

```
'*****
'*          A FES DEVICE DEVELOPED FOR TREATING DROP FOOT          *
'*          *
'* By       : Aykut YAVUZ                                         *
'* Date    : 13/05/06                                             *
'* Version : 1.0                                                 *
'* Notes   : This program is developed for the designed FES system *
'*          *
'*****

'*****
' ---- Initializing the microcontroller -----
'*****

' ---- Includes / Defines -----

INCLUDE "modedefs.bas" 'Serial mode definitions for controlling the
                        'potetiometer

INCLUDE "INT_CTRL.PBP" 'Standardized subroutines for achieving instant
                        'interrupts. This routine saves the state of the
                        'system variables at the start of the interrupt,
                        'and restore them before exiting the interrupt.

DEFINE OSC 20          'clock oscillator frequency

DEFINE ADC_BITS 8      'Number of bits in ADCIN result
DEFINE ADC_CLOCK 3     'ADC clock source (rc)
DEFINE ADC_SAMPLEUS 10 'ADC sampling time in microseconds

DEFINE LCD_DREG PORTB  'LCD data port
DEFINE LCD_DBIT 4      'LCD data starting bit
DEFINE LCD_RSREG PORTB 'LCD register select port
DEFINE LCD_RSBIT 2     'LCD register select bit
DEFINE LCD_EREG PORTB  'LCD enable port
DEFINE LCD_EBIT 3      'LCD enable bit
DEFINE LCD_BITS 4      'LCD bus size
DEFINE LCD_LINES 2     'Number lines on LCD
DEFINE LCD_COMMANDUS 2000 'Command delay time in us
DEFINE LCD_DATAUS 50   'Data delay time in us

' ---- variables -----

Pulse1 VAR BIT
Pulse2 VAR BIT
Switch VAR BIT
Risi1 VAR BIT
Risi2 VAR BIT
Vfix1 VAR BIT
Vfix2 VAR BIT

Reg1 VAR BYTE
Reg2 VAR BYTE
Press VAR BYTE
Mobil VAR BYTE
Mobi2 VAR BYTE
i VAR BYTE
T1L VAR BYTE
T2L VAR BYTE
Rtime1 VAR BYTE
Rtime2 VAR BYTE
Pulsetime1 VAR BYTE
```

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```
Pulsetime2 VAR BYTE
Ptime1 VAR BYTE
Ptime2 VAR BYTE
Pws1 VAR BYTE
Pws2 VAR BYTE
Fpws1 VAR BYTE
Fpws2 VAR BYTE
Pws1max VAR BYTE
Pws2max VAR BYTE
Pladd VAR BYTE
P2add VAR BYTE
Pwidth VAR BYTE
Ccp VAR BYTE
Prvar VAR BYTE
T1H VAR BYTE
T2H VAR BYTE
Tru1 VAR BYTE
Tru2 VAR BYTE
Trd1 VAR BYTE
Trd2 VAR BYTE
Tfix1 VAR BYTE
Text1 VAR BYTE
Tfix2 VAR BYTE
Text2 VAR BYTE
Tdel2 VAR BYTE
Tdel1 VAR BYTE
Rustep1 VAR BYTE
Rustep2 VAR BYTE
Rdstep1 VAR BYTE
Rdstep2 VAR BYTE
Intervall1 VAR BYTE
Interval2 VAR BYTE
Risil1 VAR BYTE
Risi21 VAR BYTE
CLV1 VAR BYTE
CLV2 VAR BYTE
RES0 VAR BYTE
Swthrs VAR BYTE
Add1 VAR BYTE
Add2 VAR BYTE
ARA VAR BYTE
```

```
GENS VAR WORD
GENSMAX VAR WORD
GENSMIN VAR WORD
```

```
' ----- PORT SELECT -----
```

```
ADCON1 = 14           'Set portA.0 to analog, others to digital I/O
TRISA = %11011111     'Set portA inputs and outputs
TRISC = %00000000     'Set portC to all outputs
TRISB = %00000000     'Set portB to all outputs
```

```
' ----- BUTTON ALIASING -----
```

```
SYMBOL SLCT = PORTA.1
SYMBOL UP = PORTA.4
SYMBOL DOWN = PORTA.3
SYMBOL BACK = PORTA.2
```

```
' ----- HPWM SLCT -----
```

```
PR2 = 99              'SLCT PWM Period for approximately 100KHz
CCPR2L = 0            'SLCT PWM Duty-Cycle
```

---

```

CCP2CON = %00001100      'Select PWM Mode
T2CON = %00000100        'Timer2 = ON + 1:1 presc
CCP=7                     'Duty-Cycle constant

' ----- TIMER SLCT for interrupt-----

PIR1.0=0
PIE1 = %00000001
INTCON = %11000000      'Enable Timer1 interrupt
t1con=%00000000         'Stop the timer
DISABLE INTERRUPT

' ----- POTENTIOMETER SET-----

HIGH porta.5            'Writing to the potentiometer is disabled

'*****
' ----- System Menu -----
'*****

' ----- Options -----

Options:
    GOSUB LCDOPT

Options1:
    IF SLCT = 1 THEN CHANNEL1
    IF DOWN = 1 THEN Start
    GOTO Options1

' ----- Channel 1-----

Channel1:
    GOSUB LCDCH1

Channel11:
    IF SLCT = 1 THEN Statel
    IF BACK = 1 THEN Options
    IF DOWN = 1 THEN Channel2
    GOTO Channel11

' ----- Channel 1/ state-----

Statel:
    GOSUB LCDSTATE

Statel1:
    IF SLCT = 1 THEN StatelOK
    IF BACK = 1 THEN Channel1
    IF DOWN = 1 THEN Adapfix1
    GOTO Statel1

StatelOK:
    GOSUB LCDStateOK

StatelOK1:
    IF UP = 1 THEN ENABLECH1
    IF BACK = 1 THEN Statel
    IF DOWN = 1 THEN DisableCH1
    GOTO StatelOK1

Enablech1:
    GOSUB LCDEN

```

---

```
Enablech11:
  IF SLCT = 1 THEN SetEnable1
  IF BACK = 1 THEN StatelOK
  GOTO Enablech11
```

```
Disablech1:
  GOSUB LCDDIS
```

```
Disablech11:
  IF SLCT = 1 THEN SetDisable1
  IF BACK = 1 THEN StatelOK
  GOTO Disablech11
```

```
' ----- Channel 1/ Duration -----
```

```
Adapfix1:
  GOSUB LCDADFIX
```

```
Adapfix11:
  IF SLCT = 1 THEN Adapfix1OK
  IF BACK = 1 THEN Channell1
  IF UP = 1 THEN Statel
  IF DOWN = 1 THEN waveform
  GOTO Adapfix11
```

