LOW220.ASM

此为王真星　1995年期间开发的低频变频调速器完整代码，输出的最低马达频率为2hz，功率20KW

王真星 ，毕业于清华大学精仪系，博士后，现在为IACSIT国际会议执行主席，深圳科技局专家，核心刊物《计算机应用研究》特邀审稿专家，上海政府采购专家，保加利亚软件学报审稿专家

，我国嵌入式系统专家，。项目联系方式：http://www.cleanrobot.com.cn　电话021-51619832

;top frequ 120hz

```
    TIM     EQU 0C7FCH
    TIM1    EQU 0C7FDH
    TIM2    EQU 0C7FEH
    TIM3    EQU 0C7FFH
                            ;   履穆哪履穆哪履穆哪履穆哪?
    A1X     EQU 20H         ;   砆C砆U砣U砆L鐠3砆H鐠1鐠0?  0FfH     ERRFLAG
    A1L     EQU 20H         ;   聊牧哪聊牧哪聊牧哪聊牧哪?
    A1H     EQU 21H         ;                   D3:AS0
    A2X     EQU 22H ; COMMAN REGISTER
    A2L     EQU 22H
    A2H     EQU 23H ;    A1X-A4X
    A3X     EQU 24H
    A3L     EQU 24H
    A3H     EQU 25H
    A4X     EQU 26H
    A4L     EQU 26H
    A4H     EQU 27H
    a5x     equ 28h     ;                   谀哪0FFH哪哪哪哪? ERRFLAG
    DX      EQU 2CH     ;                   ?--0FEH--------? FLAG
    LX      EQU 2EH     ;                   ?--0D4H--------? SP AREA    FROM
0D0H-0FDH
    FX      EQU 30H     ;                   ?--0D0H--------?
    VX      EQU 32H     ;                   ?--------------?
    CX      EQU 34H     ;                   ?--------------?
    CL      EQU 34H     ;                   ?--------------?
    CH      EQU 35H     ;                   ?--------------?
    REGH6   EQU 36H     ;                   ?--------------?
    REGH6L  EQU 36H     ;                   ?--------------?
    REGH6H  EQU 37H     ;                   ?--85H---------?
    REGH7   EQU 38H     ;                   ?--50H---------? CAN'T USE AS
COMMON
    REGH7L  EQU 38H     ;                   ?--------------?
    REGH7H  EQU 39H     ;                   ?--------------?
    REGH8   EQU 3AH     ;                   ?--27H---------?COMMOM REGISTER
    REGH8L  EQU 3AH     ;                   ?--20H---------?
```

```
    REGH8H EQU 3BH     ;                          ?--------------?
    MX1    EQU 3CH     ;                          ?--1AH---------?
    MX2    EQU 3EH     ;                          滥哪SFR哪哪哪哪筏
    ST1TE  EQU 42H     ;   2000H-5FFFH 27128   6000H-7FFFH 6264 8000H-9FFFH 8279
A000H-BFFFH  LEAVE FOR OTHER USE
    st2te  equ 44h
    GX2    EQU 46H
    GX1    EQU 48H
    ZX     EQU 4AH
    st2    equ 4ch     ;   C000H-DFFFH 8253   E000H-FFFFH 74LS377
    mxfl   EQU 4eH     ;    INITIALATE START FREQUENCY 1.75Hz
    mxfh equ   4fh     ;  D7    D6  D5   D4  D3   D2  D1  D0
    DSP1   EQU 50H      ;谀哪哪穆哪穆哪穆哪穆哪穆哪哪履哪穆哪履哪目  LED        0
LIGHT
    DSP2   EQU 51H      ;矢LARM 砹EV矲WD砜OG矲RQ 砸EQ 砌z赠ATA? RAMLED     1 SHUT
    DSP3   EQU 52H      ;滥哪哪牧哪牧哪牧哪牧哪哪聊哪牧哪聊哪筏
    DSP4   EQU 53H      ;              谀哪履穆哪履穆哪穆哪穆哪哪履哪哪哪?
                        ;              ?  ? ? ? 砗/ ?\ 砹/S 矲WD/REV?
                        ;              滥哪聊牧哪聊牧哪牧哪牧哪哪聊哪哪哪?
    ERRFLAG EQU 59H     ;       谀哪履哪履哪穆哪哪履哪履哪履哪履哪哪哪?
     FLAG   EQU 58H     ; HB    矲WD砹EV砸TOP?/\ 砗/ 砜OG矲UN矲OWARD 砥EYFLAG
    keyflag equ 5ah     ;       媚穆聊穆聊哪铝哪履聊哪拍哪拍哪拍哪哪哪?
    keyflagL equ 5ah    ; LB    砆H?OL? LU?OU?OJOG砸P2砸P1砹EWARD ?
    keyflagH equ 5Bh    ;       滥牧哪牧哪哪聊哪聊哪哪聊哪聊哪聊哪哪哪?
    fnflag  equ 5ch     ;   HB  谀哪穆哪哪履哪穆哪哪履哪穆哪哪履哪穆哪哪目
    fnflagL  equ 5ch    ;       矲N28矲N27矲N26矲N25矲N24矲N23矲N22矲N21 ?
    fnflagH  equ 5Dh    ;       媚哪呐哪哪拍哪呐哪哪拍哪呐哪哪拍哪呐哪哪拇FNFLAG
    FGIVEN  EQU 5EH     ;   LB  矲N20矲N19矲N18矲N17矲N16矲N15矲N14矲N13 ?
    FN1     EQU 60H     ;       滥哪牧哪哪聊哪牧哪哪聊哪牧哪哪聊哪牧哪哪筏
    FN2     EQU 62H
    FN7     EQU 64H
    FN9     EQU 66H
    FN10    EQU 68H
    FN11    EQU 6aH
    FN4     EQU 6CH
    FN5     EQU 6EH
    FN6     EQU 70H
    t1flag  equ 72h
    fn3     equ 74h
    fn8     equ 76h
    sflag   equ 78h
    sereg   equ 79h
    seregt  equ 7ah
    sertim  equ 7bh
    OUT     EQU 80H
    RAMLED    EQU 81h
    pi1       equ 82h
    pi2       equ 84h
    pi2h       equ 85h
    pi3       equ 86h
    pi4       equ 88h
    LED       EQU 0E000H ;
    K8279C EQU 8FFFH     ;
    K8279D EQU 8FFEH     ;
    OUTPUT EQU 4200H
;屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯
```

```
;next equ have nothing to do with any  register!
    READ   EQU 60H
    UPPER  EQU 61H
    LOWER  EQU 62H
    STOP   EQU 63H
    FOWARD EQU 64H
    REWARD EQU 65H
    JOG    EQU 66H
    FUN    EQU 67H
    fwd    EQU 68H
    rev    EQU 69H
    oh     EQU 6AH
    ol     EQU 6BH
    SP1    EQU 6CH
    SP2    EQU 6DH
    TOWKEY EQU 6EH
    reset  equ 6fh
    res    equ 70h
    ojog   equ 71h
    oU     equ 72h
    lU     equ 73h
;//////////////////////////////
;RESET AND START INITIALATE PROGRAM
;//////////////////////////
          org 2000H
          dw t1
          org 2002H
          dw adr
          org 2004H
          dw HSIDA
          org 2006H
          dw hsoint
          org 2008H
          dw  exint
          org 200AH
          dw  SOFINT
          org 200cH
          dw  serint
          org 200EH
          dw EXINT
          ORG 2018H
          DB 3DH

          ORG 2080H
          DI
          LD SP,#100H
          LDB IOC0,#14H
          LDB IOC1,#0a5h ;UPPER IS INTERRUPT SYSTEM INITIALATED
          ldb intmas,#0e9h
          CLRB INTPEN
          orb out,#50h ;open 8253 gate

          ldb baudra,#8eh;9bh
          ldb baudra,#80h;baud rate is 1200
          ldb spcon,#1ah
          EI
```

```
          andb ramled,#0feh
          stb ramled,led[0]   ;shut pwm out
         ldb sflag,#02h
          clrb seregt
          clrb sereg
          clr st1te
          clr st2te
          clrb sertim
          clr t1flag
          clr keyflag
          CLRB ERRFLAG
          ld lx,#4     ;palse is 64
          lcall sad6
          ld pi1,pi4
          ld pi2,#5000
          stb sbufrx,r0
          ldb A1L,#07FH
          STB A1L,LED[0]
          STB A1L,RAMLED
          ldb a1l,7ah
          jbc a1l,6,main2
         ldb a2l,ramled
         andb a2l,#0fbh
         stb a2l,ramled
         stb a2l,led[0]   ;light seq led
main2:   jbc a1l,5,main1  ;light distance frequency led
         ldb a2l,ramled
         andb a2l,#0f7h
         stb a2l,ramled
         stb a2l,led[0]   ;light frq led
main1:   LD A1X,#K8279C   ;NEXT IS INITIALATE 8279
          LDB A2L,#34h    ;DEVIDE ALE TO 100KHz
          STB A2L,[A1X]   ;SEND THIS COMMAND
          LDB A2L,#0D3H   ;POINT COMMAND/STATE PORT ADDRESS
          STB A2L,[A1X]   ; CLEAR COMMAND CODE,SEND TO 8279
WAIT:     LDB A2H,[A1X]   ;READ IN STATE WORD
          JBS A2H,7,WAIT
          LDB A2L,#05H    ;INTECTOR/DISPLAY WORKING MODE
          STB A2L,[A1X]   ;SEND THIS COMMAND
          LDB A1X,#30H     ;INITIALATE 8253
          STB A1X,TIM3[0];THE THREE CTC OF 8253 IS SET MODE 0 READ/WRITE WORD
          LDB A1X,#70H
          STB A1X,TIM3[0]
          LDB A1X,#0B0H
          STB A1X,TIM3[0]
          lcall hsoint;start 1ms calculate
          lcall key1
          clr keyflag
          ld mxf1,#190
          ld mx2,#400
          di
           LDB HSOCOM,#39H
           ADD HSOTIM,TIMER1,mx2
          ei
         LCALL DEL0.5  ;ELECTRO CHARGE DELAY 1 SECOND
        lcall del0.5
```

```
          LCALL MF
          jbs fnflagh,3,m211
          CLRB FLAG
M211:     andb out,#0bfh
          stb out,output[0]
MAI1:      ld dx,#0
           ld gx1,#80
           ld gx2,#40
           jbc port2,2,x3
            sjmp exint
x3: jbc flag,0,x1
jbs flag,1,x2
          orb keyflagl,#1
          andb keyflagh,#0feh
          ljmp ma3
x2:       orb keyflagh,#1
