6	V
	Vom23i	Iol/h=+/-10uA,#3		3.8		4.2	V
Output "L" Voltage	Vol12i	Iol=1uA,#1,#2				0.2	V
	Vol3i	Iol=1uA,#3				0.2	V
Output "H" Voltage	Voh12j	Ioh=-10uA,#1,#2	COM-n	3.4			V
	Voh3j	Ioh=-10uA,#3		5.8			V
Output "M1" Voltage	Vom12j	Iol/h=+/-10uA,#1,#2		1.0		1.4	V
	Vom13j	Iol/h=+/-10uA,#3		1.8		2.2	V
Output "M2" Voltage	Vom22j	Iol/h=+/-10uA,#1,#2		2.2		2.6	V
	Vom23j	Iol/h=+/-10uA,#3		3.8		4.2	V
Output "L" Voltage	Vol12j	Iol=10uA,#1,#2				0.2	V
	Vol3j	Iol=10uA,#3				0.2	V

TYPICAL APPLICATION CIRCUIT

This application circuit is simply an example, and is not guaranteed to work.



Li power mode, 1/3 Bias, 1/5 Duty