```
Adapfix1OK:
  GOSUB LCDADFIXOK
```

```
Adapfix1OK1:
  IF UP = 1 THEN Adap1
  IF BACK = 1 THEN Adapfix1
  IF DOWN = 1 THEN Fix1
  GOTO Adapfix1OK1
```

```
Adap1:
  GOSUB LCDADAP
```

```
Adap11:
  IF SLCT = 1 THEN SetAdap1
  IF BACK = 1 THEN Adapfix1OK
  GOTO Adap11
```

```
Fix1:
  GOSUB LCDFIX
```

```
Fix11:
  IF SLCT = 1 THEN SetFix1
  IF BACK = 1 THEN Adapfix1OK
  GOTO Fix11
```

```
' ----- Channel 1/ Waveform Type -----
```

```
Waveform:
  GOSUB LCDWAVE
```

```
Waveform1:
  IF SLCT = 1 THEN Wave1OK
  IF BACK = 1 THEN Channell1
  IF UP = 1 THEN Adapfix1
  IF DOWN = 1 THEN Model
  GOTO Waveform1
```

```
Wave1OK:
  GOSUB LCDWAVEOK
```

```
Wave1OK1:
```

```
IF UP = 1 THEN Monol
IF BACK = 1 THEN Waveform
IF DOWN = 1 THEN BIP1
GOTO Wave1OK1
```

```
Monol:
  GOSUB LCDMONO
```

```
Monol1:
  IF SLCT = 1 THEN SetMonol
  IF BACK = 1 THEN Wave1OK
  GOTO Monol1
```

```
BIP1:
  GOSUB LCDBIP
```

```
BIP11:
  IF SLCT = 1 THEN SetBip1
  IF BACK = 1 THEN Wave1OK
  GOTO BIP11
```

```
' ----- Channel1/ Stimulation Mode -----
```

```
Model:
  GOSUB LCDMODE
```

```
Model1:
  IF SLCT = 1 THEN ModelOK
  IF BACK = 1 THEN Channel1
  IF UP = 1 THEN waveform
  IF DOWN = 1 THEN PW1
  GOTO Model1
```

```
ModelOK:
  GOSUB LCDMODEOK
```

```
ModelOK1:
  IF UP = 1 THEN Risel
  IF BACK = 1 THEN Model
  IF DOWN = 1 THEN STRIKE1
  GOTO ModelOK1
```

```
Risel:
  GOSUB LCDRISE
```

```
Risel1:
  IF SLCT = 1 THEN SetRisel
  IF BACK = 1 THEN Model
  GOTO Risel1
```

```
Strikel:
  GOSUB LCDSTRIKE
```

```
Strikel1:
  IF SLCT = 1 THEN SetStrikel
  IF BACK = 1 THEN Model
  GOTO strikel1
```

```
' ----- Channel 1/ Pulse width-----
```

```
PW1:
  GOSUB LCDPW
```

```
PW11:
  IF SLCT = 1 THEN PW1OK
  IF BACK = 1 THEN Channel1
```

```

    IF UP = 1 THEN Model
    IF DOWN = 1 THEN Freq1
    GOTO PW11

PW1OK:
    GOSUB LCDPWOK

PW1OK1:
    IF UP = 1 THEN
        READ 8, GENS
        GENS=GENS*5
        GOTO POS1
    ENDIF
    IF BACK = 1 THEN PW1
    IF DOWN = 1 THEN
        READ 9, GENS
        GENS=GENS*5
        GOTO INT1
    ENDIF
    GOTO PW1OK1

POS1:
    GOSUB LCDPOS

POS11:

    IF SLCT = 1 THEN SetPos1
    IF BACK = 1 THEN PW1OK
    IF DOWN = 1 THEN
        GOSUB PWAZ
        GOTO pos1
    ENDIF
    IF UP = 1 THEN
        GOSUB PWART
        GOTO pos1
    ENDIF
    GOTO POS11

INT1:
    GOSUB LCDINT

INT11:

    IF SLCT = 1 THEN SetInt1
    IF BACK = 1 THEN PW1OK
    IF DOWN = 1 THEN
        GOSUB PWAZ
        GOTO INT1
    ENDIF
    IF UP = 1 THEN
        GOSUB PWART
        GOTO INT1
    ENDIF
    GOTO INT11

' ----- Channel 1/ Frequency-----

Freq1:
    GOSUB LCDFREQ
    READ 10, GENS
    GENSMAX = 65
    GENSMIN = 20
    ARA = 5

Freq11:
    IF SLCT = 1 THEN Freq1OK
    IF BACK = 1 THEN Channel1
    IF UP = 1 THEN PW1

```

```
    IF DOWN = 1 THEN Current1
    GOTO Freq11

Freq1OK:
    GOSUB LCDFREQOK

Freq1OK1:
    IF SLCT= 1 THEN SetFreq1
    IF BACK = 1 THEN Freq1
    IF DOWN = 1 THEN
        GOSUB genaz
        GOTO Freq1OK
    ENDIF
    IF UP = 1 THEN
        GOSUB genart
        GOTO Freq1OK
    ENDIF
    GOTO Freq1OK1

' ----- Channel 1/ Current Level -----

Current1:
    GOSUB LCDCURRENT
    READ 11, GENS
    GENSMAX = 101
    GENSMIN = 20
    ARA = 1

Current11:
    IF SLCT = 1 THEN Current1OK
    IF BACK = 1 THEN Channell1
    IF UP = 1 THEN Freq1
    IF DOWN = 1 THEN Ext1
    GOTO Current11

Current1OK:
    GOSUB LCDCURRENTOK

Current1OK1:
    IF SLCT = 1 THEN SetCurrent1
    IF BACK = 1 THEN Current1
    IF DOWN = 1 THEN
        GOSUB genaz
        GOTO Current1OK
    ENDIF
    IF UP = 1 THEN
        GOSUB genart
        GOTO Current1OK
    ENDIF
    GOTO Current1OK1

' ----- Channel 1/ Extention-----

EXT1:
    GOSUB LCDEXT
    READ 12, GENS
    GENS = GENS * 100
    GENSMAX = 2100
    GENSMIN = 0
    ARA = 100

EXT11:
    IF SLCT = 1 THEN EXT1OK
    IF BACK = 1 THEN Channell1
    IF UP = 1 THEN Current1
    IF DOWN = 1 THEN Rising1
```