          andb keyflagl,#0feh
          ljmp ma3
x1:        ljmp mast
;//////////////////////////
t1:       inc t1flag
          ret
;//////////////////////////
hsoint:   pushf
          ldb hsocom,#10h
          add hsotim,timer1,#500;delay 1ms interrupt
          inc st1te
          addc st2te,R0
          popf
          ret
;//////////////////////////
EXINT:    di
          ANDB INTMAS,#05cH ;CLOSE SOFT INTERRUPT
          orb intmas,#40h
          ei
          ldb a1l,ramled
          andB A1L,#7FH
          STB A1L,LED[0]   ;ARLEM
          LDB dsp2,#14   ;DISPLAY ERR AND JUMP TO MONITOR
          LDB dsp1,#25
          LDB dsp3,#24
          LDB dsp4,#24
          lcall displa
          ld a1x,#xjp
          st a1x,[sp]
          ret
;//////////////////////////
serint:   ldb sereg ,spstat
          andb sereg,#0fch
          orb sflag,sereg
          ldb sereg,sbufrx
          ret

;//////////////////////////
;HSI DATA EFFECT INTERRUPT   BROKEN PROCESS
;//////////////////////////
```

```
HSIDA:    rst
GUN8:
          ANDB INTMAS,#0DfH ;CLOSE SOFT INTERRUPT
           orb intmas,#43h
          JBc ERRFLAG,7,GUN1
          LDB dsp2,#12      ;OVER CURRENT
          LDB dsp1,#0
          SJMP GUN88
GUN1:     JBc ERRFLAG,6,GUN2
          LDB dsp2,#21
          LDB dsp1,#0 ;OVER VOLTAGE
          SJMP GUN88
GUN2:     JBc ERRFLAG,5,GUN6
          LDB dsp2,#21
          LDB dsp1,#18 ;LECK VOLTARE
          SJMP GUN88
ggg:      RST
GUN3:     JBC ERRFLAG,4,GGG
          ldb dsp1, #18
          LDB dsp2, #0
          LDB dsp3, #0AH
          LDB dsp4, #0DH      ;DISPLAY OVER LOAD
          SJMP GUN08
GUN6:     JBc errflag,3,GUN4
          LDB dsp1,#10
          LDB dsp2,#5      ;ASSOCIATED LOCK
         sjmp gun88
GUN4:     JBc errflag,2,GUN3
          LDB dsp1,#0
          LDB dsp2,#19     ;OVER HOT
GUN88:    JBc FLAG,1,GUN89
          LDB dsp3,#36           ;DISPLAY XX-R
          LDB dsp4,#24           ;INCREASE FREQUENCY
GUN08:    LCALL DISPLA
          LDB A1L,#7FH
          STB A1L,LED[0]    ;ARLEM
          STB A1L,RAMLED
          ld mxfl,#190
          sjmp xjp
GUN89:    LDB dsp3,#36           ;DISPLAY XX-C
          LDB dsp4,#0CH
          sjmp gun08
xjp:  jbs fnflagl,6,tr1
      sjmp wzxl
tte: andb intmas,#0bfh
      orb spcon,#10h
      ldb sbuftx,#55h
      jbc spstat,5,$
      andb intpen,#0bfh
      orb intmas,#40h
tr8:  andb sflag,#1fh
      clrb sereg
texit:sjmp wzxl
tr1:  jbc sflag,6,tr8
      push sflag
```

```
        ldb al1,sflag
        andb al1,#3
        cmpb al1,#2
        pop sflag
        jne tr6
tr3:    jbs sflag,7,tr4
        sjmp tr8
tr4:    cmpb sereg,fn8
        jne tr8
tr5:    andb intmas,#0bfh
        orb spcon,#10h
        ldb sbuftx,fn8
        jbc spstat,5,$
        andb intpen,#0bfh
        orb intmas,#40h
        ldb sflag,#1fh
        ldb spcon,#1fh
        sjmp texit
tr6:    jbs sflag,7,tte
        cmpb sertim,#1
        je str1
        ldb seregt,sereg
        incb sertim
        sjmp tr8
str1:   clrb sertim
        cmpb sereg,seregt
        jne tte
        cmpb sereg,#50h
        jne tr71
        ld a1x,mxfl
tr72:    andb intmas,#0bfh
        orb spcon,#10h
        ldb sbuftx,a1l
        jbc spstat,5,$
        orb spcon,#10h
        ldb sbuftx,a1h
        jbc spstat,5,$
        andb intpen,#0bfh
        orb intmas,#40h
        sjmp tr8
tr71:   cmpb sereg,#5ah
        jne tr7
        ld a1x,fgiven
        sjmp tr72
tr7:    cmpb sereg,#51h
        jne tr11
tr9:    andb sflag,#1fh
        jbc sflag,6,$
        ldb a1l,sereg
        andb sflag,#1fh
tr10:   jbc sflag,6,$
        ldb a1h,sereg
        ld fgiven,a1x
        sjmp tr8
tr11:   cmpb sereg,#57h
        jne tr15
```

```
      rst
tr15: cmpb sereg,#59h
      jne tr17
      andb intmas,#0bfh
      orb spcon,#10h

      ldb sbuftx,#55h
      jbc spstat,5,$
      andb intpen,#0bfh
      orb intmas,#40h
      sjmp tr8
tr17: cmpb sereg,#58h
      je tr18
      sjmp tr8
tr18: ldb sflag,#1ah
      ldb spcon,#1ah
      sjmp tr8

wzx1:   clr t1flag
        lcall keysc
         cmpb a2l,#reset
         jne    xjp1
         sjmp dsp
xjp1:    lcall keysb
         jbs a2l,7,dsp
         sjmp   xjp
dsp:     ldb 1ah,#42
         push mxfl
         clrb flag
         ldb mxfh,flag
         lcall fnwr       ;when is err auto start is invalide
         pop mxfl
         ljmp 2080h
;//////////////////////////////
ER1:     LCALL KEYSD
         CMPB A2L,R0
         JE KD5
         SJMP GUN8
KD5:     RET
;//////////////////////////////
;屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯
;if distance control then call keysb key board control call keysa if stop call
keysc
;then it will jump to keysa or keysb function
;屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯屯
;//////////////////////
;DISPLA PROGRAM
;BEFORE THIS PROGRAM THE SEGMENT CODE SHOULD SEND TO DSP1,DSP2,DSP3,DSP4
;use COMMOM REGISTER
;//////////////////////
DISPLA:  PUSH A1X
         PUSH A2X
         PUSH A3X
         PUSH A4X
         LDB A4L,#04H  ;DISPLAY 4 NUMBER
         LDB A1L,#90H  ;WRITE DISPLAY RAM
```

```
        STB A1L,K8279C[0] ;SEND THIS COMMAND
        LD A1X,#DSP1 ;THE FIRST ADDRESS OF DISPLAY BUFFER IS SEND TO a1x
DISPL1: CLRB A3H
        LDB A3L,[A1L]+ ;DATA IN DISPLAY BUFFER IS SEND TO 24H THEN POINT TO
NEXT REGISTER
        ADD A3X,#DPTR1 ;ACCORDING DATA IN DISPLAY BUFFER SEARCH TABLE THEN GET
SEGMENT ADDRESS NUMBER
        LDB A4H,[A3X]+ ;SEGMENT CODE SEND TO 8279 DISPLAY RAM AND POINT TO NEXT
CODE
        STB A4H,K8279D[0]
        DJNZ A4L,DISPL1;IF 4 NUMBER HAVEN'T FINISHED DISPLAY THEN CONTINUE
        POP A4X
        POP A3X
        POP A2X
        POP A1X
        RET
;//////////////////////////////////
;DISPLAY CURRENT FREQUENCY PROGRAM
;ues DSP2,DSP1,DSP3,DSP4,A1X,A2X, A3X,A4X
;//////////////////////////////////
dspa:   push a1x
        push a2x
        clr a2x
        ld a1x,mxfl
        cmp mxfl,#9999
        jnh ldb3
        divu a1x,#10
        clr a2x
        divu a1x,#10
        stb a2x,dsp4
        clr a2x
        divu a1x,#10
        stb a2x,dsp3
        clr a2x
        divu a1x,#10
        stb a2x,dsp2
        clr a2x
        divu a1x,#10
        stb a2x,dsp1
        sjmp ib4
ldb3:    divu a1x,#10
        stb a2x,dsp4
        clr a2x
        divu a1x,#10
        stb a2x,dsp3
        clr a2x
        divu a1x,#10
        stb a2x,dsp2
        clr a2x
        divu a1x,#10
        stb a2x,dsp1
ib4:    cmp mxfl,#999
        jnh ib2
        cmp mxfl,#9999
        jnh ib1
        addb dsp3,#1ah
```

```
        sjmp ib5
ib2:    ldb dsp1,#25
ib1:    addb dsp2,#1ah
ib5:    pop a2x
        pop a1x
LBL:    LCALL DISPLA
        RET
;//////////////////////////
;    SUBPWM
;//////////////////////////
SUBPWM:LDbze a1x,mxfl  ;PUT INTEGERET PART OF CURRENT FREQUENCY IN 20H
       MULU a1x,#10  ;ENLARGE CURRENT FREQUENCY 10 TIMES PUT IT IN 20H WORD
       DIVUB a1x,#78 ;PUT QUOTATION PART IN 20H BITE
       LDB PWMCON,a11
       RET
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
;OUT VOLTAGE GIVEN FREQUENCY SIGNAL
;AUTO CALCULATE FREQUENCY VALUE ACCORDING MID-LOW VERTER,FN13,14
;RESULT IS IN A1X
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
adr:    ret
saD6:  push a1x
       PUSH A2X
       push a3x
       ldb a3x,#10
       clr a2x
la1:   LDB ADCOM,#14  ;START A/D CONVERT CHANNEL 7
       SKIP
