



十速科技股份有限公司  
tenx technology inc.

**Advance  
Information**

---

# **TM8999**

## **Demo Board (For TM8727)**

## **Specification User's Manual**

**Tenx reserves the right to change or discontinue this product without notice.**

**tenx technology, inc.**

---

**Preliminary**

**tenx technology, inc.**

Rev 1.0, 2010/03/11

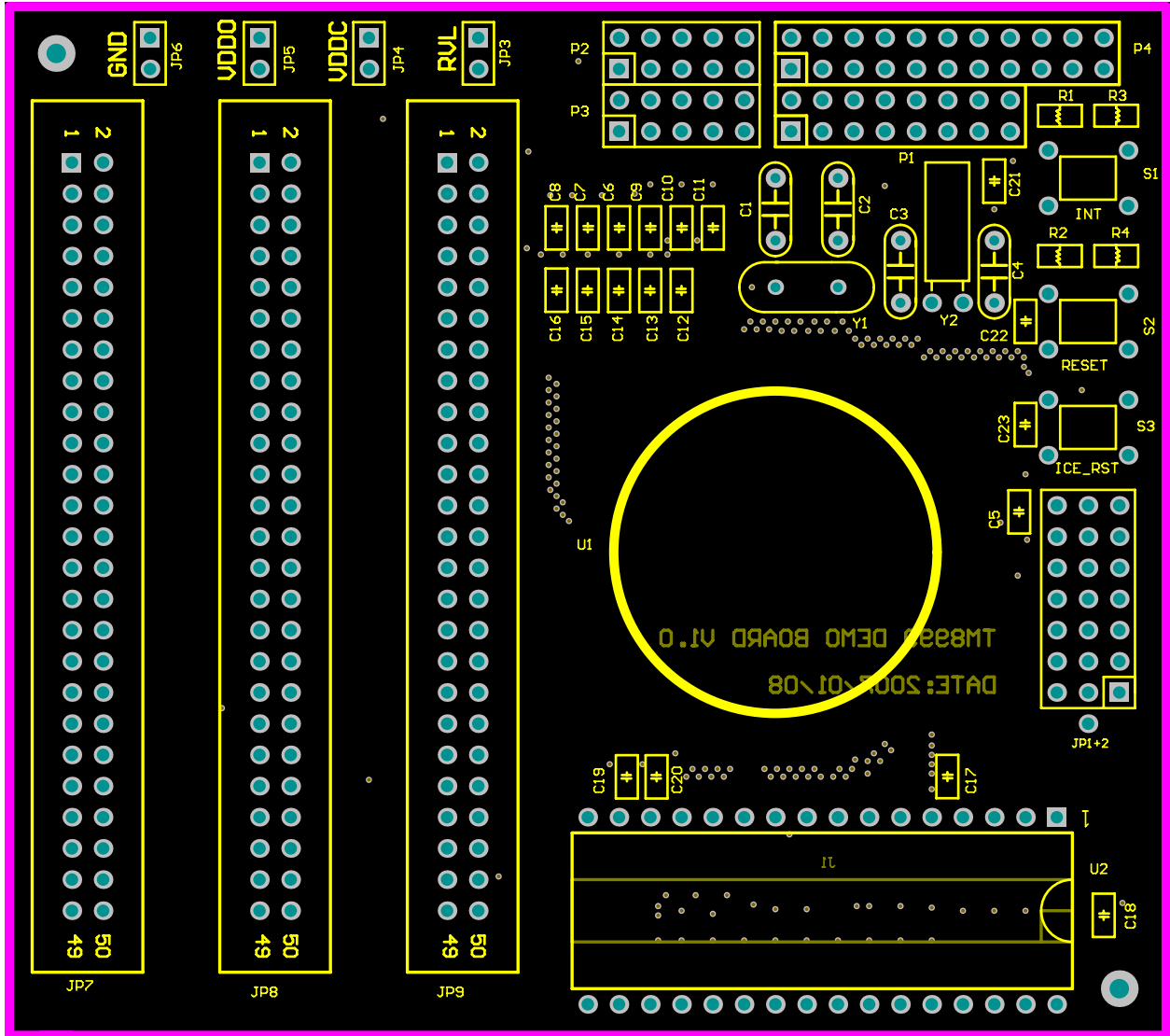
---

## Content

|  |   |
|--|---|
| 1. TM8999 Demo Board could support following chips directly..... | 2 |
| 2. The top view of TM8999 Demo Board .....                       | 2 |
| 3. Parts Location & Description .....                            | 3 |
| 4. IO connector JP7, JP8, JP9 and JP1+2 Pin Description .....    | 4 |
| 5. P1 ~ P4 Description .....                                     | 5 |
| 6. INT key Description .....                                     | 7 |
| 7. RESET key Description .....                                   | 7 |
| 8. ICE_RST Description.....                                      | 8 |
| 9. FAST CLOCK SOURCE Description.....                            | 8 |
| 10. SLOW CLOCK SOURCE Description .....                          | 8 |
| 11. U2 pin Description.....                                      | 9 |

1. TM8999 Demo Board could support following chips directly:  
TM8727

2. The top view of TM8999 Demo Board:



### 3. Parts Location & Description:

| Item | Parts ref. | Description   | Parts type    |
|------|------------|---|---------------|
| 1    | U1         | TM8999 EV chip  | COB           |
| 2    | U2         | Program Rom: 1M bits EPROM, EEPROM or Flash<br>Example: ICE28LF010, 27C010, 28C010, starting address is 0000H | 32 pin DIP    |
| 3    | C1         | EV chip CFOUT CAP   |               |
| 4    | C2         | EV chip CFIN CAP  |               |
| 5    | C3         | EV chip XOUT CAP  |               |
| 6    | C4         | EV chip Xin CAP   |               |
| 7    | C5         | VDDR CAP 0.1uF  | 104/0805      |
| 8    | C6         | For CUPN with CUP0 or CUP1  | 104/0805      |
| 9    | C7         | For CUP0 with CUP1 or CUP2  | 104/0805      |
