

Filename: sine_pwm_voltage-regulator_32_int_05.02.2009.lst

ROM used: 2939 words (36%)

Largest free fragment is 2048

RAM used: 186 (51%) at main() level

193 (52%) worst case

Stack: 5 worst case (1 in main + 4 for interrupts)

*

0000: MOVLW 08

0001: MOVWF 0A

0002: GOTO 280

0003: NOP

0004: MOVWF 7F

0005: SWAPF 03,W

0006: CLRF 03

0007: MOVWF 21

0008: MOVF 0A,W

0009: MOVWF 20

000A: CLRF 0A

000B: MOVF 04,W

000C: MOVWF 22

000D: MOVF 77,W

000E: MOVWF 23
000F: MOVF 78,W
0010: MOVWF 24
0011: MOVF 79,W
0012: MOVWF 25
0013: MOVF 7A,W
0014: MOVWF 26
0015: MOVF 7B,W
0016: MOVWF 27
0017: BCF 03.7
0018: BCF 03.5
0019: BTFSS 0B.5
001A: GOTO 01D
001B: BTFSC 0B.2
001C: GOTO 030
001D: MOVF 22,W
001E: MOVWF 04
001F: MOVF 23,W
0020: MOVWF 77
0021: MOVF 24,W
0022: MOVWF 78
0023: MOVF 25,W
0024: MOVWF 79
0025: MOVF 26,W
0026: MOVWF 7A

0027: MOVF 27,W

0028: MOVWF 7B

0029: MOVF 20,W

002A: MOVWF 0A

002B: SWAPF 21,W

002C: MOVWF 03

002D: SWAPF 7F,F

002E: SWAPF 7F,W

002F: RETFIE

0030: BSF 0A.3

0031: BCF 0A.4

0032: GOTO 000

..... #include <16F876A.h>

..... ////////// Standard Header file for the PIC16F876A device //////////////////

..... #device PIC16F876A

..... #list

.....

..... #device *=16

..... #device ADC=8

..... #fuses HS,WDT,PUT,BROWNOUT,NOPROTECT,NOLVP,NOCPD

..... #use delay(clock=20000000, RESTART_WDT)

*

0726: MOVLW 31

0727: MOVWF 04

0728: BSF 03.7

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0729: MOVF 00,W
072A: BTFSC 03.2
072B: GOTO 73D
072C: MOVLW 06
072D: MOVWF 78
072E: MOVLW BF
072F: MOVWF 77
0730: CLRWD
0731: DECFSZ 77,F
0732: GOTO 730
0733: DECFSZ 78,F
0734: GOTO 72E
0735: MOVLW 7A
0736: MOVWF 77
0737: DECFSZ 77,F
0738: GOTO 737
0739: GOTO 73A
073A: CLRWD
073B: DECFSZ 00,F
073C: GOTO 72C
073D: BSF 0A.3
073E: BCF 0A.4
073F: GOTO 42D (RETURN)
..... #use fast_io(B)
..... #use fast_io(C)
```

```

.....

..... #define ab_chan    0

..... #define stdby_chan  1

..... #define i_chan     2

..... #define acc_chan   3

..... #define v_chan     4

.....

..... const long sine_wave[32] = {81,162,241,318,392,462,527,588,642,691,733,768,795, // sine
wave constants;

.....          815,827,831,827,815,795,768,733,691,642,588,527,462,

.....          392,318,241,162,81,0};

..... const int volt_sine_ref[32] = {0,5,9,14,18,23,27,31,34,37,40,42,44,46,47,48,48,

.....          48,47,46,44,42,40,37,34,31,27,23,18,14,9,5};

..... //const int delta_v_h[16] = {7,7,6,6,6,5,5,5,4,4,4,3,3,2,2};

..... //const int delta_v_l[16] = {3,3,3,3,3,3,2,2,2,2,1,1,1,0,0};

..... const int delta_corr[32] = {3,6,9,12,15,18,20,23,25,27,28,30,31,31,32,32,32,31,

.....          31,30,28,27,25,23,20,18,15,12,9,6,3,0};

.....

.....

..... int index, sine_pol, inv_mode, stdby_mode, stdby, i, inv_on, inv_off;

..... int low_curr_h, low_curr_l, over_curr, short_curr, high_ab, stdby_go_blink;

..... int low_acc, high_acc, high_t_stop, high_t_blink, low_curr;

..... int low_acc_delay, acc_avg_counter, volt_ref_counter, volt_l_avg_counter,
volt_h_avg_counter;

..... int volt_h, volt_l, volt_h_avg, volt_l_avg, delta;

..... int acc_v, acc_v_avg, volt_a, volt_b, stdby_i, stdby_i_h, stdby_i_l, stdby_i_avg_counter;

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```

..... int volt_ref, volt_ref_avg, curr_h, curr_l, curr_h_avg, curr_l_avg;

..... signed int delta_h_v, delta_l_v, delta_h_ref, delta_l_ref, volt_ref_delta;

..... signed long int level_corr[32];

..... signed int shape_corr[32];

..... long int pwm_pos, pwm_neg;

..... long int volt_h_temp, volt_l_temp, volt_ref_temp, acc_v_temp, over_curr_delay;

..... long int stdby_delay, stdby_go_delay, high_t_delay, curr_h_temp, curr_l_temp,
stdby_i_temp;

..... const long pwm_max=1023;

..... const int curr_l_max=32, short_curr_l=16, ab_max=96, volt_ref_const_h=168,
volt_ref_const_l=87;

..... const int stdby_i_h_max=239, stdby_i_h_min=143, stdby_max=253, stdby_min=2;

..... const int curr_h_max=223, curr_h_min=143, curr_l_min=111, short_curr_h=239;

..... const int acc_max_l=92, acc_max_h=98, acc_min_l=60, acc_min_h=66;

.....

.....