       JBS 02H,3,$    ;IF S=1 THEN WAIT
       LDB A1L,AD   ;STORE A/D RESULT
       LDB A1H,ADH
       SHR A1X,#6   ;IN A1X WORD THAT IS STORED A/D RESULT
       add a2x,a1x
       djnz a3x,la1
la3:   ld a1x,a2x
       clr a2x
       divu a1x,#10
       mulu a1x,#12000
       divu a1x,#1024
       ld pi4,a1x
       pop a3x
       pop a2x
       pop a1x
       ret
;\\\\\\\\\\\\\\\\\\\\\\\\\\
sAD7:  push a1x
       PUSH A2X
       push a3x
       ldb a3x,#10
       clr a2x
sa1:   LDB ADCOM,#15  ;START A/D CONVERT CHANNEL 7
       SKIP
       JBS 02H,3,$    ;IF S=1 THEN WAIT
       LDB A1L,AD   ;STORE A/D RESULT
       LDB A1H,ADH
       SHR A1X,#6   ;IN A1X WORD THAT IS STORED A/D RESULT
```

```
        add a2x,a1x
        djnz a3x,sa1
sa3:    ld a1x,a2x
        clr a2x
        divu a1x,#10
        jbs fnflagh,7,sad7.1
        cmp a1x,#34
        jnh sad7.7
        orb intmas,#20h
        andb flag,#0Cfh
        mulu a1x,#6000
        divu a1x,#1024
        clr a2x
        divu a1x,#10
        mulu a1x,#10
ins:    jbc fnflagh,2,sa11
        cmp a1x,fn2
        je sa11
        jh sa11
     ;  ld fgiven,fn2
        sjmp sadexit
sa11:   ld fgiven,a1x
        sjmp sadexit
sad7.1:cmp a1x,#238
        jnh sad7.7
        andb flag,#0Cfh
        sub a1x,#205
        orb intmas,#20h
        mulu a1x,#6000
        divu a1x,#820
        clr a2x
        divu a1x,#10
        mulu a1x,#10
        jbc fnflagh,2,sa11
        cmp a1x,fn2
        je sa11
        jh sa11
     ;  ld fgiven,fn2
sadexit:pop a3x
        pop a2x
        pop a1x
        ret
sad7.7: clr keyflag
        orb flag,#18h
        ld fgiven,#190
        sjmp sadexit

;////////////////////////////////////////////////////////////
pi:     push a1x
        push a2x
        push a3x
        push a4x
        add pi1,pi3
        add a1x,pi1,pi2
        lcall sad6
        ld pi2,pi4
```

```
        mulu a3x,pi4,#2
        cmp a1x,a3x
        jh sb1
        ld pi2,fn2
        sjmp pout
sb1:    sub a1x,a3x
        ld pi2,a1x
pout: ld pi1,pi4
        pop a4x
        pop a3x
        pop a2x
        pop a1x
        ret
;////////////////////////////////////////////////////////////
MAST:       LCALL KEYSA
            CMPB A2L,#STOP
            JNE MA001
            LJMP STOP1
MA001:      LCALL KEY1
            JBS KEYFLAGH,7,MA3
            JBS FLAG,1,MA7
            SJMP MA21
MA3:
            orb ramled,#80h
            stb ramled,led[0]
            CLR KEYFLAG
            JBC INTMAS,1,MA4
            ldb flag,#3
            LJMP STO1
MA4:        JBC FLAG,1,MA6
            JBS FLAG,0,MA7
            SJMP MA25
MA6:        ORB FLAG,#3
            push mxfl
            ldb 1ah,#42
            ldb mxfh,flag
            lcall fnwr
            pop mxfl

MA7:




     JBS KEYFLAGH,4,MA9
            SJMP MA12
MA9:        CLR KEYFLAG
            JBC fnfLAGH,0,MA10
            SJMP MA13
MA10:       CMP FGIVEN,FN1
            JE MA13
            JH MA13
            ADD MXFL,#10
            ANDB FLAG,#0F7H
```

```
            ORB FLAG,#4H
            LD FGIVEN,MXFL
MA11:       LCALL CHGFRE
MA12:       CMP MXFL,FGIVEN
            JE MA13
            JH MA13
            LCALL KEY1
            JBC KEYFLAGH,5,MA38
STOP0:      CLR KEYFLAG
            push mxfl
            ldb mxfh,r0
            ldb 1ah,#42
            lcall fnwr
            pop mxfl
            LJMP STOP1
MA38:       JBS KEYFLAGH,4,MA9
            JBS KEYFLAGH,3,MA16
MA41:       CMP MXFL,FN1
            JE MA19
            JH MA19

            jbc fnflagh,1,mpn;pid allowence
            lcall del0.5
            push mxfl
            ldb 1ah,r0
            lcall fnread
            ld pi3,mxfl
            pop mxfl
            lcall pi
            cmp pi2,fn1
            jnh pi23
            ld pi2,fn1
pi23:        ld fgiven,pi2


mpn:        CMP MXFL,FGIVEN
            JE MA19
            sub a1x,fgiven,mxfl
            cmp a1x,#100
            jnh  ma02
            ADD MXFL,#100
            andb flag,#0f7h
            ORB FLAG,#04H
            SJMP MA11
MA13:       LCALL KEY1
            JBC KEYFLAGH,4,MA14
            SJMP MA9
MA14:       JBC KEYFLAGH,5,MA15
            SJMP STOP0
MA15:       JBS KEYFLAGH,3,MA16
            SJMP MA19
ma02:       ADD MXFL,#10
            andb flag,#0f7h
            ORB FLAG,#04H
            SJMP MA11
```

```
MA16:       CLR KEYFLAG
            JBC fnFLAGH,0,MA17
            SJMP MA19
MA17:       CMP MXFL,FN2
            JNH MA20
            SUB MXFL,#10
            ORB FLAG,#8H
            LD FGIVEN,MXFL
MA18:       LCALL CHGFRE
MA19:

            jbc fnflagh,1,mapn
            lcall del0.5
            push mxfl
            ldb 1ah,r0
            lcall fnread
            ld pi3,mxfl
            pop mxfl
            lcall pi
            cmp pi2,fn1
            jnh pi22
            ld pi2,fn1
pi22:        ld fgiven,pi2


mapn:        andb flag,#0f3h
            LCALL KEY1
MA20:       JBC KEYFLAGH,3,MA21
            SJMP MA16
MA21:       JBS KEYFLAGH,6,MA22
            SJMP MA34
MA22:       orb ramled,#80h
            stb ramled,led[0]
            CLR KEYFLAG
            JBc FNFLAGL,7,MA23
            push dsp3
            push dsp1
            LDB dsp4,#11h
            LDB dsp3,#12
            LDB dsp2,#0
            LDB dsp1,#18    ;DISPLAY LOCK
            LCALL DISPLA
            LCALL DEL0.5
            pop dsp1
            pop dsp3
            LCALL DISPLA
            SJMP MA37
MA23:       JBS FLAG,1,MA24
            LDB FLAG,#2H
            push mxfl
            ldb 1ah,#42
            ldb mxfh,flag
            lcall fnwr
            pop mxfl

            JBC INTMAS,1,MA24
```

```
          LJMP STQ1
MA24:     JBS FLAG,0,MA25
          SJMP MA32
MA25:     cmp mxfl,#200
          jnh ma0e
          sub a1x,mxfl,fgiven
          cmp a1x,#1
          jnh ma025
          SUB MXFL,#100
          ORB FLAG,#8H
          ANDB FLAG,#0FBH
          sjmp ma024
ma025:    SUB MXFL,#10
          ORB FLAG,#8H
          ANDB FLAG,#0FBH
ma024:    LCALL CHGFRE
ma0e:     CMP MXFL,#200
          JNH MA26
          LCALL KEY1
          JBC KEYFLAGH,5,MA25
          SJMP STOP0
MA26:     XORB FLAG,#1H
          SJMP MA7
MA34:     JBS FLAG,1,MA29
          SJMP MA35
MA29:     JBC KEYFLAGH,5,MA30
          SJMP STOP0
MA30:     JBC KEYFLAGH,4,MA31
          SJMP MA9
MA31:     JBC KEYFLAGH,3,MA32
          SJMP MA16
MA32:     clr keyflag
          CMP MXFL,FGIVEN
          JE MA5
          JNH MA5
          sub a1x, mxfl,fgiven
          cmp a1x,#100
          jnh ma03
           SUB MXFL,#100
          ANDB FLAG,#0FBH
          ORB FLAG,#8H
          SJMP MA18
ma03:     ld mxfl,fgiven
          cmp a1x,#0
          je  ma5
          cmp a1x,#10
          je was1
          jnh was
was1:     SUB MXFL,#10
          ANDB FLAG,#0FBH
          ORB FLAG,#8H
was:      SJMP MA18
MA5:      CLR KEYFLAG
          SJMP MA37
MA35:     JBC KEYFLAGH,2,MA36
          CLR KEYFLAG
```

```
            lJMP JOG%
MA36:       JBC KEYFLAGH,1,MA39
            CLR KEYFLAG
            LJMP FUN%
MA37:       LCALL ER1
            jbc flag,0,dm1
            lcall dspa
dm1:       jbs fnflagl,6,sr1

            sjmp mast
MA39:       LJMP MASI1
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
;communication process
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
ote:  andb intmas,#0bfh
      orb spcon,#10h
      ldb sbuftx,#55h