| 10   | C8         | For CUP1, CUP2  | 104/0805      |
| 11   | C9~C16     | For BAK, VDD1, VDDO, VDD2, VDD3, VDD4, VDD5, VDDT   | 104/0805      |
| 12   | C17        | For VDDC  | 104/0805      |
| 13   | C18        | For U2 VCC  | 104/0805      |
| 14   | C19        | For VDDO  | 104/0805      |
| 15   | C20        | For BAK   | 104/0805      |
| 16   | C21        | INT CAP connect to GND or VDDO  | 104/0805      |
| 17   | C22        | RESET CAP connect to GND or VDDO  | 104/0805      |
| 18   | C23        | ICE_RST CAP connect to GND  | 104/0805      |
| 19   | J1         | For EV test   |               |
| 20   | JP1+2      | For RFC use   |               |
| 21   | JP3        | No use  |               |
| 22   | JP4        | *External Voltage input for EV chip & program rom interface   |               |
| 23   | JP5        | Working voltage input for EV chip   |               |
| 24   | JP6        | Power Ground  |               |
| 25   | JP7        | SEG25 ~ SEG64 connector   | 50 pin IDC    |
| 26   | JP8        | COM1 ~ COM16 and SEG1 ~ SEG24 connector   | 50 pin IDC    |
| 27   | JP9        | ELC & ELP & BZB & BZ & IOA1 ~ IOE4 & RESET & INT & KI1 ~ KI4 connector  | 50 pin IDC    |
| 28   | P1         | VDD1 ~ VDD5 & VDDO & RVL for LCD power setting  | 16 pin Jumper |
| 29   | P2         | CUP CAP selection   | 10 pin Jumper |
| 30   | P3         | VDD5 & VDDO & VDDT & VDDR & BAK for IO PAD power setting  | 10 pin Jumper |
| 31   | P4         | Mask Option   | 22 pin Jumper |
| 32   | R1         | Selection C21 connect to VDDO   | 0/0805        |
| 33   | R2         | Selection C22 connect to VDDO   | 0/0805        |
| 34   | R3         | Selection C21 connect to GND  | 0/0805        |
| 35   | R4         | Selection C22 connect to GND  | 0/0805        |
| 36   | S1         | INT key   | Push button   |
| 37   | S2         | RESET key   | Push button   |
| 38   | S3         | Download key  | Push button   |
| 39   | Y1         | Fast clock used crystal or resonator or R   |               |
| 40   | Y2         | Slow clock used crystal or R  |               |