..... #separate

..... void sine_pwm_start(void)                                // Start mode;

..... {

.....     set_pwm1_duty((sine_wave[index]+level_corr[index])>>1);    // positive start
sine half wave;

*

009B: BCF  03.0

009C: RLF  28,W

009D: BSF  03.6

009E: MOVWF 32

009F: INCF 32,W

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00A0: BCF 03.6
00A1: CALL 033
00A2: MOVWF 7A
00A3: BSF 03.6
00A4: MOVF 32,W
00A5: BCF 03.6
00A6: CALL 033
00A7: BSF 03.6
00A8: MOVWF 33
00A9: MOVF 7A,W
00AA: MOVWF 34
00AB: BCF 03.0
00AC: BCF 03.6
00AD: RLF 28,W
00AE: ADDLW A0
00AF: MOVWF 04
00B0: BCF 03.7
00B1: INCF 04,F
00B2: MOVF 00,W
00B3: MOVWF 7A
00B4: DECF 04,F
00B5: MOVF 00,W
00B6: BSF 03.6
00B7: ADDWF 33,W
00B8: MOVWF 35

00B9: MOVF 34,W
00BA: MOVWF 36
00BB: MOVF 7A,W
00BC: BTFSC 03.0
00BD: INCFSZ 7A,W
00BE: ADDWF 36,F
00BF: BCF 03.0
00C0: RRF 36,W
00C1: MOVWF 38
00C2: RRF 35,W
00C3: MOVWF 37
00C4: RRF 38,F
00C5: RRF 37,F
00C6: RRF 38,F
00C7: RRF 37,F
00C8: RRF 38,F
00C9: MOVF 37,W
00CA: BCF 03.6
00CB: MOVWF 15
00CC: BSF 03.6
00CD: RRF 38,F
00CE: RRF 38,W
00CF: ANDLW 30
00D0: MOVWF 77
00D1: BCF 03.6


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00D2: MOVF 17,W
00D3: ANDLW CF
00D4: IORWF 77,W
00D5: MOVWF 17
..... output_high(PIN_C1);           // A=1;
00D6: BSF 07.1
..... output_low(PIN_C0);           // Z=0;
00D7: BCF 07.0
..... output_low(PIN_B1);
00D8: BCF 06.1
..... set_adc_channel(ab_chan);
00D9: MOVLW 00
00DA: MOVWF 78
00DB: MOVF 1F,W
00DC: ANDLW C7
00DD: IORWF 78,W
00DE: MOVWF 1F
..... delay_us(10);
00DF: CLRWD
00E0: MOVLW 10
00E1: MOVWF 77
00E2: DECFSZ 77,F
00E3: GOTO 0E2
..... read_adc(ADC_START_ONLY);
00E4: BSF 1F.2

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```

..... delay_us(20);

00E5: CLRWDT

00E6: MOVLW 20

00E7: MOVWF 77

00E8: DECFSZ 77,F

00E9: GOTO 0E8

00EA: GOTO 0EB

..... volt_a=read_adc(ADC_READ_ONLY);

00EB: BTFSC 1F.2

00EC: GOTO 0EB

00ED: MOVF 1E,W

00EE: MOVWF 47

..... if(volt_a>=ab_max) {

00EF: MOVF 47,W

00F0: SUBLW 5F

00F1: BTFSC 03.0

00F2: GOTO 0F9

..... high_ab++;

00F3: INCF 34,F

..... if(high_ab>8) break;

00F4: MOVF 34,W

00F5: SUBLW 08

00F6: BTFSS 03.0

00F7: GOTO 0F8

..... }

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..... else high_ab=0;

00F8: GOTO 0FA

00F9: CLRF 34

..... output_low(PIN_C3);

00FA: BCF 07.3

..... set_adc_channel(i_chan);

00FB: MOVLW 10

00FC: MOVWF 78

00FD: MOVF 1F,W

00FE: ANDLW C7

00FF: IORWF 78,W

0100: MOVWF 1F

..... delay_us(10);

0101: CLRWD

0102: MOVLW 10

0103: MOVWF 77

0104: DECFSZ 77,F

0105: GOTO 104

..... read_adc(ADC_START_ONLY);

0106: BSF 1F.2

..... delay_us(20);

0107: CLRWD

0108: MOVLW 20

0109: MOVWF 77

010A: DECFSZ 77,F

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010B: GOTO 10A

010C: GOTO 10D

..... curr_h=read_adc(ADC_READ_ONLY);

010D: BTFSC 1F.2

010E: GOTO 10D

010F: MOVF 1E,W

0110: MOVWF 4F

..... if(curr_h>=short_curr_h) {

0111: MOVF 4F,W

0112: SUBLW EE

0113: BTFSC 03.0

0114: GOTO 11B

..... short_curr++;

0115: INCF 33,F

..... if(short_curr>8) break;

0116: MOVF 33,W

0117: SUBLW 08

0118: BTFSS 03.0

0119: GOTO 11A

..... }

..... else {

011A: GOTO 126

..... short_curr=0;

011B: CLRF 33

..... if(curr_h>curr_h_max) over_curr_delay++;

```

```

011C: MOVF 4F,W
011D: SUBLW DF
011E: BTFSC 03.0
011F: GOTO 124
0120: INCF 64,F
0121: BTFSC 03.2
0122: INCF 65,F
.....    else over_curr_delay=0;
0123: GOTO 126
0124: CLRF 65
0125: CLRF 64
.....    }
.....    }
0126: RETLW 00
.....
.....
.....    #separate
.....    void sine_pwm_norm(void)                // Normal mode;
.....    {
.....        switch (sine_pol) {
0127: MOVF 29,W
0128: XORLW 00
0129: BTFSC 03.2
012A: GOTO 12F
012B: XORLW 01

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012C: BTFSC 03.2

012D: GOTO 28D

012E: GOTO 3EC

.....      case 0:                                // negative sine half wave;

.....      set_adc_channel(v_chan);

012F: MOVLW 20

0130: MOVWF 78

0131: MOVF 1F,W

0132: ANDLW C7

0133: IORWF 78,W

0134: MOVWF 1F

.....      delay_us(10);

0135: CLRWD

0136: MOVLW 10

0137: MOVWF 77

0138: DECFSZ 77,F

0139: GOTO 138

.....      read_adc(ADC_START_ONLY);

013A: BSF 1F.2

.....      delay_us(20);

013B: CLRWD

013C: MOVLW 20

013D: MOVWF 77

013E: DECFSZ 77,F

013F: GOTO 13E

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0140: GOTO 141

.....      volt_l=read_adc(ADC_READ_ONLY);