```

        GOTO EXT11

EXT10K:
        GOSUB LCDEXTOK

EXT10K1:
        IF SLCT = 1 THEN SetExt1
        IF BACK = 1 THEN Ext1
        IF DOWN = 1 THEN
                GOSUB Genaz
                GOTO EXT10K
        ENDIF
        IF UP = 1 THEN
                GOSUB Genart
                GOTO EXT10K
        ENDIF
        GOTO EXT10K1

' ----- Channel 1/ Rising Ramp Time-----

Rising1:
        GOSUB LCDRISING
        READ 13, GENS
        GENS = GENS * 100
        GENSMAX = 4100
        GENSMIN = 0
        ARA = 100

Rising11:
        IF SLCT = 1 THEN Rising1OK
        IF BACK = 1 THEN Channell1
        IF UP = 1 THEN EXT1
        IF DOWN = 1 THEN Fall11
        GOTO Rising11

Rising1OK:
        GOSUB LCDRISINGOK

Rising1OK1:
        IF SLCT = 1 THEN SetRising1
        IF BACK = 1 THEN Rising1
        IF DOWN = 1 THEN
                GOSUB Genaz
                GOTO Rising1OK
        ENDIF
        IF UP = 1 THEN
                GOSUB Genart
                GOTO Rising1OK
        ENDIF
        GOTO Rising1OK1

' ----- Channel 1/ Falling Ramp Time-----

Fall11:
        GOSUB LCDFALL
        READ 14, GENS
        GENS = GENS * 100
        GENSMAX = 4100
        GENSMIN = 0
        ARA = 100

Fall111:

        IF SLCT = 1 THEN Fall11OK
        IF BACK = 1 THEN Channell1
        IF UP = 1 THEN Rising1

```



```

    IF DOWN = 1 THEN Fixed1
    GOTO Fall11

Fall10K:
    GOSUB LCDFALLOK

Fall10K1:
    IF SLCT = 1 THEN SetFall1
    IF BACK = 1 THEN Fall1
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Fall10K
    ENDIF
    IF UP = 1 THEN
        GOSUB Genart
        GOTO Fall10K
    ENDIF
    GOTO Fall10K1

' ----- Channel 1/ Fixed Time-----

Fixed1:
    GOSUB LCDFIXT
    READ 15, GENS
    GENS = GENS * 100
    GENSMAX = 6100
    GENSMIN = 0
    ARA = 100

Fixed11:
    IF SLCT = 1 THEN Fixed1OK
    IF BACK = 1 THEN Channell
    IF DOWN = 1 THEN delay1
    IF UP = 1 THEN Fall1
    GOTO Fixed11

Fixed1OK:
    GOSUB LCDFIXTOK

Fixed1OK1:
    IF SLCT = 1 THEN SetFixed1
    IF BACK = 1 THEN Fixed1
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Fixed1OK
    ENDIF
    IF UP = 1 THEN
        GOSUB Genart
        GOTO Fixed1OK
    ENDIF
    GOTO Fixed1OK1

' ----- Channel 1/ Delay Time-----

Delay1:
    GOSUB LCDDELAY
    READ 16, GENS
    GENS = GENS * 100
    GENSMAX = 2100
    GENSMIN = 0
    ARA = 100

Delay11:
    IF SLCT = 1 THEN Delay1OK
    IF BACK = 1 THEN Channell
    IF UP = 1 THEN Fixed1
```

```
        GOTO Delay11

Delay1OK:
    GOSUB LCDDELAYOK

Delay1OK1:

    IF SLCT = 1 THEN SetDelay1
    IF BACK = 1 THEN Delay1
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Delay1OK
    ENDIF
    IF UP = 1 THEN
        GOSUB Genart
        GOTO Delay1OK
    ENDIF
    GOTO Delay1OK1

' ----- Channel 2 -----

Channel2:
    GOSUB LCDCH2

Channel21:
    IF SLCT = 1 THEN State2
    IF BACK = 1 THEN Options
    IF UP = 1 THEN channel1
    IF DOWN = 1 THEN Reset
    GOTO Channel21

' ----- Channel 2/ state-----

State2:
    GOSUB LCDSTATE

State21:
    IF SLCT = 1 THEN State2OK
    IF BACK = 1 THEN Channel2
    IF DOWN = 1 THEN Adapfix2
    GOTO State21

State2OK:
    GOSUB LCDStateOK

State2OK1:
    IF UP = 1 THEN ENABLECH2
    IF BACK = 1 THEN State2
    IF DOWN = 1 THEN DISABLECH2
    GOTO State2OK1

Enablech2:
    GOSUB LCDEN

Enablech21:
    IF SLCT = 1 THEN SetEnable2
    IF BACK = 1 THEN State2OK
    GOTO Enablech21

Disablech2:
    GOSUB LCDDIS

Disablech21:
    IF SLCT = 1 THEN SetDisable2
    IF BACK = 1 THEN State2OK
```

```
      GOTO Disablech21

' ----- Channel 2/ Duration-----

Adapfix2:
  GOSUB LCDADFIX

Adapfix21:
  IF SLCT = 1 THEN Adapfix2OK
  IF BACK = 1 THEN Channel2
  IF UP = 1 THEN State2
  IF DOWN = 1 THEN waveform2
  GOTO Adapfix21

Adapfix2OK:
  GOSUB LCDADFIXOK

Adapfix2OK1:
  IF UP = 1 THEN Adap2
  IF BACK = 1 THEN Adapfix2
  IF DOWN = 1 THEN Fix2
  GOTO Adapfix2OK1

Adap2:
  GOSUB LCDADAP

Adap21:
  IF SLCT = 1 THEN SetAdap2
  IF BACK = 1 THEN Adapfix2OK
  GOTO Adap21

Fix2:
  GOSUB LCDFIX

Fix21:
  IF SLCT = 1 THEN SetFix2
  IF BACK = 1 THEN Adapfix2OK
  GOTO Fix21

' ----- Channel 2/ Waveform Type -----

Waveform2:
  GOSUB LCDWAVE

Waveform21:
  IF SLCT = 1 THEN Wave2OK
  IF BACK = 1 THEN Channel2
  IF UP = 1 THEN Adapfix2
  IF DOWN = 1 THEN Mode2
  GOTO Waveform21

Wave2OK:
  GOSUB LCDWAVEOK

Wave2OK1:
  IF UP = 1 THEN Mono2
  IF BACK = 1 THEN Waveform2
  IF DOWN = 1 THEN BIP2
  GOTO Wave2OK1