“ \* ” : The Voltage is used for external ROM (U2).

4. IO connector JP7, JP8, JP9 and JP1+2 Pin Description:

TM8727 SEG24/IOA1/CX ~ SEG39/IOD4 :

LCD Function must connect JP7 and JP8. (ex : SEG25 = JP7.1,SEG28 = JP7.4)

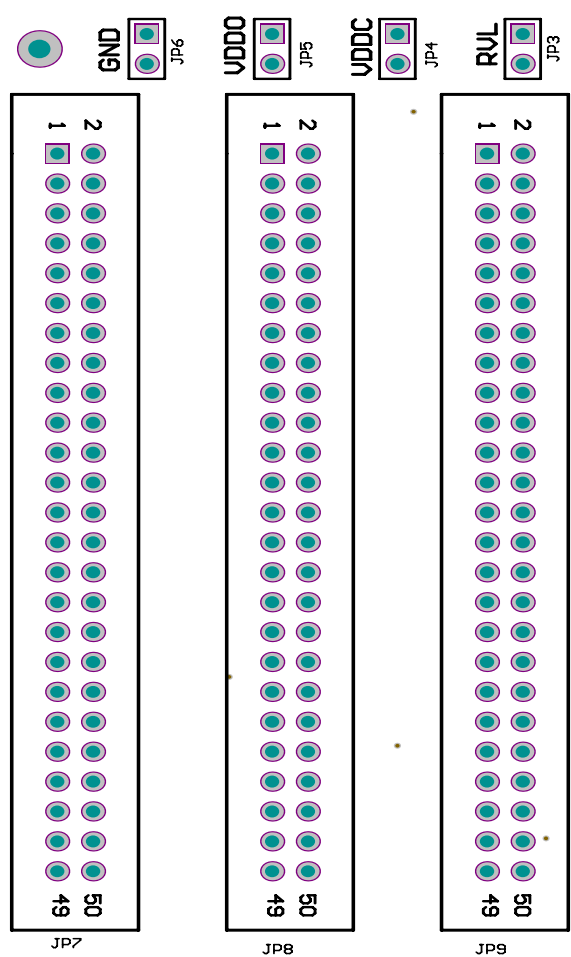
IO Function must connect JP9.(ex : IOA2 = JP9.8 ,ELC = JP9.1 , IOB1 = JP9.13)

RFC Function must connect JP1+2.(ex : RR =JP1+2.17)