0141: BTFSC 1F.2

0142: GOTO 141

0143: MOVF 1E,W

0144: MOVWF 41

.....      volt_l_temp+=volt_l;

0145: MOVF 41,W

0146: ADDWF 5E,F

0147: BTFSC 03.0

0148: INCF 5F,F

.....      pwm_neg=sine_wave[index] + shape_corr[index] + level_corr[index];

0149: BCF 03.0

014A: RLF 28,W

014B: BSF 03.6

014C: MOVWF 32

014D: INCF 32,W

014E: BCF 03.6

014F: CALL 033

0150: MOVWF 7A

0151: BSF 03.6

0152: MOVF 32,W

0153: BCF 03.6

0154: CALL 033

0155: BSF 03.6
```

0156: MOVWF 33
0157: MOVF 7A,W
0158: MOVWF 34
0159: MOVLW 10
015A: BCF 03.6
015B: ADDWF 28,W
015C: MOVWF 04
015D: BSF 03.7
015E: MOVF 00,W
015F: CLRF 7A
0160: MOVWF 77
0161: BTFSC 77.7
0162: DECF 7A,F
0163: BSF 03.6
0164: ADDWF 33,W
0165: MOVWF 35
0166: MOVF 34,W
0167: MOVWF 36
0168: MOVF 7A,W
0169: BTFSC 03.0
016A: INCF SZ 7A,W
016B: ADDWF 36,F
016C: BCF 03.0
016D: BCF 03.6
016E: RLF 28,W

016F: ADDLW A0

0170: MOVWF 04

0171: BCF 03.7

0172: INCF 04,F

0173: MOVF 00,W

0174: MOVWF 7A

0175: DECF 04,F

0176: MOVF 00,W

0177: BSF 03.6

0178: ADDWF 35,W

0179: MOVWF 78

017A: MOVF 36,W

017B: BTFSC 03.0

017C: INCFSZ 36,W

017D: ADDWF 7A,F

017E: MOVF 78,W

017F: BCF 03.6

0180: MOVWF 5A

0181: MOVF 7A,W

0182: MOVWF 5B

..... if(pwm_neg>pwm_max) pwm_neg=pwm_max;

0183: MOVF 5B,W

0184: SUBLW 03

0185: BTFSC 03.0

0186: GOTO 18B

```
0187: MOVLW 03
0188: MOVWF 5B
0189: MOVLW FF
018A: MOVWF 5A
.....    //if(pwm_neg<0) pwm_neg=0;
.....    set_pwm1_duty(pwm_neg);
018B: MOVF 5B,W
018C: MOVWF 79
018D: MOVF 5A,W
018E: MOVWF 78
018F: RRF 79,F
0190: RRF 78,F
0191: RRF 79,F
0192: RRF 78,F
0193: RRF 79,F
0194: MOVF 78,W
0195: MOVWF 15
0196: RRF 79,F
0197: RRF 79,W
0198: ANDLW 30
0199: MOVWF 77
019A: MOVF 17,W
019B: ANDLW CF
019C: IORWF 77,W
019D: MOVWF 17
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.....      output_low(PIN_C1);                // A=0;

019E: BCF  07.1

.....      output_low(PIN_C0);                // Z=0;

019F: BCF  07.0

.....      output_high(PIN_B1);

01A0: BSF  06.1

.....      //set_pwm2_duty(volt_l);

.....      set_adc_channel(ab_chan);

01A1: MOVLW 00

01A2: MOVWF 78

01A3: MOVF  1F,W

01A4: ANDLW C7

01A5: IORWF 78,W

01A6: MOVWF 1F

.....      delay_us(10);

01A7: CLRWDT

01A8: MOVLW 10

01A9: MOVWF 77

01AA: DECFSZ 77,F

01AB: GOTO  1AA

.....      read_adc(ADC_START_ONLY);

01AC: BSF  1F.2

.....      delay_us(20);

01AD: CLRWDT

01AE: MOVLW 20

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01AF: MOVWF 77

01B0: DECFSZ 77,F

01B1: GOTO 1B0

01B2: GOTO 1B3

.....      volt_b=read_adc(ADC_READ_ONLY);

01B3: BTFSC 1F.2

01B4: GOTO 1B3

01B5: MOVF 1E,W

01B6: MOVWF 48

.....      if(volt_b>=ab_max) {

01B7: MOVF 48,W

01B8: SUBLW 5F

01B9: BTFSC 03.0

01BA: GOTO 1C1

.....      high_ab++;

01BB: INCF 34,F

.....      if(high_ab>4) break;

01BC: MOVF 34,W

01BD: SUBLW 04

01BE: BTFSS 03.0

01BF: GOTO 3EC

.....      }

.....      else high_ab=0;

01C0: GOTO 1C2

01C1: CLRF 34

```

```

.....      output_low(PIN_C3);

01C2: BCF  07.3

.....      set_adc_channel(i_chan);

01C3: MOVLW 10

01C4: MOVWF 78

01C5: MOVF 1F,W

01C6: ANDLW C7

01C7: IORWF 78,W

01C8: MOVWF 1F

.....      delay_us(10);

01C9: CLRWD

01CA: MOVLW 10

01CB: MOVWF 77

01CC: DECFSZ 77,F

01CD: GOTO 1CC

.....      read_adc(ADC_START_ONLY);

01CE: BSF  1F.2

.....      delay_us(20);

01CF: CLRWD

01D0: MOVLW 20

01D1: MOVWF 77

01D2: DECFSZ 77,F

01D3: GOTO 1D2

01D4: GOTO 1D5

.....      curr_l=read_adc(ADC_READ_ONLY);

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01D5: BTFSC 1F.2

01D6: GOTO 1D5

01D7: MOVF 1E,W

01D8: MOVWF 50

.....      if(curr_l<=short_curr_l) {

01D9: MOVF 50,W

01DA: SUBLW 10

01DB: BTFSS 03.0

01DC: GOTO 1E3

.....      short_curr++;

01DD: INCF 33,F

.....      if(short_curr>4) break;

01DE: MOVF 33,W

01DF: SUBLW 04

01E0: BTFSS 03.0

01E1: GOTO 3EC

.....      }

.....      else {

01E2: GOTO 1EE

.....      short_curr=0;