Mono2:
  GOSUB LCDMONO

Mono21:
  IF SLCT = 1 THEN Setmono2
  IF BACK = 1 THEN Wave2OK
```

```

        GOTO Mono21

BIP2:
    GOSUB LCDBIP

BIP21:
    IF SLCT = 1 THEN Setbip2
    IF BACK = 1 THEN Wave2OK
    GOTO BIP21

' ----- Channel2/ Stimulation Mode-----

Mode2:
    GOSUB LCDMODE

Mode21:
    IF SLCT = 1 THEN Mode2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN waveform2
    IF DOWN = 1 THEN PW2
    GOTO Mode21

Mode2OK:
    GOSUB LCDMODEOK

Mode2OK1:
    IF UP = 1 THEN Rise2
    IF BACK = 1 THEN Mode2
    IF DOWN = 1 THEN STRIKE2
    GOTO Mode2OK1

Rise2:
    GOSUB LCDRISE

Rise21:
    IF SLCT = 1 THEN Setrise2
    IF BACK = 1 THEN Mode2
    GOTO Rise21

Strike2:
    GOSUB LCDSTRIKE

Strike21:
    IF SLCT = 1 THEN Setstrike2
    IF BACK = 1 THEN Mode2
    GOTO strike21

' ----- Channel 2/ Pulse width-----

PW2:
    GOSUB LCDPW

PW21:
    IF SLCT = 1 THEN PW2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN Mode2
    IF DOWN = 1 THEN Freq2
    GOTO PW21

PW2OK:
    GOSUB LCDPWOK

PW2OK1:
    IF UP = 1 THEN
        READ 21, GENS
        GENS=GENS*5

```

```

                                GOTO POS2
ENDIF
IF BACK = 1 THEN PW2
IF DOWN = 1 THEN
    READ 22, GENS
    GENS=GENS*5
    GOTO INT2
ENDIF
GOTO PW2OK1

POS2:
    GOSUB LCDPOS

POS21:
    IF SLCT = 1 THEN SETPOS2
    IF BACK = 1 THEN PW2OK
    IF DOWN = 1 THEN
        GOSUB PWAZ
        GOTO pos2
    ENDIF
    IF UP = 1 THEN
        GOSUB PWART
        GOTO pos2
    ENDIF
    GOTO POS21

INT2:
    GOSUB LCDINT

INT21:
    IF SLCT = 1 THEN SETINT2
    IF BACK = 1 THEN PW2OK
    IF DOWN = 1 THEN
        GOSUB PWAZ
        GOTO int2
    ENDIF
    IF UP = 1 THEN
        GOSUB PWART
        GOTO int2
    ENDIF
    GOTO INT21

' ----- Channel 2/ Frequency-----

Freq2:
    GOSUB LCDFREQ
    READ 23, GENS
    GENSMAX = 65
    GENSMIN = 20
    ARA = 5

Freq21:
    IF SLCT = 1 THEN Freq2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN PW2
    IF DOWN = 1 THEN Current2
    GOTO Freq21

Freq2OK:
    GOSUB LCDFREQOK

Freq2OK1:
    IF SLCT = 1 THEN SETFreq2
    IF BACK = 1 THEN Freq2
    IF DOWN = 1 THEN
        GOSUB genaz
```

---

```
                GOTO Freq2OK
ENDIF
IF UP = 1 THEN
    GOSUB genart
    GOTO Freq2OK
ENDIF
GOTO Freq2OK1

' ----- Channel 2/ Current Level-----

Current2:
    GOSUB LCDCURRENT
    READ 24, GENS
    GENSMAX = 101
    GENSMIN = 20
    ARA = 1

Current21:
    IF SLCT = 1 THEN Current2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN Freq2
    IF DOWN = 1 THEN Ext2
    GOTO Current21

Current2OK:
    GOSUB LCDCURRENTOK

Current2OK1:
    IF SLCT = 1 THEN SETCurrent2
    IF BACK = 1 THEN Current2
    IF DOWN = 1 THEN
        GOSUB GENAZ
        GOTO Current2OK
    ENDIF
    IF UP = 1 THEN
        GOSUB GENART
        GOTO Current2OK
    ENDIF
    GOTO Current2OK1

' ----- Channel 2/ Extention-----

EXT2:
    GOSUB LCDEXT
    READ 25, GENS
    GENS = GENS * 100
    GENSMAX = 2100
    GENSMIN = 0
    ARA = 100

EXT21:
    IF SLCT = 1 THEN EXT2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN Current2
    IF DOWN = 1 THEN Rising2
    GOTO EXT21

EXT2OK:
    GOSUB LCDEXTOK

EXT2OK1:
    IF SLCT = 1 THEN setExt2
    IF BACK = 1 THEN Ext2
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO EXT2OK
```

---

```
ENDIF
IF UP = 1 THEN
    GOSUB Genart
    GOTO EXT2OK
ENDIF
GOTO EXT2OK1
```

*' ----- Channel 2/ Rising Ramp Time-----*

```
Rising2:
    GOSUB LCDRISING
    READ 26, GENS
    GENS = GENS * 100
    GENSMAX = 4100
    GENSMIN = 0
    ARA = 100
```

```
Rising21:
    IF SLCT = 1 THEN Rising2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN EXT2
    IF DOWN = 1 THEN Fall2
    GOTO Rising21
```

```
Rising2OK:
    GOSUB LCDRISINGOK
```

```
Rising2OK1:
    IF SLCT = 1 THEN SETRising2
    IF BACK = 1 THEN Rising2
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Rising2OK
    ENDIF
    IF UP = 1 THEN
        GOSUB Genart
        GOTO Rising2OK
    ENDIF
    GOTO Rising2OK1
```

*' ----- Channel 2/ Falling Ramp Time-----*

```
Fall2:
    GOSUB LCDFALL
    READ 27, GENS
    GENS = GENS * 100
    GENSMAX = 4100
    GENSMIN = 0
    ARA = 100
```

```
Fall21:
    IF SLCT = 1 THEN Fall2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN Rising2
    IF DOWN = 1 THEN Fixed2
    GOTO Fall21
```

```
Fall2OK:
    GOSUB LCDFALLOK
```

```
Fall2OK1:
    IF SLCT = 1 THEN SETFall2
    IF BACK = 1 THEN Fall2
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Fall2OK
    ENDIF
```

```
ENDIF
IF UP = 1 THEN
    GOSUB Genart
    GOTO Fall2OK
ENDIF
GOTO Fall2OK1
```

*' ----- Channel 2/ Fixed Time-----*

```
Fixed2:
    GOSUB LCDFIXT
    READ 28, GENS
    GENS = GENS * 100
    GENSMAX = 6100
    GENSMIN = 0
    ARA = 100
```