JP7 and JP8 : Lcd function pin

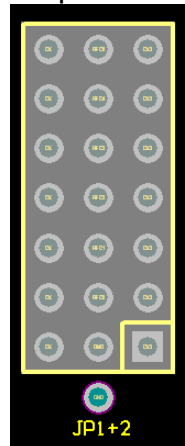
JP9 : IO function pin

| JP7   |       | JP8   |       | JP9   |      |
|-------|-------|-------|-------|-------|------|
| SEG25 | SEG26 | COM1  | COM2  | ELC   | ELP  |
| SEG27 | SEG28 | COM3  | COM4  | BZB   | BZ   |
| SEG29 | SEG30 | COM5  | COM6  | GND   | GND  |
| SEG31 | SEG32 | COM7  | COM8  | IOA1  | IOA2 |
| GND   | GND   | GND   | GND   | IOA3  | IOA4 |
| SEG33 | SEG34 | COM9  | COM10 | GND   | GND  |
| SEG35 | SEG36 | COM11 | COM12 | IOB1  | IOB2 |
| SEG37 | SEG38 | COM13 | COM14 | IOB3  | IOB4 |
| SEG39 | SEG40 | COM15 | COM16 | GND   | GND  |
| GND   | GND   | GND   | GND   | IOC1  | IOC2 |
| SEG41 | SEG42 | SEG1  | SEG2  | IOC3  | IOC4 |
| SEG43 | SEG44 | SEG3  | SEG4  | GND   | GND  |
| SEG45 | SEG46 | SEG5  | SEG6  | IOD1  | IOD2 |
| SEG47 | SEG48 | SEG7  | SEG8  | IOD3  | IOD4 |
| GND   | GND   | GND   | GND   | GND   | GND  |
| SEG49 | SEG50 | SEG9  | SEG10 | IOE1  | IOE2 |
| SEG51 | SEG52 | SEG11 | SEG12 | IOE3  | IOE4 |
| SEG53 | SEG54 | SEG13 | SEG14 | GND   | VDDO |
| SEG55 | SEG56 | SEG15 | SEG16 | RESET | GND  |
| GND   | GND   | GND   | GND   | GND   | RVL  |
| SEG57 | SEG58 | SEG17 | SEG18 | INT   | GND  |
| SEG59 | SEG60 | SEG19 | SEG20 | GND   | GND  |
| SEG61 | SEG62 | SEG21 | SEG22 | KI1   | KI2  |
| SEG63 | SEG64 | SEG23 | SEG24 | KI3   | KI4  |
| GND   | GND   | GND   | GND   | GND   | GND  |



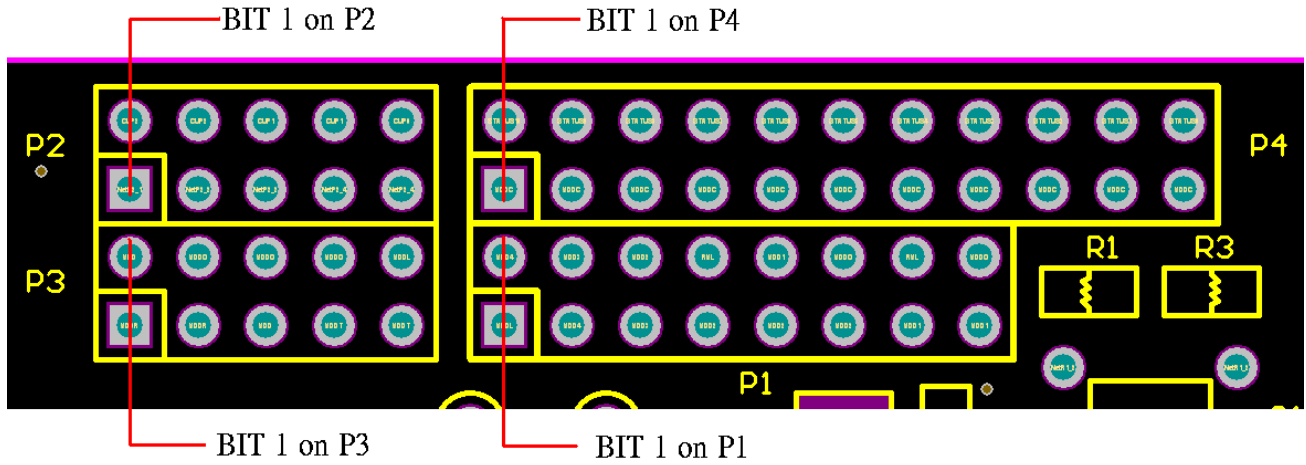
JP1+2 : RFC function pin

| JP1+2 |     |     |
|-------|-----|-----|
| CX    | X   | CX2 |
| CX    | X   | CX2 |
| CX    | X   | CX2 |
| CX    | RH  | CX2 |
| CX    | RT  | CX2 |
| CX    | RR  | CX2 |
| CX    | GND | CX2 |
|       | GND |     |



5. P1 ~ P4 Description:

When the upper side hole and lower side hole are shorted in each bit on P1, P2, P3 or P4, the bit will be set to 1. If the holes are opened in each bit on P1, P2, P3 or P4, the bit will be set to 0.