01E3: CLRF 33

.....      if(curr_l<curr_l_max){

01E4: MOVF 50,W

01E5: SUBLW 1F

01E6: BTFSS 03.0

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01E7: GOTO 1EC
.....      over_curr_delay++;

01E8: INCF 64,F

01E9: BTFSC 03.2

01EA: INCF 65,F
.....      //level_corr[index+1]-=delta_corr[index+1];
.....      }
.....      else over_curr_delay=0;

01EB: GOTO 1EE

01EC: CLRF 65

01ED: CLRF 64
.....      }
.....      output_high(PIN_C3);

01EE: BSF 07.3
.....      set_adc_channel(i_chan);

01EF: MOVLW 10

01F0: MOVWF 78

01F1: MOVF 1F,W

01F2: ANDLW C7

01F3: IORWF 78,W

01F4: MOVWF 1F
.....      delay_us(10);

01F5: CLRWD

01F6: MOVLW 10

01F7: MOVWF 77

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01F8: DECFSZ 77,F
01F9: GOTO 1F8
.....      read_adc(ADC_START_ONLY);
01FA: BSF 1F.2
.....      delay_us(20);
01FB: CLRWDT
01FC: MOVLW 20
01FD: MOVWF 77
01FE: DECFSZ 77,F
01FF: GOTO 1FE
0200: GOTO 201
.....      curr_h=read_adc(ADC_READ_ONLY);
0201: BTFSC 1F.2
0202: GOTO 201
0203: MOVF 1E,W
0204: MOVWF 4F
.....      curr_h_temp+=curr_h;
0205: MOVF 4F,W
0206: ADDWF 6C,F
0207: BTFSC 03.0
0208: INCF 6D,F
.....      /*if(index) {
.....          delta_l_v=(127-volt_sine_ref[index])-volt_l;
.....          delta=delta_corr[index-1]>>2;
.....          if(delta_l_v>delta) shape_corr[index-1]--;

```



```

.....      else if(delta_l_v<-delta) shape_corr[index-1]++;

.....      }*/

.....      if(index==31) {
0209: MOVF  28,W
020A: SUBLW 1F
020B: BTFSS 03.2
020C: GOTO  28C

.....      curr_h_avg=curr_h_temp>>5;

020D: RRF   6D,W
020E: MOVWF 7A
020F: RRF   6C,W
0210: MOVWF 79
0211: RRF   7A,F
0212: RRF   79,F
0213: RRF   7A,F
0214: RRF   79,F
0215: RRF   7A,F
0216: RRF   79,F
0217: RRF   7A,F
0218: RRF   79,F
0219: MOVF  79,W
021A: MOVWF 51

.....      if((curr_h_avg<stdby_i_h)&&(!inv_on)) low_curr_l=1;

021B: MOVF  4A,W
021C: SUBWF 51,W

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021D: BTFSC 03.0
021E: GOTO 225
021F: MOVF 2E,F
0220: BTFSS 03.2
0221: GOTO 225
0222: MOVLW 01
0223: MOVWF 31
.....      else low_curr_l=0;
0224: GOTO 226
0225: CLRF 31
.....      volt_l_avg=volt_l_temp>>5;
0226: RRF 5F,W
0227: MOVWF 7A
0228: RRF 5E,W
0229: MOVWF 79
022A: RRF 7A,F
022B: RRF 79,F
022C: RRF 7A,F
022D: RRF 79,F
022E: RRF 7A,F
022F: RRF 79,F
0230: RRF 7A,F
0231: RRF 79,F
0232: MOVF 79,W
0233: MOVWF 43

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.....      delta_l_ref=volt_l_avg-(volt_ref_const_l-volt_ref_delta);

0234: MOVF  57,W

0235: SUBLW 57

0236: SUBWF 43,W

0237: MOVWF 56

.....      if(delta_l_ref>2) for(i=0; i<32; i++) level_corr[i]+=delta_corr[i]>>1;

0238: BTFSC 56.7

0239: GOTO  25E

023A: MOVF  56,W

023B: SUBLW 02

023C: BTFSC 03.0

023D: GOTO  25E

023E: CLRF  2D

023F: MOVF  2D,W

0240: SUBLW 1F

0241: BTFSS 03.0

0242: GOTO  25D

0243: BCF   03.0

0244: RLF   2D,W

0245: ADDLW A0

0246: MOVWF 04

0247: BCF   03.7

0248: MOVF  2D,W

0249: CALL  077

024A: MOVWF 77

```

024B: BCF 03.0
024C: RRF 77,F
024D: MOVF 77,W
024E: ADDWF 00,W
024F: INCF 04,F
0250: MOVWF 78
0251: MOVF 00,W
0252: MOVWF 7A
0253: BTFSC 03.0
0254: INCF 7A,F
0255: DECF 04,F
0256: MOVF 78,W
0257: MOVWF 00
0258: INCF 04,F
0259: MOVF 7A,W
025A: MOVWF 00
025B: INCF 2D,F
025C: GOTO 23F
..... else if(delta_l_ref<-2) for(i=0; i<32; i++) level_corr[i]-=delta_corr[i]>>1;
025D: GOTO 284
025E: MOVF 56,W
025F: XORLW 80
0260: SUBLW 7D
0261: BTFSS 03.0
0262: GOTO 284

0263: CLRF 2D
0264: MOVF 2D,W
0265: SUBLW 1F
0266: BTFSS 03.0
0267: GOTO 284
0268: BCF 03.0
0269: RLF 2D,W
026A: ADDLW A0
026B: MOVWF 04
026C: BCF 03.7
026D: MOVF 2D,W
026E: CALL 077
026F: MOVWF 77
0270: BCF 03.0
0271: RRF 77,F
0272: MOVF 77,W
0273: SUBWF 00,W
0274: MOVWF 77
0275: INCF 04,F
0276: MOVF 00,W
0277: MOVWF 7A
0278: MOVLW 00
0279: BTFSS 03.0
027A: MOVLW 01
027B: SUBWF 7A,F

[illegible]

```

.....      set_adc_channel(v_chan);

028D: MOVLW 20

028E: MOVWF 78

028F: MOVF 1F,W

0290: ANDLW C7

0291: IORWF 78,W

0292: MOVWF 1F

.....      delay_us(10);

