```
//     ??????? ???? ?  ???g
//2 ???? ?????? ??? ???g??

// prog:lcd_mes.c
//
        #include<string.h>
        #include<pic.h>
        char control[4]={0x38,0xe,0x6,0x1};
        char mes1[16];
        void print(char mes[]);


        void main (void)
          {
         int x,i;
         TRISE=0;
             TRISD=0;
             PORTD=1;//data=1
             RE0=1;
             RE0=0;
         PORTD=0xf0;//wr=0
         RE0=1;
             RE0=0;
             PORTD=0xc0;//RS=0
         RE0=1;
             RE0=0;

        for(x=0;x<4;x++)
         {
          PORTD=control[x];
          RE1=1;
          RE1=0;
          PORTD=0xd1;//e=1
              RE0=1;
          RE0=0;
          PORTD=0xd0;//e=0
              RE0=1;
          RE0=0;
          for(i=0;i<3200;i++);//delay
          }



            PORTD=0xc1;//RS=1
        RE0=1;
            RE0=0;
            strcpy(mes1,"Menachem ");
        print(mes1);
        strcpy(mes1,"Epstein");
        print(mes1);

          while(1);
        }

   void print(char mes[])
        {
        int x,i;

         for(x=0;x<strlen(mes);x++)
           {
          PORTD=mes[x];
          RE1=1;
          RE1=0;
          PORTD=0xd1;//e=1
              RE0=1;
          RE0=0;
          PORTD=0xd0;//e=0
              RE0=1;
          RE0=0;
```

```
          for(i=0;i<3200;i++);//delay
         } }



// ?????? ???? ?  ???g
/      ?????????? ?????   ??? ????g? ??? ?? ???g?   ???g??
// file:c:\microchip\proram\lcd_font.c
// 31/10/2002
#include<pic.h>
unsigned char s;
char z[10]={0x38,0xe,0x6,0x1,0x40};// set CGRAM=0x40
char
men[16]={9,0xa,0xc,0xc,0xc,0xa,9,9,0x26,0x29,0x31,0x21,0x29,0x2b,0x36,0x34};
char father[3]={0,1,0};// ???
int x;
long y;
char g=0x1f;
void main (void)
       {
        TRISA=0;
        TRISD=0;
        TRISE=0;

        // control lcd---------------



        PORTD=0x1; //data=1
        RE0=1;
        RE0=0;

        PORTD=0xc0;// rs=0
        RE0=1;
        RE0=0;
        PORTD=0xf0;// wr=0
        RE0=1;
        RE0=0;
       for(x=0;x<5;x++)
         {
        PORTD=0xd1;//enabl=1
        RE0=1;
        RE0=0;
        PORTD=z[x];
        RE1=1;
        RE1=0;
        PORTD=0xd0;//enabl=0
        RE0=1;
        RE0=0;

    for(y=0;y<500;y++);

         }
      PORTD=0xc1;// rs=1 data
        RE0=1;
        RE0=0;
        for(x=0;x<16;x++)
          {

        PORTD=0xd1;//enabl=1
        RE0=1;
        RE0=0;
        PORTD=men[x];
        RE1=1;
        RE1=0;
        PORTD=0xd0;//enabl=0
        RE0=1;
        RE0=0;
```

```
        RA5=1;
         for(y=0;y<700;y++);
         RA5=0;
        for(y=0;y<7000;y++);
         }
        PORTD=0xc0;// rs=0 control
        RE0=1;
        RE0=0;

        PORTD=0xd1;//enabl=1 VHDL
        RE0=1;
        RE0=0;

        PORTD=0x80;//set DDRAM LCD
        RE1=1;
        RE1=0;

        PORTD=0xd0;//enabl=0 VHDL
        RE0=1;
        RE0=0;

   for(y=0;y<500;y++);
        PORTD=0xc1;// rs=1 DATA LCD
        RE0=1;
        RE0=0;
for(x=0;x<3;x++)
         {
        PORTD=0xd1;//enabl=1
        RE0=1;
        RE0=0;
        PORTD=father[x];// font ?
        RE1=1;
        RE1=0;
        PORTD=0xd0;//enabl=0
        RE0=1;
        RE0=0;

        RA5=1;
         for(y=0;y<700;y++);
         RA5=0;
        for(y=0;y<27000;y++);
         }
         PORTD=0xc0;// rs=0 control
        RE0=1;
        RE0=0;
   while(1)
         {
   for(x=0;x<16;x++)
         {
        PORTD=0xd1;//enabl=1 VHDL
        RE0=1;
        RE0=0;

        PORTD=g;//????? ?????
        RE1=1;
        RE1=0;

        PORTD=0xd0;//enabl=0 VHDL
        RE0=1;
        RE0=0;
         RA5=1;
         for(y=0;y<700;y++);
         RA5=0;
        for(y=0;y<70000;y++);
        }
        if (g==0x1f)
          g=0x18;
        else
          g=0x1f;
  }
```

```
while(1);
}

//====================================
  //LCD ? ?????? ????
  //   ?????? ???? ?  ?  ??g
  // 23.3.2004
  // file:lc_pfont.c
  #include<pic.h>
  #include<string.h>
  #define line_1 0x1
  #define RS_control 0xc0
  #define RS_data    0xc1
  #define Enable_1   0xd1
  #define Enable_0   0xd0
  #define WRITE_lcd  0xf0

   void config_FPGA(char x);
   void Enable_lcd(void);
   void Print_lcd(char st[]);
   void delay(int j);
   void Print_char(char st[],int j);

    void config_FPGA(char x)
          {
           PORTD=x;
           RE0=1;
           RE0=0;
          }

     void Print_char(char st[],int j)
            { int x;
           for(x=0;x<j;x++)
                {
              PORTD=st[x];
              RE1=1;
              RE1=0;
              config_FPGA(Enable_1);
              config_FPGA(Enable_0);
              delay(32000);
                }
           }

    void Print_lcd(char st[])
           {int x;
             for(x=0;x<strlen(st);x++)
                 {
              PORTD=st[x];
               RE1=1;
               RE1=0;
              config_FPGA(Enable_1);
              config_FPGA(Enable_0);
               delay(32000);
                 }
               }

        void delay(int j)
             {
           int x;
              for(x=0;x<j;x++);
             }
```

```
 char string[9]={0x6,0x9,0x9,0x6,0x1f,0x6,0x9,0x9}; //CGRAM char
 unsigned char char_control_lcd[6]={0x38,0xe,0x6,0x1,0x40,0x0};// SETCGRAM
char data[15]={0,0,160,161,160,' ','M','E',' ',161,0,0};
 char Setddram[2]={0xc4,0x0};

        void main (void)
              {
              char mes[16];
              int x,y,z;
                TRISE=0;
                TRISD=0;
                config_FPGA(line_1);
                config_FPGA(WRITE_lcd);

                config_FPGA(RS_control);
                strcpy(mes,char_control_lcd);
                Print_char(mes,5);

                config_FPGA(RS_data);
                strcpy(mes,string);
                Print_char(mes,8);

                config_FPGA(RS_control);
                strcpy(mes,Setddram);
                Print_char(mes,1);

               config_FPGA(RS_data);
               Print_char(data,12);

             while(1);
               }
```