(1). P1 Description:

|            | Bit1 | Bit2 | Bit3 | Bit4 | Bit5 | Bit6 | Bit7 | Bit8 |
|------------|------|------|------|------|------|------|------|------|
| Ext/Li 1/2 | 1    | 1    | 1    | 0    | 0    | 1    | 0    | 0    |
| Ext/Li 1/3 | 1    | 1    | 0    | 0    | 0    | 1    | 0    | 0    |
| Ext/Li 1/4 | 1    | 0    | 0    | 0    | 0    | 1    | 0    | 0    |
| Ext/Li_DC  | 1    | 1    | 1    | 0    | 1    | 1    | 0    | 0    |
| Ag 1/2     | 1    | 1    | 1    | 0    | 0    | 0    | 0    | 1    |
| Ag 1/3     | 1    | 1    | 0    | 0    | 0    | 0    | 0    | 1    |
| Ag 1/4     | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 1    |
| Ag DC      | 1    | 1    | 1    | 0    | 1    | 0    | 0    | 1    |

(2). P2 Description:

Mask Option file --> LCD --> Bias

|          | Bit1 | Bit2 | Bit3 | Bit4 | Bit5 |
|----------|------|------|------|------|------|
| No Bias  | 0    | 0    | 0    | 0    | 0    |
| 1/2 Bias | 1    | 0    | 0    | 0    | 0    |
| 1/3 Bias | 1    | 0    | 0    | 0    | 0    |
| 1/4 Bias | 1    | 1    | 0    | 0    | 0    |

(3). P3 Description:

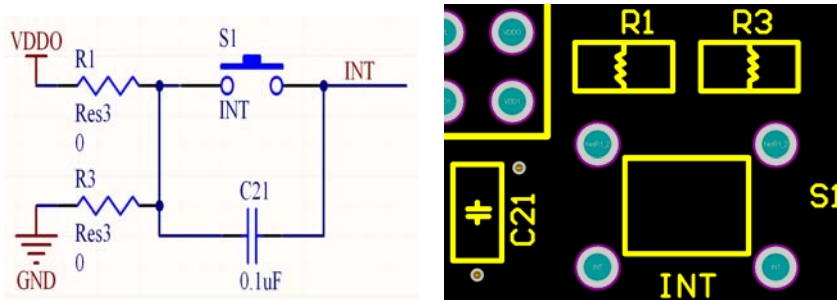
|        | Bit1 | Bit2 | Bit3 | Bit4 | Bit5 |
|--------|------|------|------|------|------|
| TM8727 | 1    | 0    | 0    | 0    | 1    |

(4). P4 Description:

| Bit |   |    |    | P4 Bit definition             |
|-----|---|----|----|-------------------------------|
| 1   |   |    |    | TM8727 Reset Pin Option:      |
| 0   |   |    |    | TM8727 must <b>set to "0"</b> |
| 2   |   | 3  |    | Option for Fast Clock source: |
| 0   | 0 | 0  |    | INTR-250KHz                   |
| 0   | 1 | 1  |    | INTR-500KHz                   |
| 1   | 0 | 0  |    | EXT-R                         |
| 1   | 1 | 1  |    | Resonator                     |
| 4   |   |    |    | Option for Slow Clock source: |
| 0   |   |    |    | XT                            |
| 1   |   |    |    | RC                            |
| 5   |   |    |    | Option for Fast/Slow:         |
| 0   |   |    |    | Fast-only                     |
| 1   |   |    |    | Slow-only/Dual                |
| 6   |   |    |    | Option for POWER source:      |
| 0   |   |    |    | Ext/Li model                  |
| 1   |   |    |    | Ag model                      |
| 7   |   |    |    | Option for POWER source:      |
| 0   |   |    |    | EXTV/Li-B                     |
| 1   |   |    |    | Ag-B                          |
| 8   | 9 | 10 | 11 | Option for Bias:              |
| 0   | 0 | 0  | 0  | No Bias                       |
| 0   | 0 | 1  | 0  | 1/2 Bias                      |
| 0   | 0 | 0  | 1  | 1/3 Bias                      |
| 1   | 0 | 0  | 1  | 1/4 Bias                      |