```
Fixed21:
    IF SLCT = 1 THEN Fixed2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN Fall2
    IF DOWN = 1 THEN Delay2
    GOTO Fixed21
```

```
Fixed2OK:
    GOSUB LCDFIXTOK
```

```
Fixed2OK1:
    IF SLCT = 1 THEN setFixed2
    IF BACK = 1 THEN Fixed2
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Fixed2OK
    ENDIF
    IF UP = 1 THEN
        GOSUB Genart
        GOTO Fixed2OK
    ENDIF
    GOTO Fixed2OK1
```

*' ----- Channel 2/ Delay Time-----*

```
Delay2:
    GOSUB LCDDELAY
    READ 29, GENS
    GENS = GENS * 100
    GENSMAX = 2100
    GENSMIN = 0
    ARA = 100
```

```
Delay21:
    IF SLCT = 1 THEN Delay2OK
    IF BACK = 1 THEN Channel2
    IF UP = 1 THEN Fixed2
    GOTO Delay21
```

```
Delay2OK:
    GOSUB LCDDELAYOK
```

```
Delay2OK1:
    IF SLCT = 1 THEN setDelay2
    IF BACK = 1 THEN Delay2
    IF DOWN = 1 THEN
        GOSUB Genaz
        GOTO Delay2OK
    ENDIF
```



```
        IF UP = 1 THEN
            GOSUB Genart
            GOTO Delay2OK
        ENDIF
        GOTO Delay2OK1

' ----- Reset-----

Reset:
    GOSUB LCDRES

Reset1:
    IF SLCT = 1 THEN ResetOK
    IF BACK = 1 THEN Options
    IF UP = 1 THEN Channel2
    GOTO Reset1

ResetOK:
    GOSUB LCDRESOK

ResetOK1:
    IF SLCT = 1 THEN SETReset
    IF BACK = 1 THEN Reset
    GOTO ResetOK1

' ----- Start-----

Start:
    GOSUB LCDSTART

Start1:
    IF SLCT = 1 THEN StartOK
    IF UP = 1 THEN Options
    GOTO Start1

'*****
' ----- Memory Writes-----
'*****

SetEnable1:
    WRITE 4, 1
    GOSUB Saved
    GOTO Adapfix1

SetDisable1:
    WRITE 4, 0
    GOSUB Saved
    GOTO Adapfix1

SetAdap1:
    WRITE 5, 0
    GOSUB Saved
    GOTO waveform

SetFix1:
    WRITE 5, 1
    GOSUB Saved
    GOTO waveform

SetMonol:
    WRITE 6, 0
    GOSUB Saved
    GOTO Model

SetBip1:
    WRITE 6, 1
```

```
      GOSUB Saved
      GOTO Model

SetRise1:
      WRITE 7, 0
      GOSUB Saved
      GOTO PW1

SetStrike1:
      WRITE 7, 1
      GOSUB Saved
      GOTO PW1

SetPos1:
      GENS=GENS/5
      WRITE 8, GENS
      GOSUB Saved
      GOTO PW1OK

SetInt1:
      GENS=GENS/5
      WRITE 9, GENS
      GOSUB Saved
      GOTO PW1OK

SetFreq1:
      WRITE 10, GENS
      GOSUB Saved
      GOTO Current1

SetCurrent1:
      WRITE 11, GENS
      RES0 = 17
      GOSUB SaveCLV
      GOSUB saved
      GOTO Ext1

SetExt1:
      GENS = GENS/100
      WRITE 12, GENS
      GOSUB Saved
      GOTO Rising1

SetRising1:
      GENS = GENS/100
      WRITE 13, GENS
      GOSUB Saved
      GOTO Fall1

SetFall1:
      GENS = GENS/100
      WRITE 14, GENS
      GOSUB Saved
      GOTO Fixed1

SetFixed1:
      GENS = GENS/100
      WRITE 15, GENS
      GOSUB Saved
      GOTO delay1

SetDelay1:
      GENS = GENS/100
      WRITE 16, GENS
      GOSUB Saved
      GOTO State1
```

```
SetEnable2:
    WRITE 17, 1
    GOSUB Saved
    GOTO Adapfix2

SetDisable2:
    WRITE 17, 0
    GOSUB Saved
    GOTO Adapfix2

SetAdap2:
    WRITE 18, 0
    GOSUB Saved
    GOTO waveform2

SetFix2:
    WRITE 18, 1
    GOSUB Saved
    GOTO waveform2

SetMono2:
    WRITE 19, 0
    GOSUB Saved
    GOTO Mode2

SetBip2:
    WRITE 19, 1
    GOSUB Saved
    GOTO Mode2

SetRise2:
    WRITE 20, 0
    GOSUB Saved
    GOTO PW2

SetStrike2:
    WRITE 20, 1
    GOSUB Saved
    GOTO PW2

SetPos2:
    GENS=GENS/5
    WRITE 21, GENS
    GOSUB Saved
    GOTO PW2OK

SetInt2:
    GENS=GENS/5
    WRITE 22, GENS
    GOSUB Saved
    GOTO PW2OK

SetFreq2:
    WRITE 23, GENS
    GOSUB Saved
    GOTO Current2

SetCurrent2:
    WRITE 24, GENS
    RES0 = 18
    GOSUB SaveCLV
    GOSUB Saved
    GOTO Ext2

SetExt2:
```

```
    GENS = GENS/100
    WRITE 25, GENS
    GOSUB Saved
    GOTO Rising2

SetRising2:
    GENS = GENS/100
    WRITE 26, GENS
    GOSUB Saved
    GOTO Fall2

SetFall2:
    GENS = GENS/100
    WRITE 27, GENS
    GOSUB Saved
    GOTO Fixed2

SetFixed2:
    GENS = GENS/100
    WRITE 28, GENS
    GOSUB Saved
    GOTO Delay2

SetDelay2:
    GENS = GENS/100
    WRITE 29, GENS
    GOSUB Saved
    GOTO State2

SetReset:
    WRITE 4, 1      ' Enable (CH1)
    WRITE 5, 0      ' Adaptive timing (CH1)
    WRITE 6, 1      ' Biphasic signal(CH1)
    WRITE 7, 0      ' Stimulation starts on heel rise (CH1)
    WRITE 8, 20     ' Pulsewidth = 100 us (CH1)
    WRITE 9, 10     ' Pulse interval = 50 us (CH1)
    WRITE 10, 40    ' Frequency = 40 Hz (CH1)
    WRITE 11, 30    ' Current Level = 30 mA (CH1)
    WRITE 12, 5     ' Extention Time = 500 ms (CH1)
    WRITE 13, 10    ' Rising Ramp Time = 1 s (CH1)
    WRITE 14, 10    ' Falling Ramp Time = 1 s (CH1)
    WRITE 15, 30    ' Fixed Time = 3 s (CH1)
    WRITE 16, 0     ' Delay Time = 0 (CH1)