      jbc spstat,5,$
      andb intpen,#0bfh
      orb intmas,#40h
sr8:  andb sflag,#1fh
      clrb sereg
sexit:sjmp mast
sr1:  jbc sflag,6,sr8
      push sflag
      ldb a11,sflag
      andb a11,#3
      cmpb a11,#2
      pop sflag
      jne sr6
sr3:  jbs sflag,7,sr4
      sjmp sr8
sr4:  cmpb sereg,fn8
      jne sr8
sr5:  andb intmas,#0bfh
      orb spcon,#10h
      ldb sbuftx,fn8
      jbc spstat,5,$
      andb intpen,#0bfh
      orb intmas,#40h
      ldb sflag,#1fh
      ldb spcon,#1fh
      sjmp sexit
sr6:  jbs sflag,7,ote
      cmpb sertim,#1
      je ssr1
      ldb seregt,sereg
      incb sertim
      sjmp sr8
ssr1: clrb sertim
      cmpb sereg,seregt
      jne ote
      cmpb sereg,#50h
      jne sr71
      ld a1x,mxfl
sr72:  andb intmas,#0bfh
```

```
        orb spcon,#10h
        ldb sbuftx,a1l
        jbc spstat,5,$
        orb spcon,#10h
        ldb sbuftx,a1h
        jbc spstat,5,$
        andb intpen,#0bfh
        orb intmas,#40h
        sjmp sr8
sr71:   cmpb sereg,#5ah
        jne sr7
        ld a1x,fgiven
        sjmp sr72
sr7:    cmpb sereg,#51h
        jne sr11
sr9:    andb sflag,#1fh
        jbc sflag,6,$
        ldb a1l,sereg
        andb sflag,#1fh
sr10:   jbc sflag,6,$
        ldb a1h,sereg
        ld fgiven,a1x
        sjmp sr8
sr11:   cmpb sereg,#52h
        jne sr12
        andb sflag,#1fh
        clrb sereg
        ljmp ma3
sr12:   cmpb sereg,#53h
        jne sr13
        andb sflag,#1fh
        clrb sereg
        ljmp ma22
sr13:   cmpb sereg,#54h
        jne sr14
        andb sflag,#1fh
        clrb sereg
        ljmp stop1
sr14:   cmpb sereg,#57h
        jne sr15
        rst
sr15:   cmpb sereg,#59h
        jne sr17
        andb intmas,#0bfh
        orb spcon,#10h

        ldb sbuftx,#56h
        jbc spstat,5,$
        andb intpen,#0bfh
        orb intmas,#40h
        sjmp sr8
sr17:   cmpb sereg,#58h
        je sr18
        sjmp sr8
sr18:   ldb sflag,#1ah
        ldb spcon,#1ah
```

```
      sjmp sr8
;/////////////////////////////////////////////////////////////
key1:       push a2x
            lcall keysc
            cmpb a2l,#fun
            je key2
            jbs fnflag,6,key0
            sjmp key3
key2:       or keyflag,#200h
key0:       sjmp kexit
key3:       jbc fnflag,1,key4
            jbc fnflag,5,key5
            lcall keysa
            cmpb a2l,#stop
            jne key5
key13:      or keyflag,#2000h
            and keyflag,#21ffh
            andb flag,#0fh
            andb intmas,#0fdh
            sjmp kexit
key5:       lcall keysb
            jbs fnflag,0,key7
            ldb a2h,a2l
            andb a2h,#0fh
            shrb a2h,#2
            andb a2h,#03h
            cmpb a2h,r0
            je key13
            cmpb a2h,#1
            jne key12
            sjmp key14
key12:      cmpb a2h,#2
            jne key13
            sjmp key16
key7:       ldb a2h,a2l
            andb a2h,#0fh
            shrb a2h,#2
            cmpb a2h,r0
            je key13
            cmpb a2h,#1
            je key14
            cmpb a2h,#2
            je key13
            sjmp key16
key4:       lcall keysa
            cmpb a2l,#fwd
            jne key15
key14:      or keyflag,#8000h
            and keyflag,#81ffh
            sjmp key17
KEY01:      CMPB A2L,#STOP
            JNE KEY177
            SJMP KEY20
key177:     cmpb a2l,#jog
            je key21
            sjmp key17
```

```
key15:  cmpb a2l,#rev
        jne key01
key16:  or keyflag,#4000h
        and keyflag,#41ffh
        sjmp key17
key17:  jbs fnflag,2,key22
        ANDB INTMAS,#0FDH
        lcall keysa
        cmpb a2l,#upper
        jne key19
        or keyflag,#1000h
        sjmp kexit
key19:  cmpb a2l,#lower
        jne key20
        or keyflag,#800h
keya1:  sjmp kexit
key20:  jbs fnflag,1,keya1
        cmpb a2l,#stop
        jne key21
        ORB KEYFLAGH,#20H
        sjmp kexit
key21:  cmpb a2l,#jog
        jne keya1
        or keyflag,#400h
        sjmp kexit
key22:  lcall keysb
        shrb a2l,#4
        cmpb a2l,#1
        jne key23
        cmp fn2,fn4
        jh opq
        LD FGIVEN,FN4
        ANDB INTMAS,#0FDH
        sjmp kexit
opq:    LD FGIVEN,FN2
        ANDB INTMAS,#0FDH
        sjmp kexit
key23:  cmpb a2l,#2
        jne key24

        cmp fn2,fn5
        jh opq
        LD FGIVEN,FN5
        ANDB INTMAS,#0FDH
        sjmp kexit
key24:  cmpb a2l,#3
        jne key25
        cmp fn2,fn6
        jh opq
        LD FGIVEN,FN6
        ANDB INTMAS,#0FDH
        sjmp kexit
key25:  cmpb a2l,#0
        jne key26
        orb intmas,#2
        sjmp kexit
```

```
key26:      andb intpen,#0fdh
            andb intmas,#0fdh
            shrb a2l,#2
            cmpb a2l,#1
            je key27
            sjmp kexit
key27:      or keyflag,#400h
            sjmp kexit
kexit:      pop a2x
            ret



;////////////////////////////////////////////////////////////
SOFINT:     PUSHF
            orb intmas,#80h;open exint interrupt
STIME1:     LDB HSOCOM,#39H
            ADD HSOTIM,TIMER1,MX2
             push a1x
            push a2x
            CMP DX,#240
            JNH LV1
            CLR DX
            LD GX1,#160
            LD GX2,#80
LV1:        ADD cX,DX,#TABSIN
            LD a1x,[cX]; THE VALUE OF  SINX/2 IS PUT IN a1l
            MULU a1x,st2 ;Tc*Vm/Vc*(sin@i+sin@i+1)/2 is put in st2
            divu a1x,#10000
            CMP DX,#120
            JH FY
            ADD a1x,MX1
            SJMP FRY1
FY:         SUB a1x,MX1,a1x
FRY1:       LD REGH6,a1x
            CMP GX1,#240
            JNH LV2
            CLR GX1
LV2:        ADD cX,GX1,#TABSIN
            LD a1x,[cX]
            MULU a1x,st2
            divu a1x,#10000
            CMP GX1,#120
            JH FY1
            ADD a1x,MX1
            SJMP FRY2
FY1:        SUB a1x,MX1,a1x
FRY2:       LD REGH7,a1x
            CMP GX2,#240
            JNH LV3
            CLR GX2
LV3:        ADD cX,GX2,#TABSIN
            LD a1x,[cX]
            MULU a1x,st2
            divu a1x,#10000
```

```
            CMP GX2,#120
            JH FY2
            ADD a1x,MX1
            SJMP FRY3
FY2:        SUB a1x,MX1,a1x
FRY3:       LD REGH8,a1x
            pop a2x
            pop a1x
            add dx,lx
            add gx1,lx
            add gx2,lx
            JBc flag,0,VV4
            STB REGH6L,TIM[0]     ;FWD-RUN
            STB REGH6H,TIM[0]
            STB REGH7L,TIM1[0]
            STB REGH7H,TIM1[0]
            STB REGH8L,TIM2[0]
            STB REGH8H,TIM2[0]
             POPF
            RET
VV4:        STB REGH6L,TIM1[0]
            STB REGH6H,TIM1[0]
            STB REGH7L,TIM[0]
            STB REGH7H,TIM[0]
            STB REGH8L,TIM2[0]
            STB REGH8H,TIM2[0]
            POPF                  ;REV-RUN
            RET
;---------------------------------------
STOP1:      ld lx,#4      ;palse is 64
            jbs fnflag1,3,masi1
            JBC FLAG,1,MASI1
            orb flag,#08h
styp3:      cmp mxf1,#200
            jnh skl
            sub a1x, mxf1,#200
            cmp a1x,#100
            jnh   styp1
            sub mxf1,#100
styp2:      lcall chgfre
            sjmp styp3
styp1:      cmp mxf1,#200
            jnh skl
            sub mxf1,#10
            lcall chgfre
            sjmp styp1
;哪哪哪哪哪哪哪哪哪哪哪哪哪穆哪哪哪哪哪哪哪哪哪哪
skl:        ld lx,#0
            ld mxf1,#190
            JBC FLAG,1,MASI1
            ld a3x,fn11       ; ?