### 6. INT key Description:

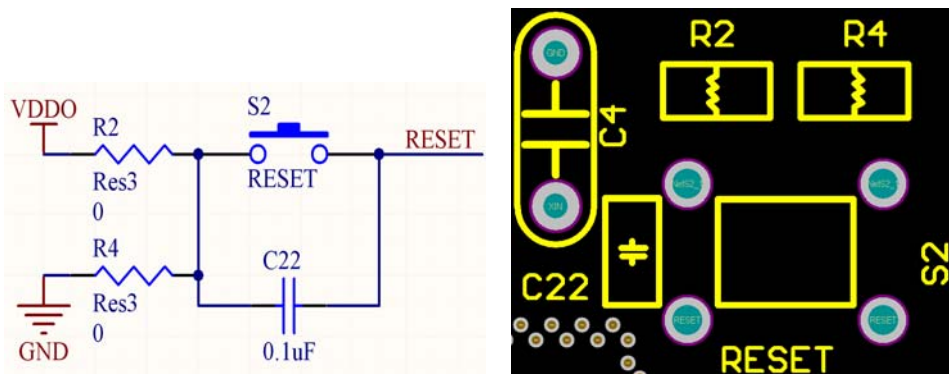
This key function can be used or not use.



INT pin internal Pull\_High: R1 open, R3 short  
 INT pin internal Pull\_low : R1 short, R3 open

### 7. RESET key Description:

This key function can be used or not use.

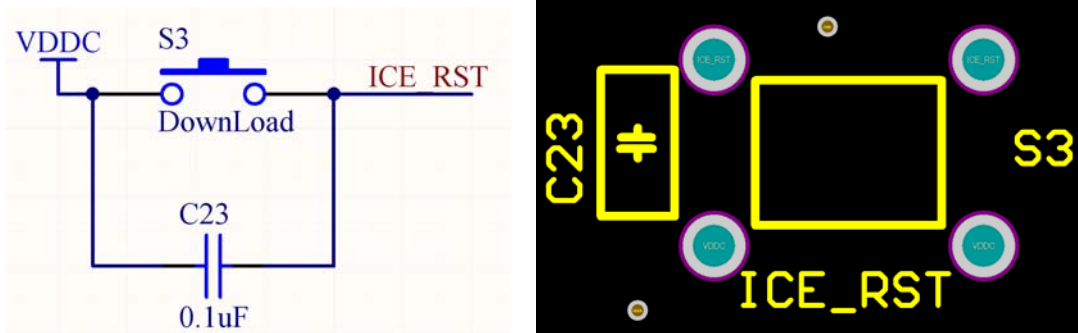


RESET pin internal Pull\_low : R2 short, R4 open

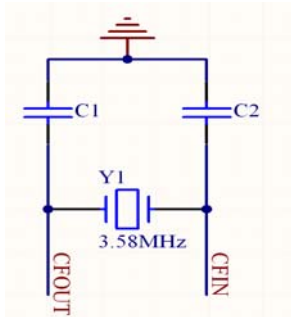


8. ICE\_RST Description:

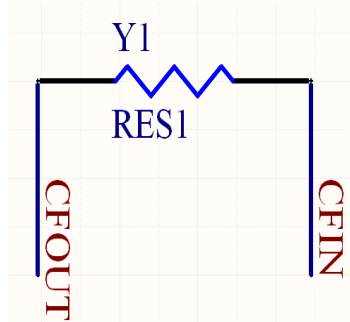
Push this key at first time power on.