    WRITE 17, 1     ' Enable (CH2)
    WRITE 18, 0     ' Adaptive timing (CH2)
    WRITE 19, 1     ' Biphasic signal (CH2)
    WRITE 20, 0     ' Stimulation starts on heel rise (CH2)
    WRITE 21, 20    ' Pulsewidth = 100 us (CH2)
    WRITE 22, 10    ' Pulse interval = 50 us (CH2)
    WRITE 23, 40    ' Frequency = 40 Hz (CH2)
    WRITE 24, 30    ' Current Level = 30 mA (CH2)
    WRITE 25, 5     ' Extention Time = 500 ms (CH2)
    WRITE 26, 10    ' Rising Ramp Time = 1 s (CH2)
    WRITE 27, 10    ' Falling Ramp Time = 1 s (CH2)
    WRITE 28, 30    ' Fixed Time = 3 s (CH2)
    WRITE 29, 0     ' Delay Time = 0 (CH2)

    GOSUB saved
    GOTO Reset

' *****
' ----- SUB PROGRAMS-----
' *****
```

```
saveCLV:
  LOW porta.5
  SHIFTOUT portc.3, portc.0, MSBFIRST, [RES0]
  SHIFTOUT portc.3, portc.0, MSBFIRST, [GENS]
  HIGH porta.5
  RETURN

Genart:
  GENS = GENS + ARA
  IF GENS >= GENSMAX THEN
    GENS = GENSMIN
  ENDIF
  RETURN

Genaz:
  IF GENS = GENSMIN THEN
    GENS = GENSMAX
  ENDIF
  GENS = GENS - ARA
  RETURN

PWAZ:
  IF GENS<15 THEN
    GENS = 355
  ENDIF
  GENS = GENS - 5
  RETURN

PWART:
  GENS = GENS + 5
  IF GENS>350 THEN
    GENS = 0
  ENDIF
  RETURN

'*****
' ---- LCD SUBROUTINES-----
'*****

Saved:
  GOSUB LCDCLEAR
  LCDOUT "Saved"
  GOSUB PAUSESUB
  RETURN

LCDOPT:
  GOSUB LCDCLEAR
  LCDOUT "OPTIONS"
  GOSUB PAUSESUB
  RETURN

LCDCH1:
  GOSUB LCDCLEAR
  LCDOUT "CHANNEL 1"
  GOSUB PAUSESUB
  RETURN

LCDCH2:
  GOSUB LCDCLEAR
  LCDOUT "CHANNEL 2"
  GOSUB PAUSESUB
  RETURN
```

```
LCDRES:
    GOSUB LCDCLEAR
    LCDOUT "RESET"
    GOSUB PAUSESUB
    RETURN

LCDRESOK:
    GOSUB LCDCLEAR
    LCDOUT "<Yes  Reset All"
    GOSUB LINE2
    LCDOUT "<No    Values?"
    GOSUB PAUSESUB
    RETURN

LCDSTART:
    GOSUB LCDCLEAR
    LCDOUT "START"
    GOSUB PAUSESUB
    RETURN

LCDSTARTOK:
    GOSUB LCDCLEAR
    LCDOUT "PRESS 'BACK'"
    GOSUB LINE2
    LCDOUT "  TO STOP"
    GOSUB PAUSESUB
    RETURN

LCDADFIX:
    GOSUB LCDCLEAR
    LCDOUT "CHANNEL DURATION"
    GOSUB PAUSESUB
    RETURN

LCDADFIXOK:
    GOSUB LCDCLEAR
    LCDOUT "SELECT      Ad.>"
    GOSUB LINE2
    LCDOUT "TYPE        Fix.>"
    GOSUB PAUSESUB
    RETURN

LCDADAP:
    GOSUB LCDCLEAR
    LCDOUT "Set Adaptive"
    GOSUB LINE2
    LCDOUT "  Timing?"
    GOSUB PAUSESUB
    RETURN

LCDFIX:
    GOSUB LCDCLEAR
    LCDOUT "Set Fixed"
    GOSUB LINE2
    LCDOUT "  Timing?"
    GOSUB PAUSESUB
    RETURN

LCDSTATE:
    GOSUB LCDCLEAR
    LCDOUT "CHANNEL STATE"
    GOSUB PAUSESUB
    RETURN

LCDSTATEOK:
    GOSUB LCDCLEAR
```

```
LCDOUT " SELECT      En.>"
GOSUB LINE2
LCDOUT "CH. STATE  Dis.>"
GOSUB PAUSESUB
RETURN
```

```
LCDEN:
GOSUB LCDCLEAR
LCDOUT "Enable Channel?"
GOSUB PAUSESUB
RETURN
```

```
LCDDIS:
GOSUB LCDCLEAR
LCDOUT "Disable Channel?"
GOSUB PAUSESUB
RETURN
```

```
LCDWAVE:
GOSUB LCDCLEAR
LCDOUT " WAVEFORM TYPE"
GOSUB PAUSESUB
RETURN
```

```
LCDWAVEOK:
GOSUB LCDCLEAR
LCDOUT " SELECT      Mono.>"
GOSUB LINE2
LCDOUT "WAVEFORM      Bip.>"
GOSUB PAUSESUB
RETURN
```

```
LCDMONO:
GOSUB LCDCLEAR
LCDOUT "Monophasic"
GOSUB LINE2
LCDOUT "Waveform?"
GOSUB PAUSESUB
RETURN
```

```
LCDBIP:
GOSUB LCDCLEAR
LCDOUT "Biphasic"
GOSUB LINE2
LCDOUT "Waveform?"
GOSUB PAUSESUB
RETURN
```

```
LCDMODE:
GOSUB LCDCLEAR
LCDOUT "STIMULATION MODE"
GOSUB PAUSESUB
RETURN
```

```
LCDMODEOK:
GOSUB LCDCLEAR
LCDOUT " SELECT      Rise>"
GOSUB LINE2
LCDOUT "  MODE      Strike>"
GOSUB PAUSESUB
RETURN
```