0293: CLRWD

0294: MOVLW 10

0295: MOVWF 77

0296: DECFSZ 77,F

0297: GOTO 296

.....      read_adc(ADC_START_ONLY);

0298: BSF 1F.2

.....      delay_us(20);

0299: CLRWD

029A: MOVLW 20

029B: MOVWF 77

029C: DECFSZ 77,F

029D: GOTO 29C

029E: GOTO 29F

.....      volt_h=read_adc(ADC_READ_ONLY);

029F: BTFSC 1F.2

02A0: GOTO 29F

```

```

02A1: MOVF 1E,W
02A2: MOVWF 40
.....      volt_h_temp+=volt_h;
02A3: MOVF 40,W
02A4: ADDWF 5C,F
02A5: BTFSC 03.0
02A6: INCF 5D,F
.....      pwm_pos=sine_wave[index] + shape_corr[index] + level_corr[index];
02A7: BCF 03.0
02A8: RLF 28,W
02A9: BSF 03.6
02AA: MOVWF 32
02AB: INCF 32,W
02AC: BCF 03.6
02AD: CALL 033
02AE: MOVWF 7A
02AF: BSF 03.6
02B0: MOVF 32,W
02B1: BCF 03.6
02B2: CALL 033
02B3: BSF 03.6
02B4: MOVWF 33
02B5: MOVF 7A,W
02B6: MOVWF 34
02B7: MOVLW 10

```


02B8: BCF 03.6
02B9: ADDWF 28,W
02BA: MOVWF 04
02BB: BSF 03.7
02BC: MOVF 00,W
02BD: CLRF 7A
02BE: MOVWF 77
02BF: BTFSC 77.7
02C0: DECF 7A,F
02C1: BSF 03.6
02C2: ADDWF 33,W
02C3: MOVWF 35
02C4: MOVF 34,W
02C5: MOVWF 36
02C6: MOVF 7A,W
02C7: BTFSC 03.0
02C8: INCF SZ 7A,W
02C9: ADDWF 36,F
02CA: BCF 03.0
02CB: BCF 03.6
02CC: RLF 28,W
02CD: ADDLW A0
02CE: MOVWF 04
02CF: BCF 03.7
02D0: INCF 04,F

02D1: MOVF 00,W

02D2: MOVWF 7A

02D3: DECF 04,F

02D4: MOVF 00,W

02D5: BSF 03.6

02D6: ADDWF 35,W

02D7: MOVWF 78

02D8: MOVF 36,W

02D9: BTFSC 03.0

02DA: INCFSZ 36,W

02DB: ADDWF 7A,F

02DC: MOVF 78,W

02DD: BCF 03.6

02DE: MOVWF 58

02DF: MOVF 7A,W

02E0: MOVWF 59

..... if(pwm_pos>pwm_max) pwm_pos=pwm_max;

02E1: MOVF 59,W

02E2: SUBLW 03

02E3: BTFSC 03.0

02E4: GOTO 2E9

02E5: MOVLW 03

02E6: MOVWF 59

02E7: MOVLW FF

02E8: MOVWF 58

```

..... //if(pwm_pos<0) pwm_pos=0;

..... set_pwm1_duty(pwm_pos);

02E9: MOVF 59,W
02EA: MOVWF 79
02EB: MOVF 58,W
02EC: MOVWF 78
02ED: RRF 79,F
02EE: RRF 78,F
02EF: RRF 79,F
02F0: RRF 78,F
02F1: RRF 79,F
02F2: MOVF 78,W
02F3: MOVWF 15
02F4: RRF 79,F
02F5: RRF 79,W
02F6: ANDLW 30
02F7: MOVWF 77
02F8: MOVF 17,W
02F9: ANDLW CF
02FA: IORWF 77,W
02FB: MOVWF 17

..... output_high(PIN_C1); // A=1;

02FC: BSF 07.1

..... output_low(PIN_C0); // Z=0;

02FD: BCF 07.0

```

```

.....      output_low(PIN_B1);

02FE: BCF  06.1

.....      //set_pwm2_duty(volt_h);

.....      set_adc_channel(ab_chan);

02FF: MOVLW 00

0300: MOVWF 78

0301: MOVF  1F,W

0302: ANDLW C7

0303: IORWF 78,W

0304: MOVWF 1F

.....      delay_us(10);

0305: CLRWD

0306: MOVLW 10

0307: MOVWF 77

0308: DECFSZ 77,F

0309: GOTO  308

.....      read_adc(ADC_START_ONLY);

030A: BSF  1F.2

.....      delay_us(20);

030B: CLRWD

030C: MOVLW 20

030D: MOVWF 77

030E: DECFSZ 77,F

030F: GOTO  30E

0310: GOTO  311

```

```
.....      volt_a=read_adc(ADC_READ_ONLY);
```

```
0311: BTFSC 1F.2
```

```
0312: GOTO 311
```

```
0313: MOVF 1E,W
```

```
0314: MOVWF 47
```

```
.....      if(volt_a>=ab_max) {
```

```
0315: MOVF 47,W
```

```
0316: SUBLW 5F
```

```
0317: BTFSC 03.0
```

```
0318: GOTO 31F
```

```
.....      high_ab++;
```

```
0319: INCF 34,F
```

```
.....      if(high_ab>4) break;
```

```
031A: MOVF 34,W
```

```
031B: SUBLW 04
```

```
031C: BTFSS 03.0
```

```
031D: GOTO 3EC
```

```
.....      }
```

```
.....      else high_ab=0;
```

```
031E: GOTO 320
```

```
031F: CLRF 34
```

```
.....      output_low(PIN_C3);
```

```
0320: BCF 07.3
```

```
.....      set_adc_channel(i_chan);
```

```
0321: MOVLW 10
```

```

0322: MOVWF 78

0323: MOVF 1F,W

0324: ANDLW C7

0325: IORWF 78,W

0326: MOVWF 1F

.....      delay_us(10);

0327: CLRWD

0328: MOVLW 10

0329: MOVWF 77

032A: DECFSZ 77,F

032B: GOTO 32A

.....      read_adc(ADC_START_ONLY);

032C: BSF 1F.2

.....      delay_us(20);