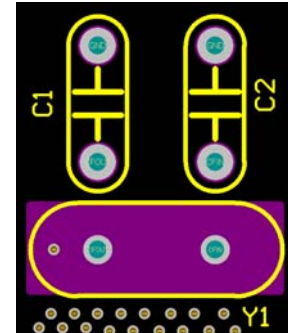
9. FAST CLOCK SOURCE Description:



Fast Resonator Model

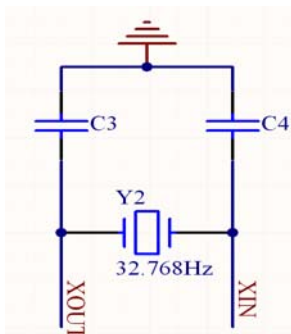


Fast EXT-R Model

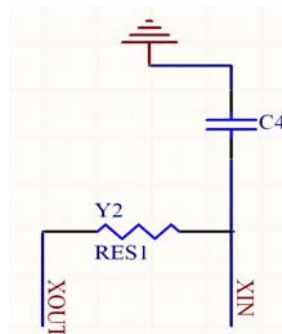


Fast Clock Source on Demo Board

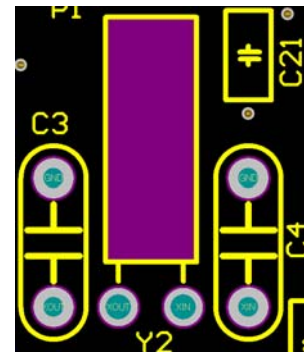
10. SLOW CLOCK SOURCE Description:



Slow XT Model

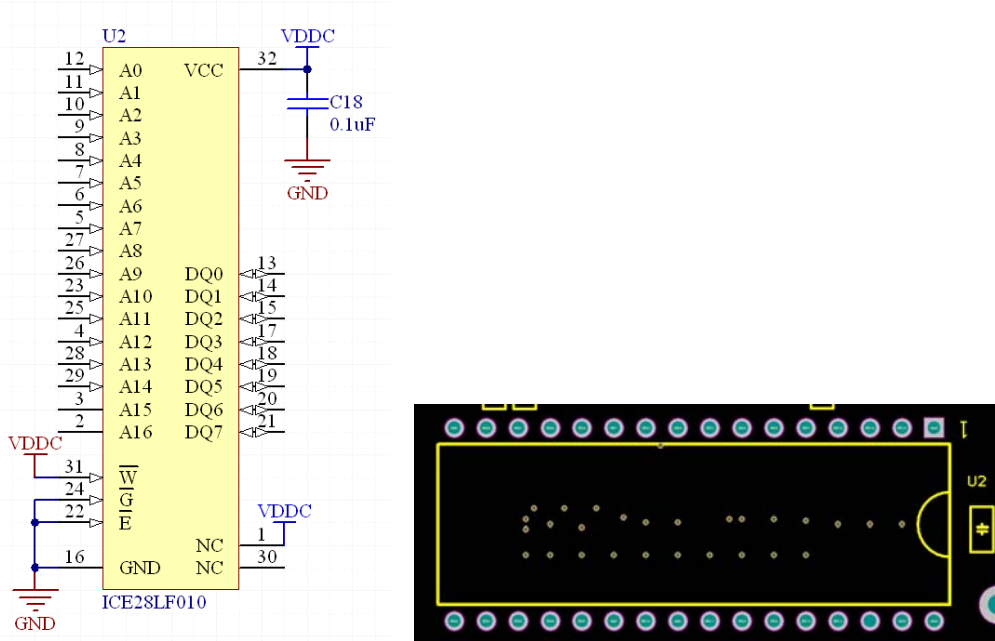


Slow RC Model



Slow Clock Source on Demo Board

11. U2 pin Description:



**MEMORY USE:** ICE28LF010, AT27C010, AT28C010 ..... 1-Megabit (128K x 8) memory  
**Programming File:** TM8727 => \*.nce (MUST use **TM89 COMPILER** TO CREAT)  
**File Format:** Binary  
**Programming Buff start:** 0000H