            shl a3x,#1
ssq1:       ld a1x,st1te      ; ?
EA11:       sub a2x,st1te,a1x; ?
            cmp a2x,#5        ; ?del 5ms    skid delay
            JNH EA11          ; ?
```

```
            dec a3x
            cmp a3x,#1
            jnh masi1
            sjmp ssq1
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
masi1:      LCALL ER1
            ldb r0,ios1
            andb ramled,#7fh
            stb ramled,led[0]
            LDB dsp4,#20
            LDB dsp3,#0         ;NATURAL STOP
            LDB dsp2,#23
            LDB dsp1,#5
            LCALL DISPLA
            ld lx,#4
            ld mxfl,#190
            clr keyflag
            clrb flag
            ORB A1L,#073h
            andb a1l,#7FH
            STB A1L,LED[0]
            lcall keysC
            CMPB A2L,#TOWKEY
            JE READA
            LJMP ma37
READA:      lcall recover
            LJMP 2080h        ;JUMP TO MONITOR PROGRAM
;//////////////////////////////////////
;jog key process
;//////////////////////////////////////
JOG%:       LDB A2L,RAMLED
            ANDB A2L,#0EFH    ;LIGHT JOG LED
            STB A2L,LED[0]
            STB A2L,RAMLED
            LD mxfl,#0
            LCALL DSPA
            ld mxfl,#190
goh:        clr keyflag
            lcall key1
            jbc keyflagh,7,jr1
             sjmp fs1
jr1:        jbc keyflagh,6,jr2
            jbs fnflag1,7,goh
            jbs flag,1,jr7
            andb flag,#0feh
            clr keyflag
            orb flag,#02h

            sjmp fs6
jr2:        jbc keyflagh,5,jr3
            ljmp stop1
jr3:        cmp mxfl,#190
            je  rft1
             jnh goh
             orb flag,#08h
             andb flag,#0fbh
```

```
          sub a1x, mxfl,#200
          cmp a1x,#100
          jnh   ltyp1
          sub mxfl,#100
ltyp2:    lcall chgfre
          sjmp jr3
rft:      jbs flag,3,rft1
          sjmp goh
ltyp1:    cmp mxfl,#200
          je rft
          jnh goh
          sub mxfl,#10
          lcall chgfre
          sjmp ltyp1
jr7:      jbs flag,0,jr2
          sjmp fs6
rft1:     jbc flag,1,goh
          JBS FNFLAGL,3,msx1
          ld a3x,fn11       ; ?
          shl a3x,#1
gss1:     ld a1x,st1te      ; ?
b11:      sub a2x,st1te,a1x ; ?
          cmp a2x,#5        ; ?del 5ms    skid delay
          JNH b11           ; ?
          dec a3x
          cmp a3x,#1
          jnh msx1
          sjmp gss1
msx1:     LD MXFL,#0
          ldb ramled,#7fh
          stb ramled,led[0]
          LCALL DSPA
          ld mxfl,#190
          clrb flag
          clr keyflag
          SJMP goh
fs1:      jbs flag,1,fs5
          clr keyflag
          ldb flag,#3h

fs6:      ld fgiven,fn7
          sjmp jbt5
fs5:      jbs flag,0,fs6
          sjmp goh
jbt5:          lcall er1
               CMP MXFL,FN1
               JE jbt10
               JH jbt10
jbt7:           CMP MXFL,FGIVEN
               JE jbt10
               JH jbt10
               ORB FLAG,#04H
               ANDB FLAG,#0F7H
               SUB A1X,FGIVEN,MXFL
               CMP A1X,#100
               JNH jbt8
```

```
                ADD MXFL,#100
jbt9:            LCALL CHGFRE
                SJMP jbt10
jbt8:            ADD MXFL,#10
                SJMP jbt9
jbt10:           cmp  fgiven,#200
                jnh jbt11
                CMP MXFL,FGIVEN
                JNH joh2
jbt11:           CMP MXFL,#200
                JNH joh2
                ORB FLAG,#08H
                ANDB FLAG,#0FBH
                SUB A1X,MXFL,FGIVEN
                CMP A1X,#100
                JNH jbt12
                SUB MXFL,#100
                SJMP jbt13
jbt12:           cmp mxfl,#200
                jnh jbt13
                SUB MXFL,#10
jbt13:           LCALL CHGFRE
joh2:            SJMP goh

;################################
;START ;START  ;START  ;STAR      FUNCTION AUTO MATICALY PRODUCT SPWM WAVE
ACCORDING DEFFERENT FREQUENCY
;1.display current frequency
;################################

mulout:    ret     ;multi function output
;################################
CHGFRE:    lcall pwmstart
           orb ramled,#80h
           stb ramled,led[0]
           jbc fnflagh,6,mul1   ;WHEN IS RUNNING OUTPUT SIGNAL FN27=0
           cmp mxfl,fn3         ;F27=1
           je mul1
           jNh lhg
mul1:      lcall mulout
lhg:        CMP FGIVEN,FN1
            JNH nf1
            LD FGIVEN,FN1
            LCALL DSPA
            sjmp CDA
nf1:        CMP FGIVEN,FN2
            JE nf2
            JH cda
nf2:        jbs fnflagh,2,nf3
            sjmp cda
nf3:        LD FGIVEN,FN2
cda:       lcall dspa
           LCALL EFD    ;FOR VM ACCORD CURVE
           ;FOR VM/VC*TC
```

```
            jbc flag,2,dectim    ;ACCORATE AND DECREASE
            ld a3x,fn9
            sjmp sda1
dectim:     ld a3x,fn10
sda1:       clr a4x
            divu a3x,#25
sda2:       ld a1x,st1te
DEA11:      sub a2x,st1te,a1x; ?
            cmp a2x,#4        ; ?del 5ms
            JNH DEA11         ; ?