032D: CLRWD

032E: MOVLW 20

032F: MOVWF 77

0330: DECFSZ 77,F

0331: GOTO 330

0332: GOTO 333

.....      curr_h=read_adc(ADC_READ_ONLY);

0333: BTFSC 1F.2

0334: GOTO 333

0335: MOVF 1E,W

0336: MOVWF 4F

```

```

.....      if(curr_h>=short_curr_h) {
0337: MOVF  4F,W
0338: SUBLW EE
0339: BTFSC 03.0
033A: GOTO  341

.....      short_curr++;
033B: INCF  33,F

.....      if(short_curr>4) break;
033C: MOVF  33,W
033D: SUBLW 04
033E: BTFSS 03.0
033F: GOTO  3EC

.....      }

.....      else {
0340: GOTO  34C

.....      short_curr=0;
0341: CLRF  33

.....      if(curr_h>curr_h_max) {
0342: MOVF  4F,W
0343: SUBLW DF
0344: BTFSC 03.0
0345: GOTO  34A

.....      over_curr_delay++;
0346: INCF  64,F
0347: BTFSC 03.2

```

```

0348: INCF 65,F
..... //level_corr[index+1]-=delta_corr[index+1];
..... }
..... else over_curr_delay=0;

0349: GOTO 34C

034A: CLRF 65

034B: CLRF 64
..... }
..... output_high(PIN_C3);

034C: BSF 07.3
..... set_adc_channel(i_chan);

034D: MOVLW 10

034E: MOVWF 78

034F: MOVF 1F,W

0350: ANDLW C7

0351: IORWF 78,W

0352: MOVWF 1F
..... delay_us(10);

0353: CLRWD

0354: MOVLW 10

0355: MOVWF 77

0356: DECFSZ 77,F

0357: GOTO 356
..... read_adc(ADC_START_ONLY);

0358: BSF 1F.2

```



```

.....      delay_us(20);

0359: CLRWDT

035A: MOVLW 20

035B: MOVWF 77

035C: DECFSZ 77,F

035D: GOTO 35C

035E: GOTO 35F

.....      curr_l=read_adc(ADC_READ_ONLY);

035F: BTFSC 1F.2

0360: GOTO 35F

0361: MOVF 1E,W

0362: MOVWF 50

.....      curr_l_temp+=curr_l;

0363: MOVF 50,W

0364: ADDWF 6E,F

0365: BTFSC 03.0

0366: INCF 6F,F

.....      /*if(index) {

.....          delta_h_v=(127+volt_sine_ref[index])-volt_h;

.....          delta=delta_corr[index-1]>>2;

.....          if(delta_h_v>delta) shape_corr[index-1]++;

.....          else if(delta_h_v<-delta) shape_corr[index-1]--;

.....      }*/

.....      if(index==31) {

0367: MOVF 28,W

```

0368: SUBLW 1F

0369: BTFSS 03.2

036A: GOTO 3EB

..... curr_l_avg=curr_l_temp>>5;

036B: RRF 6F,W

036C: MOVWF 7A

036D: RRF 6E,W

036E: MOVWF 79

036F: RRF 7A,F

0370: RRF 79,F

0371: RRF 7A,F

0372: RRF 79,F

0373: RRF 7A,F

0374: RRF 79,F

0375: RRF 7A,F

0376: RRF 79,F

0377: MOVF 79,W

0378: MOVWF 52

..... if((curr_l_avg>stdby_i_l)&&(!inv_on)) low_curr_h=1;

0379: MOVF 52,W

037A: SUBWF 4B,W

037B: BTFSC 03.0

037C: GOTO 383

037D: MOVF 2E,F

037E: BTFSS 03.2

```

037F: GOTO 383

0380: MOVLW 01

0381: MOVWF 30

.....      else low_curr_h=0;

0382: GOTO 384

0383: CLRF 30

.....      volt_h_avg=volt_h_temp>>5;

0384: RRF 5D,W

0385: MOVWF 7A

0386: RRF 5C,W

0387: MOVWF 79

0388: RRF 7A,F

0389: RRF 79,F

038A: RRF 7A,F

038B: RRF 79,F

038C: RRF 7A,F

038D: RRF 79,F

038E: RRF 7A,F

038F: RRF 79,F

0390: MOVF 79,W

0391: MOVWF 42

.....      delta_h_ref=(volt_ref_const_h+volt_ref_delta)-volt_h_avg;

0392: MOVLW A8

0393: ADDWF 57,W

0394: MOVWF 78

```

0395: MOVF 42,W

0396: SUBWF 78,W

0397: MOVWF 55

..... if(delta_h_ref>2) for(i=0; i<32; i++) level_corr[i]+=delta_corr[i]>>1;

0398: BTFSC 55.7

0399: GOTO 3BE

039A: MOVF 55,W

039B: SUBLW 02

039C: BTFSC 03.0

039D: GOTO 3BE

039E: CLRF 2D

039F: MOVF 2D,W

03A0: SUBLW 1F

03A1: BTFSS 03.0

03A2: GOTO 3BD

03A3: BCF 03.0

03A4: RLF 2D,W

03A5: ADDLW A0

03A6: MOVWF 04

03A7: BCF 03.7

03A8: MOVF 2D,W

03A9: CALL 077

03AA: MOVWF 77

03AB: BCF 03.0

03AC: RRF 77,F

03AD: MOVF 77,W

03AE: ADDWF 00,W

03AF: INCF 04,F

03B0: MOVWF 78

03B1: MOVF 00,W

03B2: MOVWF 7A

03B3: BTFSC 03.0

03B4: INCF 7A,F

03B5: DECF 04,F

03B6: MOVF 78,W

03B7: MOVWF 00

03B8: INCF 04,F

03B9: MOVF 7A,W

03BA: MOVWF 00

03BB: INCF 2D,F

03BC: GOTO 39F

..... else if(delta_h_ref<-2) for(i=0; i<32; i++) level_corr[i]-=delta_corr[i]>>1;

03BD: GOTO 3E4

03BE: MOVF 55,W

03BF: XORLW 80

03C0: SUBLW 7D

03C1: BTFSS 03.0

03C2: GOTO 3E4

03C3: CLRF 2D

03C4: MOVF 2D,W

03C5: SUBLW 1F
03C6: BTFSS 03.0
03C7: GOTO 3E4
03C8: BCF 03.0
03C9: RLF 2D,W
03CA: ADDLW A0
03CB: MOVWF 04
03CC: BCF 03.7
03CD: MOVF 2D,W
03CE: CALL 077
03CF: MOVWF 77
03D0: BCF 03.0
03D1: RRF 77,F
03D2: MOVF 77,W
03D3: SUBWF 00,W
03D4: MOVWF 77
03D5: INCF 04,F
03D6: MOVF 00,W
03D7: MOVWF 7A
03D8: MOVLW 00
03D9: BTFSS 03.0
03DA: MOVLW 01
03DB: SUBWF 7A,F
03DC: MOVF 77,W
03DD: DECF 04,F