```
LCDSTIM:
GOSUB LCDCLEAR
LCDOUT "Stimulate On"
```

```
GOSUB LINE2
LCDOUT " Heel "
GOSUB PAUSESUB
RETURN

LCDRISE:
GOSUB LCDstim
LCDOUT "Rise?"
GOSUB PAUSESUB
RETURN

LCDSTRIKE:
GOSUB LCDstim
LCDOUT "Strike?"
GOSUB PAUSESUB
RETURN

LCDPW:
GOSUB LCDCLEAR
LCDOUT "PULSE WIDTH"
GOSUB PAUSESUB
RETURN

LCDPWOK:
GOSUB LCDCLEAR
LCDOUT " P.W. Pw.>"
GOSUB LINE2
LCDOUT " SELECT Int.>"
GOSUB PAUSESUB
RETURN

LCDPOS:
GOSUB LCDPW
GOSUB LINE2
GOSUB PULSEREST
RETURN

LCDINT:
GOSUB LCDCLEAR
LCDOUT "PULSE INTERVAL"
GOSUB LINE2
GOSUB PULSEREST
RETURN

LCDFREQ:
GOSUB LCDCLEAR
LCDOUT "FREQUENCY"
GOSUB PAUSESUB
RETURN

LCDFREQOK:
GOSUB LCDFREQ
GOSUB LINE2
LCDOUT " : ", #GENS, " Hz "
GOSUB PAUSESUB
RETURN

LCDCURRENT:
GOSUB LCDCLEAR
LCDOUT "CURRENT LEVEL"
GOSUB PAUSESUB
RETURN

LCDCURRENTOK:
GOSUB LCDCURRENT
GOSUB LINE2
```



```
    LCDOUT "  :", #GENS, " mA"
    GOSUB PAUSESUB
    RETURN

LCDRISING:
    GOSUB LCDCLEAR
    LCDOUT "RISING RAMP"
    GOSUB TIME
    RETURN

LCDRISINGOK:
    GOSUB LCDCLEAR
    LCDOUT "RISING R. TIME"
    GOSUB TIMEREST
    RETURN

LCDFALL:
    GOSUB LCDCLEAR
    LCDOUT "FALLING RAMP"
    GOSUB TIME
    RETURN

LCDFALLOK:
    GOSUB LCDCLEAR
    LCDOUT "FALLING R. TIME"
    GOSUB TIMEREST
    RETURN

LCDEXT:
    GOSUB LCDCLEAR
    LCDOUT "EXTENTION TIME"
    GOSUB PAUSESUB
    RETURN

LCDEXTOK:
    GOSUB LCDEXT
    LCDOUT " TIME"
    GOSUB TIMEREST
    RETURN

LCDFIXT:
    GOSUB LCDCLEAR
    LCDOUT "FIXED TIME"
    GOSUB PAUSESUB
    RETURN

LCDFIXTOK:
    GOSUB LCDFIXT
    GOSUB TIMEREST
    RETURN

LCDDELAY:
    GOSUB LCDCLEAR
    LCDOUT "DELAY TIME"
    GOSUB PAUSESUB
    RETURN

LCDDELAYOK:
    GOSUB LCDDELAY
    GOSUB TIMEREST
    RETURN

PAUSESUB:
    PAUSE 250
    RETURN
```

```
LDCDCLEAR:
    LCDOUT $fe, 1
    LCDOUT $fe, 2
    RETURN

LINE2:
    LCDOUT $fe, $c0
    RETURN

TIME:
    GOSUB LINE2
    LCDOUT "    TIME"
    GOSUB PAUSESUB
    RETURN

TIMEREST:
    GOSUB LINE2
    LCDOUT "    :", #GENS, " mS"
    GOSUB PAUSESUB
    RETURN

PULSEREST:
    LCDOUT "    :", #GENS, " uS"
    GOSUB PAUSESUB
    RETURN

'*****
' ---- Stimulation start ----
'*****

STARTOK:

    GOSUB LCDSTARTOK

    READ 5, Vfix1
    READ 6, Mobil
    READ 7, Risi1
    Risi11 = 1-Risi1

    READ 12, Text1
    READ 13, Tru1
    READ 14, Trd1
    READ 15, Tfix1
    READ 16, Tdel1

    READ 18, Vfix2
    READ 19, Mobi2
    READ 20, Risi2
    Risi21 =1-Risi2

    READ 25, Text2
    READ 26, Tru2
    READ 27, Trd2
    READ 28, Tfix2
    READ 29, Tdel2

    READ 11, GENS
    Add1 = GENS/22 + GENS + 41
    IF GENS <43 THEN
        Add2 = 2*GENS/5 -16
    ENDIF
    GENS=Add1 + Add2
    CLV1 = GENS
```

---

```
RES0 = 17
GOSUB saveclv

READ 24, GENS
Add1 = GENS/22 + GENS
IF GENS > 55 THEN
    Add1 = GENS/11 + Add1 - 3
ENDIF
GENS = 11*GENS/26 + Add1 + 12
CLV2 = GENS
RES0 = 18
GOSUB saveclv

READ 10, ptime1
ptime1 = 1000/ptime1

READ 23, ptime2
ptime2= 1000/ptime2

READ 9, GENS
Intervall = 2*GENS - GENS/15 - 2

READ 22, GENS
Interval2 = 2*GENS - GENS/15 - 2

READ 8, GENS
pws1max = 2*GENS - GENS/17
pladd = pws1max/5
fpws1 = pws1max//5
Rustep1 = Tru1*20
Rdstep1 = Trd1*20

READ 21, GENS
pws2max = 2*GENS - GENS/17
p2add = pws2max/5
fpws2 = pws2max//5
Rustep2 = Tru2*20
Rdstep2 = Trd2*20

READ 4, i
IF i = 1 THEN
    Reg1 = 0
ELSE
    Reg1 = 255
ENDIF

READ 17, i
IF i = 1 THEN
    Reg2 = 0
ELSE
    Reg2 = 255
ENDIF

LOW portb.1
LOW portb.0
LOW portc.7
LOW portc.6

Swthrs = 150
CCPR2L = ccp
Pulse1 = 0
Pulse2 = 0
i = 0
T1L =0
T1H =0
T2L =0
```

```
T2H =0
prvar=99
tmr1l=51
tmr1h=217
tlcon=%00000001
```

```
ENABLE INTERRUPT
```

```
Loop:
```

```
IF BACK =1 THEN
DISABLE INTERRUPT
tlcon=%00000000
CCPR2L = 0
Pulse2 = 0
Pulse1 = 0
GOTO Start
ENDIF
```

```
' ----- Channel 1 State Control-----
```

```
IF Reg1 = 0 THEN
IF Switch = Ris1 THEN
    Reg1 = 1
    T1H = 0
    T1L = 0
ENDIF
ENDIF
```