 ; 哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
            dec a3x
            cmp a3x,#1
            jh  sda2

DCF1:         ret
;/////////////////////////
PWMSTART:       push a1x
                push a2x
                mulu a1x,mxfl,#255
                divu a1x,#12000
                ldb pwmcon,a1x
                pop a2x
                pop a1x
                 RET
;/////////////////////////
;KEY PROCESS FUN KEY
;/////////////////////////
FUN%:       JBC FLAG,3,FUN01
            Ljmp 2080h      ;IF VETER IS RUN RETURN
FUN01:      andb intmas,#0dfh
            clrb intpen
            ldb 1AH,#41
            lcall fnread
            ldb 1ah,mxfl
FUN1:       LCALL FUN4
            lcall del10
            lcall del10
            lcall del10
            lcall del10
            lcall keysa
            cmpb a2l,#upper
            jne  kili
            cmpb 1ah,#40
            je fun1
            jh fun1
            INCB 1AH        ;PUT FnX IN 1AH BITE
            LCALL FUN4
            ldbze mxfl,1ah
            push 1ah
            ldb 1ah,#41
            lcall fnwr
            pop 1ah
kili:       cmpb a2l,#lower
```

```
            jne fun3
            cmpb 1ah,#0
            jnh fun1
            DECB 1AH
            LCALL FUN4
            ldbze mxfl,1ah
            push 1ah
            ldb 1ah,#41
            lcall fnwr
            pop 1ah
FUN3:       lcall keysc
            cmpb a2l,#read
            jne funh
ls:         lcall fnread
            lcall keysc
            cmpb a2l,#read
            je ls
            lcall del10
            lcall del10
            lcall del10
            lcall del10
            lcall del10
            sjmp fuji1
            lcall del10
funh:       lcall keysa
            cmpb a2l,#stop
            jne fun1
            sjmp ghj
FUJI1:      LDB A1L,#0Feh;NEXT IS DISPLAY CURRENT DATA ACCORDING FnX
            STB A1L,LED[0];LIGHT DATA LED
            STB A1L,ramled
            CMPB 1AH,#12    ;fn0-12
            JNh FUN0
           lcall   fnread
display1: lcall dspa
           ldb dsp4,dsp2
           ldb dsp1,#25
           ldb dsp2,#25
           subb dsp4,#1ah
          ldb dsp3,#25
           lcall displa
           sjmp fun11
FUN0:      lcall fnread
            LJMP FUN11
FUNX1:      cmp mxfl,#12000
            je fun11
            jh fun11
funx2:      add mxfl,#10
            sJMP FUN11
FUN30:      lcall keysc
            cmpb a2l,#read
            jne  fun500
fg:        LCALL KEYSC
            cmpb a2l,#read
            JE Fg
            LCALL DEL10
```

```
          sjmp     fun31
fun7:     cmp mxfl,#300
          je fun11
          jh fun11
          sjmp funx2
fun8:     cmp mxfl,#1200
          je fun11
          jh fun11
          add mxfl,#100
          sjmp fun11
FUN500:    SJMP FUN11
hfd:       CMPB 1AH,#10
           Jnh    FUNX1
           CMPB 1AH,#11
           JE    FUN7
           CMPB 1AH,#12
           JE    FUN8
           ld mxfl,#100
          sjmp display1
funyx1:   cmp mxfl,#200
          jnh fun11
fun10:    sub mxfl,#10
FUN11:    cmpb 1ah,#12
          jh funj1
           LCALL DSPA
funj1:     lcall keysa
           cmpb a2l,#lower
           jne vvv
           lcall del10
           lcall del10
           lcall del10
           lcall del10
           sjmp fun12
vvv:       cmpb a2l,#upper
           jne  ffd
           lcall del10
           lcall del10
           lcall del10
           lcall del10
           sjmp hfd
ffd:       cmpb a2l,#stop
           je   ghj
           sjmp fun30
ghj:       ldb mxfl,1ah
           ldb 1ah,#40
           lcall fnwr
           ljmp 2080h
fc4:       cmp mxfl,#25
           jnh   fun11
           sjmp fun10
fc44:      cmp mxfl,#10
           jnh fun11
           sjmp fun10
fc40:      cmp mxfl,#100
           jnh fun11
           sub mxfl,#100
```

```
            sjmp fun11
FUN12:      CMPB 1AH,#8
            Jnh    FUNYX1
            cmpb 1ah,#10
            jnh   fc4
            cmpb 1ah,#11
            je   fc44
            cmpb 1ah,#12
            je   fc40
            clr mxfl
            sjmp display1
fun323:     pop 1ah
            pop mxfl
            sjmp fun32
FUN31:      cmpb 1ah,#21
            je fun32
            push mxfl
            push 1ah
            ldb 1ah,#21 ;SET VALUE LOCKED?
            lcall fnread
            cmp mxfl,#100
            jne fun323
            pop 1ah
            pop mxfl
            LDB dsp4,#11h
            LDB dsp3,#12
            LDB dsp2,#0
            LDB dsp1,#18   ;DISPLAY LOCK
            LCALL DISPLA
            LCALL DEL0.5
            SJMP FUN50
FUN32:      lcall fnwr
FUN50:      LDB dsp4,#25
            LDB dsp3,#0DH
            LDB dsp2,#22        ;DISPLAY END
            LDB dsp1,#14
            LCALL DISPLA
            LCALL DEL0.5
            LDB  A1L,#0FFH
            STB A1L,LED[0];SHUT DATA LED
            STB A1L,ramled
            LJMP FUN1    ;DISPLAY CURRENT FNX
FUN39:      LJMP 2080h
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪?
;entrace put address in 1ah ,the output data in mxfl
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪?
fnread:     orb out,#01h
            stb out,output[0]  ;cs high
            push a1x
            push a2x
            push a3x
            push a4x
            ldbze a4x,1ah
            shl a4x,#7
            and a4x,#0Dfffh ;READ
            or a4x,#0C000h
```

```
            ld mxfl,a4x
            ldb a3l,#9
            LCALL W9346B
            LDB A3L,#16
            LCALL R9346B
            ANDB OUT,#0FEH
            STB OUT,OUTPUT[0]  ;cs low
            SJMP FW
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
;entrace put address in lah ,data in mxfl the capable of 9346 is 64 word
;\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
FNWR:       ORB OUT,#01H   ;cs high
            stb out,output[0]
            push a1x
            push a2x
            push a3x
            push a4x
            PUSH MXFL
            CLR MXFL
            LD MXFL,#9800H ;erase/write enable
            LDB A3L,#9
            LCALL W9346B
            ANDB OUT,#0FEH
            STB OUT,OUTPUT[0]  ;cs low
            LDBZE A4X,1AH
            SHL A4X,#7
            OR A4X,#0e000H ;erase special register
            LD MXFL,A4X
            LDB A3L,#9
            LCALL W9346B
            lcall clock
            ANDB OUT,#0FEH
          STB OUT,OUTPUT[0]  ;cs low
            lcall clock
          orb out,#1
          STB OUT,OUTPUT[0]  ;cs high
          jbc port0,5,$
            ANDB OUT,#0FEH
          STB OUT,OUTPUT[0]  ;cs low
            LDBZE A4X,1AH
            SHL A4X,#7
            AND A4X,#0BFFFH ;write special register
            OR A4X,#0A000H
            LD MXFL,A4X
            LDB A3L,#9
            LCALL W9346B
            POP MXFL
            LDB A3L,#16
            LCALL W9346B    ;write data to reg
            ANDB OUT,#0FEH
          STB OUT,OUTPUT[0]  ;cs low
          orb out,#1
          STB OUT,OUTPUT[0]  ;cs high
          jbc port0,5,$
            ANDB OUT,#0FEH
          STB OUT,OUTPUT[0]  ;cs low
```

```
FW:         PUSH MXFL
            CLR MXFL
            LD MXFL,#8000H  ;erase write disable
            LDB A3L,#9
            LCALL W9346B
            ANDB OUT,#0FEH
          STB OUT,OUTPUT[0]  ;cs low
            POP MXFL
            ANDB OUT,#0FEH
            STB OUT,OUTPUT[0]
            POP A4X
            POP A3X
            POP A2X
            POP A1X
              RET
W9346B: orb out,#1
          STB OUT,OUTPUT[0]  ;cs high
          LDB A2L,A3L
            LD A1X,MXFL
RB1:       SHL A1X,#1
          JNC RB2
          ORB OUT,#4
          SJMP RB3
RB2:      ANDB OUT,#0FBH
RB3:      scall clock
          DJNZ A2L,RB1
          RET
R9346B: LDB A2L,A3L
W0:       shl a1x,#1
          scall clock
          JBC port0,5,W1
          OR A1X,#1
          SJMP W2
W1:       AND A1X,#0FFFEH
W2:       DJNZ A2L,W0
          LD MXFL,A1X
          RET
clock:    STB OUT,OUTPUT[0]
          ORB OUT,#2          ;sk high
          STB OUT,OUTPUT[0]
          SKIP
          SKIP
          SKIP
          SKIP
          ANDB OUT,#0FDH      ;sk low
          STB OUT,OUTPUT[0]
          SKIP
          SKIP
          SKIP
          SKIP
          ret
;-------------------------------------------------------+
recover:    ldb 1ah,#0ffh       ; here is special for auto  |
            ldb a2l,#42         ; set value                 |
fned:        incb 1ah           ; fnread2 can not use for   |
            lcall fnread2       ; other!                    |
```

```
            lcall fnwr          ;                                   |
            djnz a2l,fned       ;                                   |
            ret
fnread2:    ldbze a1x,1ah       ;                                   |
            shl a1x,#1          ;                                   |
            ld mxfl,gvf[a1x]    ;                                   |
            ret                 ;
;-----------------------------------------------------------------+
FUN4:       LDb a1x,1AH     ;DISPLAY CURRENT FN(X) SUB PROGRAM
            CLRB a1h
            DIVUB a1x,#10
            LDB dsp4,a1h
            CLRB a1h
            DIVUB a1x,#10
            CMPB a1h,#0
            JNE  FUQQ
            LDB dsp3,#25
            SJMP FUQQ1
FUQQ:       LDB dsp3,a1H
FUQQ1:      LDB dsp2,#22
            LDB dsp1,#15
            LCALL DISPLA
            RET
;哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪哪
MF:         push mxfl