```

03DE: MOVWF 00
03DF: INCF 04,F
03E0: MOVF 7A,W
03E1: MOVWF 00
03E2: INCF 2D,F
03E3: GOTO 3C4
.....      curr_l_temp=0;
03E4: CLRF 6F
03E5: CLRF 6E
.....      volt_h_temp=0;
03E6: CLRF 5D
03E7: CLRF 5C
.....      high_ab=0;
03E8: CLRF 34
.....      short_curr=0;
03E9: CLRF 33
.....      sine_pol=0;
03EA: CLRF 29
.....      }
.....      break;
03EB: GOTO 3EC
.....      }
.....      }
03EC: BSF 0A.3
03ED: BCF 0A.4

```

03EE: GOTO 02C (RETURN)

.....

.....

..... #separate

..... void sine_pwm_stop(void) // Stop mode;

..... {

..... set_pwm1_duty((sine_wave[index]+level_corr[index])>>1); // negative stop
sine half wave;

03EF: BCF 03.0

03F0: RLF 28,W

03F1: BSF 03.6

03F2: MOVWF 32

03F3: INCF 32,W

03F4: BCF 03.6

03F5: CALL 033

03F6: MOVWF 7A

03F7: BSF 03.6

03F8: MOVF 32,W

03F9: BCF 03.6

03FA: CALL 033

03FB: BSF 03.6

03FC: MOVWF 33

03FD: MOVF 7A,W

03FE: MOVWF 34

03FF: BCF 03.0

0400: BCF 03.6

0401: RLF 28,W
0402: ADDLW A0
0403: MOVWF 04
0404: BCF 03.7
0405: INCF 04,F
0406: MOVF 00,W
0407: MOVWF 7A
0408: DECF 04,F
0409: MOVF 00,W
040A: BSF 03.6
040B: ADDWF 33,W
040C: MOVWF 35
040D: MOVF 34,W
040E: MOVWF 36
040F: MOVF 7A,W
0410: BTFSC 03.0
0411: INCFSZ 7A,W
0412: ADDWF 36,F
0413: BCF 03.0
0414: RRF 36,W
0415: MOVWF 38
0416: RRF 35,W
0417: MOVWF 37
0418: RRF 38,F
0419: RRF 37,F

```

041A: RRF  38,F
041B: RRF  37,F
041C: RRF  38,F
041D: MOVF 37,W
041E: BCF  03.6
041F: MOVWF 15
0420: BSF  03.6
0421: RRF  38,F
0422: RRF  38,W
0423: ANDLW 30
0424: MOVWF 77
0425: BCF  03.6
0426: MOVF 17,W
0427: ANDLW CF
0428: IORWF 77,W
0429: MOVWF 17
.....  output_low(PIN_C1);                // A=0;
042A: BCF  07.1
.....  output_low(PIN_C0);                // Z=0;
042B: BCF  07.0
.....  output_high(PIN_B1);
042C: BSF  06.1
.....  set_adc_channel(ab_chan);
042D: MOVLW 00
042E: MOVWF 78

```

```

042F: MOVF 1F,W

0430: ANDLW C7

0431: IORWF 78,W

0432: MOVWF 1F

..... delay_us(10);

0433: CLRWD

0434: MOVLW 10

0435: MOVWF 77

0436: DECFSZ 77,F

0437: GOTO 436

..... read_adc(ADC_START_ONLY);

0438: BSF 1F.2

..... delay_us(20);

0439: CLRWD

043A: MOVLW 20

043B: MOVWF 77

043C: DECFSZ 77,F

043D: GOTO 43C

043E: GOTO 43F

..... volt_b=read_adc(ADC_READ_ONLY);

043F: BTFSC 1F.2

0440: GOTO 43F

0441: MOVF 1E,W

0442: MOVWF 48

..... if(volt_b>=ab_max) {

```

```

0443: MOVF  48,W

0444: SUBLW 5F

0445: BTFSC 03.0

0446: GOTO  44D

.....    high_ab++;

0447: INCF  34,F

.....    if(high_ab>4) break;

0448: MOVF  34,W

0449: SUBLW 04

044A: BTFSS 03.0

044B: GOTO  44C

.....    }

.....    else high_ab=0;

044C: GOTO  44E

044D: CLRF  34

.....    output_low(PIN_C3);

044E: BCF   07.3

.....    set_adc_channel(i_chan);

044F: MOVLW 10

0450: MOVWF 78

0451: MOVF  1F,W

0452: ANDLW C7

0453: IORWF 78,W

0454: MOVWF 1F

.....    delay_us(10);

```

```

0455: CLRWDI

0456: MOVLW 10

0457: MOVWF 77

0458: DECFSZ 77,F

0459: GOTO 458

..... read_adc(ADC_START_ONLY);

045A: BSF 1F.2

..... delay_us(20);

045B: CLRWDI

045C: MOVLW 20

045D: MOVWF 77

045E: DECFSZ 77,F

045F: GOTO 45E

0460: GOTO 461

..... curr_l=read_adc(ADC_READ_ONLY);

0461: BTFSC 1F.2

0462: GOTO 461

0463: MOVF 1E,W

0464: MOVWF 50

..... if(curr_l<=short_curr_l) {

0465: MOVF 50,W

0466: SUBLW 10

0467: BTFSS 03.0

0468: GOTO 46F

..... short_curr++;

```

```

0469: INCF 33,F
.....    if(short_curr>4) break;

046A: MOVF 33,W

046B: SUBLW 04

046C: BTFSS 03.0

046D: GOTO 46E

.....    }

.....    else {

046E: GOTO 47A

.....    short_curr=0;

046F: CLRF 33

.....    if (curr_l<curr_l_max){

0470: MOVF 50,W

0471: SUBLW 1F

0472: BTFSS 03.0

0473: GOTO 478

.....    over_curr_delay++;

0474: INCF 64,F

0475: BTFSC 03.2

0476: INCF 65,F

.....    //shape_corr[index+1]-=delta_i[index+1];

.....    }

.....    else over_curr_delay=0;

0477: GOTO 47A

0478: CLRF 65

```

```

0479: CLRF 64
..... }
..... }

047A: RETLW 00
.....
.....