```
IF Reg1 = 1 THEN
IF T1H >= Tdel1 THEN
    pws1 = fpws1
    Pulse1 = 1
    T1H = 0
    T1L = 0
    Reg1 = 2
    rtimel=0
    pulsetime1 = 0
ENDIF
ENDIF
```

```
IF Reg1 = 2 THEN
IF T1H >= Tru1 THEN
    PWS1 = PWS1max
    T1H=0
    T1L = 0
IF Vfix1 = 1 THEN
        Reg1 = 8
ELSE
        Reg1 = 4
ENDIF
ENDIF
ENDIF
```

```
IF Reg1 = 4 THEN
IF Switch = Ris11 THEN
    Reg1 = 16
    T1H = 0
    T1L = 0
ENDIF
ENDIF
```

```
IF Reg1 = 8 THEN
IF T1H >= Tfix1 THEN
```

```

                                T1H = 0
                                T1L = 0
                                Reg1 = 16
                                ENDIF
                            ENDIF
IF Reg1 = 16 THEN
    IF T1H >= Text1 THEN
        T1H = 0
        T1L = 0
        Reg1 = 32
        rtime1 = 0
    ENDIF
ENDIF
IF Reg1 = 32 THEN
    IF T1H >= Trd1 THEN
        Pulse1 = 0
        T1H=0
        T1L = 0
        Reg1 = 0
    ENDIF
ENDIF
' ----- Channel 2 State Control-----
IF Reg2 = 0 THEN
    IF Switch = Risi2 THEN
        Reg2 = 1
        T2H = 0
        T2L = 0
    ENDIF
ENDIF
IF Reg2 = 1 THEN
    IF T2H >= Tdel2 THEN
        pws2 = fpws2
        Pulse2 = 1
        T2H = 0
        T2L = 0
        Reg2 = 2
        rtime2=0
        pulsetime2 = 0
    ENDIF
ENDIF
IF Reg2 = 2 THEN
    IF T2H >= Tru2 THEN
        pws2 = pws2max
        T2H = 0
        T2L = 0
        IF Vfix2 = 1 THEN
            Reg2 = 8
        ELSE
            Reg2 = 4
        ENDIF
    ENDIF
ENDIF
IF Reg2 = 4 THEN
    IF Switch =Risi21 THEN
        Reg2 = 16
        T2H = 0
        T2L = 0
    ENDIF
ENDIF
```

```
IF Reg2 = 8 THEN
    IF T2H >= Tfix2 THEN
        T2H = 0
        T2L = 0
        Reg2 = 16
    ENDIF
ENDIF

IF Reg2 = 16 THEN
    IF T2H >= Text2 THEN
        T2H = 0
        T2L = 0
        Reg2 = 32
        rtime2 = 0
    ENDIF
ENDIF

IF Reg2 = 32 THEN
    IF T2H >= Trd2 THEN
        Pulse2 = 0
        T2H=0
        T2L = 0
        Reg2 = 0
    ENDIF
ENDIF

' ----- Intensity Control -----

IF Reg1 = 2 THEN
    IF Rtime1 >= Rustep1 THEN
        pws1 = pws1 + pladd
        rtime1 = 0
    ENDIF
ENDIF

IF Reg2 = 2 THEN
    IF Rtime2 >= Rustep2 THEN
        pws2 = pws2 + p2add
        rtime2 =0
    ENDIF
ENDIF

IF Reg1 = 32 THEN
    IF Rtime1 >= Rdstep1 THEN
        pws1 = pws1 - pladd
        rtime1 =0
    ENDIF
ENDIF

IF Reg2 = 32 THEN
    IF Rtime2 >= Rdstep2 THEN
        pws2 = pws2 - p2add
        rtime2 = 0
    ENDIF
ENDIF

IF T1L >99 THEN
    T1L = t1l-100
    T1H = T1H+1
ENDIF

IF T2L >99 THEN
    T2L = t2l-100
    T2H = T2H+1
```

```
ENDIF

GOTO loop

'*****
' ---- Pulse Generation-----
'*****

Pulses1:
    CCPR2L = 0
    T2CON = %00000000
    IF Pulse1 = 0 THEN exitisr

plp:
    i=0
    HIGH portc.6

plp1:
    i=i+1
    IF i>=pws1 THEN
        i=0
        GOTO pli
    ENDIF
    GOTO plp1

pli:
    LOW portc.6
    IF Mobil = 0 THEN exitisr

pli1:
    i=i+1
    IF i>=Intervall1 THEN
        i=0
        GOTO pln
    ENDIF
    GOTO pli1

pln:
    HIGH portb.0

pln1:
    IF i>=pws1 THEN
        LOW portb.0
        i=0
        GOTO exitisr
    ENDIF
    i=i+1
    GOTO pln1

Pulses2:
    CCPR2L = 0
    T2CON = %00000000
    IF Pulse2 = 0 THEN exitisr

p2p:
    i=0
    HIGH portb.1

p2p1:
    IF i>=pws2 THEN
        i=0
        GOTO p2i
    ENDIF
    i=i+1
    GOTO p2p1
```

```
p2i:
    LOW portb.1
    IF Mobi2 = 0 THEN exitisr

p2i1:
    i=i+1
    IF i>=Interval2 THEN
        i=0
        GOTO p2n
    ENDIF
    GOTO p2i1

p2n:
    HIGH portc.7

p2n1:
    i=i+1
    IF i>=pws2 THEN
        LOW portc.7
        i=0
        GOTO exitisr
    ENDIF
    GOTO p2n1

ExitISR:
    ADCIN 0, Press
    IF Press < Swthrs THEN
        Switch = 1
    ELSE
        Switch = 0
    ENDIF
    CCPR2L = ccp
    T2CON = %000000100
    GOTO INT_RETURN

'*****
'  ----- INTERRUPT ROUTINE -----
'*****

MY_INT_HANDLER:

    tmr1l=51
    tmr1h=217
    PIR1.0=0
    Intcon.7 =1

    T1L = t1L + 2
    T2L = T2L + 2

    rtime1 = rtime1 + 2
    rtime2 = rtime2 + 2

    pulsetime1 = pulsetime1 + 2
    pulsetime2 = pulsetime2 + 2

    IF pulsetime1 >= ptime1 THEN
        pulsetime1 = 0
        GOTO pulses1
    ENDIF
    IF pulsetime2 >= ptime2 THEN
        pulsetime2 = 0
        GOTO pulses2
    ENDIF

    GOTO INT_RETURN
```



**END**