            LDB 1AH,#13     ;MOVE DATA FROM EEROM TO FNFLAG
MF0:        LCALL FNREAD    ;ONLY USED IN START
            CMP MXFL,#100
            JNE MF1
            OR FNFLAG,#8000H
            SJMP MF2
MF1:        AND FNFLAG,#7FFFH
MF2:        INCB 1AH
            CMPB 1AH,#29
            JNE MF3
            SJMP MF4
MF3:        SHR FNFLAG,#1
            SJMP MF0
MF4:        LDB 1AH,#0
            LCALL FNREAD
            LD FGIVEN,MXFL
            LDB 1AH,#1
            LCALL FNREAD
            LD FN1,MXFL
            LDB 1AH,#2
            LCALL FNREAD
            LD FN2,MXFL
            LDB 1AH,#3
            LCALL FNREAD
            LD FN3,MXFL
            LDB 1AH,#4
            LCALL FNREAD
            LD FN4,MXFL
            LDB 1AH,#5
            LCALL FNREAD
            LD FN5,MXFL
```

```
            LDB 1AH,#6
            LCALL FNREAD
            LD FN6,MXFL
            LDB 1AH,#7
            LCALL FNREAD
            LD FN7,MXFL
            LDB 1AH,#8
            LCALL FNREAD
            LD FN8,MXFL
            LDB 1AH,#9
            LCALL FNREAD
            LD FN9,MXFL
            LDB 1AH,#10
            LCALL FNREAD
            LD FN10,MXFL
            LDB 1AH,#11
            LCALL FNREAD
            LD FN11,MXFL
            LDB 1AH,#42
            LCALL FNREAD
            LDb flag,MXFh
            pop mxfl
            RET
;//////////////////////////
;key value is put in a2L
;//////////////////////////
KEYSA:      skip                    ;here to test key state three times to sure
the
            ldb A2H,#50h                  ;key is pressed ,to smooth away the
interfere
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];sl0
            ldb A2H,#0c2h
            stb A2H,K8279C[0]
            cmpb a2l,r0
            je keysa9
            push a2l
            lcall del10
            ldb A2H,#50h
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];sl0
            ldb A2H,#0c2h
            stb A2H,K8279C[0]
            cmpb a2l,r0
            je keysa91
            cmpb a2l,[sp]
            pop a2l
            jne keysa9
            jbc A2L,3,KEYSA1
            push a2l
            lcall del10
            ldb A2H,#50h
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];sl0
            cmpb a2l,r0
            je keysa91
```

```
            cmpb a2l,[sp]
            pop a2l
            jne keysa9
            ldb A2L,#stop
            sjmp KEYSA8
keysa91:    pop r0
            sjmp keysa9
KEYSA1:     jbc A2L,2,KEYSA2
            ldb A2L,#JOG
            sjmp KEYSA8
KEYSA2:      jbc A2L,4,KEYSA3
            ldb A2L,#lower
            sjmp KEYSA8
KEYSA3:      jbc A2L,5,KEYSA4
            ldb A2L,#UPPER
            sjmp KEYSA8
KEYSA4:      jbc A2L,6,KEYSA7
             ldb A2L,#REv
            sjmp KEYSA8
KEYSA7:      jbc A2L,7,KEYSA9
             ldb A2L,#fwd
            sjmp KEYSA8
KEYSA9:      ldB A2L,#0
            sjmp KEYSA81
KEYSA8:     ANDB OUT,#0f7H
            STB OUT,OUTPUT[0]
KEYSA81:    LCALL DEL10
            ORB OUT,#08H
            STB OUT,OUTPUT[0]
            ldb A2H,#0c2h
            stb A2H,K8279C[0]
            ret
;////////////////////////////
KEYSB:
            ldb A2H,#50h ;SL1
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];sl0
            ldb A2L,K8279D[0];sl1
            ldb A2H,#0c2h
            stb A2H,K8279C[0]
            cmpb a2l,r0
            je keysb1
            push a2l
            lcall del10
            ldb A2H,#50h ;SL1
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];sl0
            ldb A2L,K8279D[0];sl1
            cmpb a2l,[sp]
            pop a2l
            jne keysa9
keysb1:     ldb A2H,#0c2h
            stb A2H,K8279C[0]
            lcall del10
            ret
;////////////////////////////
```

```
;function let you know which segment speed you selected only lcall it
;//////////////////////////////
KEYSC:
          ldb A2H,#50h                  ;SL2
           stb A2H,K8279C[0]
           ldb A2L,K8279D[0];sl0
           ldb A2L,K8279D[0];sl1
           ldb A2L,K8279D[0];sl2
            ldb A2H,#0c2h
           stb A2H,K8279C[0]
           cmpb a2l,r0
           je keysc9
           push a2l
           lcall del10
          ldb A2H,#50h                  ;SL2
           stb A2H,K8279C[0]
           ldb A2L,K8279D[0];sl0
           ldb A2L,K8279D[0];sl1
           ldb A2L,K8279D[0];sl2
            ldb A2H,#0c2h
           stb A2H,K8279C[0]
           cmpb a2l,r0
           je keysa911
           cmpb a2l,[sp]
           pop a2l
           jne keysc9
           ldb a2h,a2l
           andb a2h,#88h ;reseve read,reset
           cmpb a2h,#88h  ;press  read,reset together?
           jne   keys00
           ldb a2l,#towkey
           sjmp KEYSC8
keysa911:  sjmp keysa91
keys00:    cmpb a2h,#08h
           jne keys0
           ldb a2l,#reset
           sjmp KEYSC8
keys0:     jbc A2L,6,KEYSC1
           ldb A2L,#fun
           sjmp KEYSC8
KEYSC1:     jbc A2L,7,KEYSC2
           ldb A2L,#READ
           sjmp KEYSC8
KEYSC2:    jbc a2l,3,keysc9
           ldb a2l,#reset
KEYSC8:    ANDB OUT,#0f7H
           STB OUT,OUTPUT[0]
KEYSC88: LCALL DEL10
           ORB OUT,#08H
           STB OUT,OUTPUT[0]
            ldb A2H,#0c2h
           stb A2H,K8279C[0]
           ret
keysc9:    ldb a2l,#0
           sjmp keysc88
;//////////////////////////////
```

```
KEYSd:
            ldb A2H,#0c2h
            stb A2H,K8279C[0]
            ldb A2H,#50h
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];
            ldb A2L,K8279D[0];
            ldb A2L,K8279D[0];
            ldb A2L,K8279D[0];
            cmpb a2l,r0
            je keysd6
            push a2l
            lcall del10
            ldb A2H,#0c2h
            stb A2H,K8279C[0]
            ldb A2H,#50h
            stb A2H,K8279C[0]
            ldb A2L,K8279D[0];
            ldb A2L,K8279D[0];
            ldb A2L,K8279D[0];
            ldb A2L,K8279D[0];
            cmpb a2l,r0
            je keysd66
            cmpb a2l,[sp]
            pop a2l
            jne keysd6
            jbc A2L,2,KEYSD1
            ORB ERRFLAG,#40H
            sjmp keysd5
KEYSD1:     jbc A2L,3,KEYSD2
            ORB ERRFLAG,#20H
            sjmp keysd5
KEYSD2:     jbc A2L,5,KEYSD3
            ORB ERRFLAG,#04H
            sjmp keysd5
KEYSD3:     jbc A2L,6,KEYSD4
            ORB ERRFLAG,#08H
            sjmp keysd5
KEYSD4:     jbc A2L,4,KEYSD6
            orb intmas,#1
            cmp t1flag,#687
            jnh keysd51
            ORB ERRFLAG,#10H
KEYSD5:     ldb A2H,#0c2h
            stb A2H,K8279C[0]
            lcall del10
            RET
keysd66:    pop r0
KEYSD6:     CLRB A2L
            andb intmas,#0feh
            clr t1flag
            SJMP KEYSD5
keysd51:    clrb a2l
            sjmp keysd5
;//////////////////////////
DEL0.5:      push a1x
```

```
            push a2x
           ld a1x,st1te
hh:        sub a2x,st1te,a1x
           cmp a2x,#500
           jnh   hh        ;DELAY 0.5 SECOND SUB PROGRAM
           pop a2x
           pop a1x
           RET
;//////////////////////////////



DEL10:     push a1x
           push a2x
          ld a1x,st1te ;DELAY 10MS SUB PROGRAM
DEA10:     sub a2x,st1te,a1x
           cmp a2x,#9
           JNH DEA10
           pop a2x
           pop a1x
           RET
;-------------------------------------------------------------------------------
;NEXT IS LOW VETER  PROCESS FOR Vm/Vc*Tc ACCORDING GIVEN CURVE
;THE MAIN FUNCTION IS PUT VM/VC*TC IN ST2
;-------------------------------------------------------------------------------
EFD:        push mxfl     ;vm is 100 double enlarged
            LDb 1AH,#12   ;NEXT IS LOW VETER  PROCESS FOR Vm/Vc*Tc ACCORDING
GIVEN CURVE
            lcall fnread
            ld a1x,mxfl
            clr a2x
            divu a1x,#100
            shl a1x,#3
            sub a1x,#8
            add a1x,#curv
            ld a3x,[a1x]+ ;va
            ld a4x,[a1x]+ ;vb
            ld a5x,[a1x]+ ;vc
            ld a2x,[a1x]+ ;fc
            pop mxfl
            cmp mxfl,a2x
            jnh ef1
            push mxfl
            ldb a1h,#12
            lcall fnread
            cmp mxfl,#600
            pop mxfl
            jh ef2
            cmp mxfl,#6000
            jnh ef3
ef4:        ld a1x,#22000
            sjmp efd1
ef3:        ld a1x,#36667
ef5:        mulu a1x,mxfl
            divu a1x,#10000
```

```
            sjmp efd1
ef2:        cmp mxfl,#5000
            jh ef4
            ld a1x,#44000
            sjmp ef5
ef1:        cmp mxfl,#500
            jnh ef7
            sub a5x,a4x
            sub a2x,#500
            ld a1x,a5x
            ld a5x,a2x
            mulu a1x,#100
            divu a1x,a5x
            push mxfl
            sub mxfl,#500
            mulu a1x,mxfl
            pop mxfl
            divu a1x,#100
            add a1x,a4x
            sjmp efd1
ef7:        sub a1x,a4x,a3x
            push mxfl
            sub mxfl,#200
            mulu a1x,mxfl
            pop mxfl
            divu a1x,#300
            add a1x,a3x
efd1:       push a1x
            push a2x
            ld a1x,#06e6ah
            ld a2x,#19h  ;tc=1e6/p*f   tc is 100 times
            divu a1x,mxfl
            ld mx1,a1x
            shr a1x,#1
            ld mx2,a1x
            pop a2x
            pop a1x
            mulu a1x,mx1
            divu a1x,#22000
            st a1x,st2
            ret
;////////////////////////////////////////
;ad and communication mode
BT02:          lcall sad7
               jbs fnflag1,6,bt2
               jbc flag,4,bt2
start:     lcall keysb
           shrb a2l,#4
           cmpb a2l,#0
           je stq1
           andb intmas,#0fdh
           ljmp mast
STQ1:          lcall key1
               jbc flag,5,bt6
BT1:           lcall er1
               LCALL KEY1
```

```
                JBC KEYFLAGH,5,BT02
                LJMP STOP0
BT6:            JBC KEYFLAGH,5,BT5
                LJMP STOP0

star:          LDB dsp4,#11h
               LDB dsp3,#12
               LDB dsp2,#0
               LDB dsp1,#18    ;DISPLAY LOCK
               LCALL DISPLA
               LCALL DEL0.5
               clr keyflag
               lcall key1
               jbs keyflagh,6,star
               ljmp mai1
BT3:            JBC KEYFLAGH,6,START
                JBS FNFLAGL,7,STAR
                ANDB KEYFLAGH,#0DFH
                LDB FLAG,#2H
                SJMP BT4
BT2:            JBC KEYFLAGH,7,bt3
                ANDB KEYFLAGH,#7FH
                LDB FLAG,#3H
BT4:
                andb flag,#0cfh
BT5:            lcall er1
                lcall sad7
                cmp fgiven,#190
                jnh bt10
                CMP MXFL,FN1
                JE BT10
                JH BT10
BT7:            CMP MXFL,FGIVEN
                JE BT10
                JH BT10
                ORB FLAG,#04H
                ANDB FLAG,#0F7H
                SUB A1X,FGIVEN,MXFL
                CMP A1X,#100
                JNH BT8
                ADD MXFL,#100
BT9:            LCALL CHGFRE
                SJMP BT10
BT8:            ADD MXFL,#10
                SJMP BT9
bt155:          andb flag,#0f3h
                sjmp start
BT10:           cmp  fgiven,#200
                jnh bt11
                CMP MXFL,FGIVEN
                JNH BT155
BT11:           CMP MXFL,#200
                JNH BT14
                ORB FLAG,#08H
                ANDB FLAG,#0FBH
                SUB A1X,MXFL,FGIVEN
```

```
                CMP A1X,#100
                JNH BT12
                SUB MXFL,#100
                SJMP BT13
BT12:           cmp mxfl,#200
                jnh bt13
                SUB MXFL,#10
BT13:           LCALL CHGFRE
                SJMP BT5
BT14:       andb flag,#0efh
            lcall sad7
            jbs flag,5,bt15
            JBC FLAG,4,BT15
            JBS FNFLAGL,3,MSA1
            ld lx,r0
            ld a3x,fn11       ; ?
            shl a3x,#1
Dss1:       ld a1x,st1te      ; ?
A11:         sub a2x,st1te,a1x ; ?
            cmp a2x,#5        ; ?del 5ms    skid delay
            JNH A11           ; ?
            dec a3x
            cmp a3x,#1
            jnh msA1
            lcall sad7
            jbc flag,4,bt15
            sjmp Dss1
MSA1:       andb ramled,#7fh
            stb ramled,led[0]
            LD MXFL,#0
            ld lx,#4
            LCALL DSPA
            ld mxfl,#190
            ORB FLAG,#20H
BT15: SJMP START
;//////////////////////////////////////
gvf:            dw   200 ; fn auto given value
                dw   12000
                dw   200
                dw   200
                dw   1000
                dw   1000
                dw   1000
                dw   200
                dw   200
                dw   500
                dw   500
                dw   50
                dw   800
                dw   0
                dw   0
                dw   0
                dw   0
                dw   0
                dw   0
                dw   0
```

```
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
                dw    0
DPTR1:      DB 3FH
            DB 06H
            DB 5BH
            DB 4FH
            DB 66H
            DB 6DH
            DB 7DH
            DB 07H
            DB 7FH
            DB 6fH
            DB 77H
            DB 7CH
            DB 39H
            DB 5EH
            DB 79H
            DB 71H
            DB 0EH
            DB 70H
            DB 38H
            DB 76H
            DB 73H
            DB 3EH
            DB 54H
            DB 78H
            DB 50H
            DB 00H
            DB 0BFH
            DB 86H
            DB 0DBH
            DB 0CFH
            DB 0E6H
            DB 0EDH
            DB 0FDH
            DB 87H
```

```
        DB 0FFH
        DB 0EFH
        DB 40H
;////////////////////////////
curv:   dw   1056  ;va
        dw   2618  ;vb
        dw   5478  ;vc
        dw   1450  ;fc  curve 1
        dw   1166  ;    curve 2
        dw   2926
        dw   7216
        dw   1925
        dw   1408 ;          curve 3
        dw   3520
        dw   10846
        dw   2925  ;    4
        dw   1584
        dw   3960
        dw   11110
        dw   3000;      5
        dw   1716
        dw   4290
        dw   11110
        dw   3000;      6
        dw   1804
        dw   4510
        dw   11110
        dw   3000;      7
        dw   1298
        dw   3234
        dw   3960
        dw   900;       8
        dw   1452
        dw   3608
        dw   5258
        dw   1200;      9
        dw   1584
        dw   3960
        dw   6864
        dw   1550;      10
        dw   2002
        dw   4994
        dw   13156
        dw   3000
;////////////////////////
tabsin:
        dw     0              ;         1
        dw     523            ;         2
        dw     1045           ;         3
        dw     1564           ;         4
        dw     2079           ;         5
        dw     2588           ;         6
        dw     3090           ;         7
        dw     3583           ;         8
        dw     4067           ;         9
        dw     4539           ;         10
```

```
dw      4999            ;       11
dw      5446            ;       12
dw      5877            ;       13
dw      6293            ;       14
dw      6691            ;       15
dw      7071            ;       16
dw      7431            ;       17
dw      7771            ;       18
dw      8090            ;       19
dw      8386            ;       20
dw      8660            ;       21
dw      8910            ;       22
dw      9135            ;       23
dw      9335            ;       24
dw      9510            ;       25
dw      9659            ;       26
dw      9781            ;       27
dw      9876            ;       28
dw      9945            ;       29
dw      9986            ;       30
dw      9999            ;       31
dw      9986            ;       32
dw      9945            ;       33
dw      9876            ;       34
dw      9781            ;       35
dw      9659            ;       36
dw      9510            ;       37
dw      9335            ;       38
dw      9135            ;       39
dw      8910            ;       40
dw      8660            ;       41
dw      8386            ;       42
dw      8090            ;       43
dw      7771            ;       44
dw      7431            ;       45
dw      7071            ;       46
dw      6691            ;       47
dw      6293            ;       48
dw      5877            ;       49
dw      5446            ;       50
dw      5000            ;       51
dw      4539            ;       52
dw      4067            ;       53
dw      3583            ;       54
dw      3090            ;       55
dw      2588            ;       56
dw      2079            ;       57
dw      1564            ;       58
dw      1045            ;       59
dw      523             ;       60
dw      0               ;       61
dw      523             ;       62
dw      1045            ;       63
dw      1564            ;       64
dw      2079            ;       65
dw      2588            ;       66
```

```
dw      3090            ;       67
dw      3583            ;       68
dw      4067            ;       69
dw      4539            ;       70
dw      4999            ;       71
dw      5446            ;       72
dw      5877            ;       73
dw      6293            ;       74
dw      6691            ;       75
dw      7071            ;       76
dw      7431            ;       77
dw      7771            ;       78
dw      8090            ;       79
dw      8386            ;       80
dw      8660            ;       81
dw      8910            ;       82
dw      9135            ;       83
dw      9335            ;       84
dw      9510            ;       85
dw      9659            ;       86
dw      9781            ;       87
dw      9876            ;       88
dw      9945            ;       89
dw      9986            ;       90
dw      9999            ;       91
dw      9986            ;       92
dw      9945            ;       93
dw      9876            ;       94
dw      9781            ;       95
dw      9659            ;       96
dw      9510            ;       97
dw      9335            ;       98
dw      9135            ;       99
dw      8910            ;       100
dw      8660            ;       101
dw      8386            ;       102
dw      8090            ;       103
dw      7771            ;       104
dw      7431            ;       105
dw      7071            ;       106
dw      6691            ;       107
dw      6293            ;       108
dw      5877            ;       109
dw      5446            ;       110
dw      5000            ;       111
dw      4539            ;       112
dw      4067            ;       113
dw      3583            ;       114
dw      3090            ;       115
dw      2588            ;       116
dw      2079            ;       117
dw      1564            ;       118
dw      1045            ;       119
dw      523             ;       120
dw      0               ;       121
dw      0               ;       122
```

```
END
```