..... #separate
..... void sine_pwm_stdby(void) // Standby mode;
..... {
..... switch (stdby_mode) {

047B: MOVF 2B,W

047C: ADDLW FC

047D: BTFSC 03.0

047E: GOTO 71B

047F: ADDLW 04

0480: GOTO 71E

..... case 0:
..... sine_pwm_start();

0481: CALL 09B

..... if(index==31) {

0482: MOVF 28,W

0483: SUBLW 1F

0484: BTFSS 03.2

0485: GOTO 489

..... high_ab=0;

```

```

0486: CLRF  34
.....      short_curr=0;

0487: CLRF  33
.....      stdby_mode++;

0488: INCF  2B,F
.....      }
.....      break;

0489: GOTO  71B
.....      case 1:                                     // negative sine half wave;
.....      pwm_neg=sine_wave[index] + level_corr[index];

048A: BCF   03.0

048B: RLF   28,W

048C: BSF   03.6

048D: MOVWF 32

048E: INCF  32,W

048F: BCF   03.6

0490: CALL  033

0491: MOVWF 7A

0492: BSF   03.6

0493: MOVF  32,W

0494: BCF   03.6

0495: CALL  033

0496: BSF   03.6

0497: MOVWF 33

0498: MOVF  7A,W

```


0499: MOVWF 34

049A: BCF 03.0

049B: BCF 03.6

049C: RLF 28,W

049D: ADDLW A0

049E: MOVWF 04

049F: BCF 03.7

04A0: INCF 04,F

04A1: MOVF 00,W

04A2: MOVWF 7A

04A3: DECF 04,F

04A4: MOVF 00,W

04A5: BSF 03.6

04A6: ADDWF 33,W

04A7: MOVWF 78

04A8: MOVF 34,W

04A9: BTFSC 03.0

04AA: INCFSZ 34,W

04AB: ADDWF 7A,F

04AC: MOVF 78,W

04AD: BCF 03.6

04AE: MOVWF 5A

04AF: MOVF 7A,W

04B0: MOVWF 5B

..... if(pwm_neg>pwm_max) pwm_neg=pwm_max;

04B1: MOVF 5B,W

04B2: SUBLW 03

04B3: BTFSC 03,0

04B4: GOTO 4B9

04B5: MOVLW 03

04B6: MOVWF 5B

04B7: MOVLW FF

04B8: MOVWF 5A

..... //if(pwm_neg<0) pwm_neg=0;

..... set_pwm1_duty(pwm_neg);

04B9: MOVF 5B,W

04BA: MOVWF 79

04BB: MOVF 5A,W

04BC: MOVWF 78

04BD: RRF 79,F

04BE: RRF 78,F

04BF: RRF 79,F

04C0: RRF 78,F

04C1: RRF 79,F

04C2: MOVF 78,W

04C3: MOVWF 15

04C4: RRF 79,F

04C5: RRF 79,W

04C6: ANDLW 30

04C7: MOVWF 77

```

04C8: MOVF 17,W
04C9: ANDLW CF
04CA: IORWF 77,W
04CB: MOVWF 17
.....      output_low(PIN_C1);                // A=0;
04CC: BCF 07.1
.....      output_low(PIN_C0);                // Z=0;
04CD: BCF 07.0
.....      output_high(PIN_B1);
04CE: BSF 06.1
.....      set_adc_channel(v_chan);
04CF: MOVLW 20
04D0: MOVWF 78
04D1: MOVF 1F,W
04D2: ANDLW C7
04D3: IORWF 78,W
04D4: MOVWF 1F
.....      delay_us(10);
04D5: CLRWD
04D6: MOVLW 10
04D7: MOVWF 77
04D8: DECFSZ 77,F
04D9: GOTO 4D8
.....      read_adc(ADC_START_ONLY);
04DA: BSF 1F.2

```

```

.....      delay_us(20);

04DB: CLRWDT

04DC: MOVLW 20

04DD: MOVWF 77

04DE: DECFSZ 77,F

04DF: GOTO 4DE

04E0: GOTO 4E1

.....      volt_l=read_adc(ADC_READ_ONLY);

04E1: BTFSC 1F.2

04E2: GOTO 4E1

04E3: MOVF 1E,W

04E4: MOVWF 41

.....      volt_l_temp+=volt_l;

04E5: MOVF 41,W

04E6: ADDWF 5E,F

04E7: BTFSC 03.0

04E8: INCF 5F,F

.....      set_adc_channel(ab_chan);

04E9: MOVLW 00

04EA: MOVWF 78

04EB: MOVF 1F,W

04EC: ANDLW C7

04ED: IORWF 78,W

04EE: MOVWF 1F

.....      delay_us(10);

```

```

04EF: CLRWDI
04F0: MOVLW 10
04F1: MOVWF 77
04F2: DECFSZ 77,F
04F3: GOTO 4F2
.....      read_adc(ADC_START_ONLY);
04F4: BSF 1F.2
.....      delay_us(20);
04F5: CLRWDI
04F6: MOVLW 20
04F7: MOVWF 77
04F8: DECFSZ 77,F
04F9: GOTO 4F8
04FA: GOTO 4FB
.....      volt_b=read_adc(ADC_READ_ONLY);
04FB: BTFSC 1F.2
04FC: GOTO 4FB
04FD: MOVF 1E,W
04FE: MOVWF 48
.....      if(volt_b>=ab_max) {
04FF: MOVF 48,W
0500: SUBLW 5F
0501: BTFSC 03.0
0502: GOTO 509
.....      high_ab++;

```

```

0503: INCF 34,F
.....      if(high_ab>4) break;

0504: MOVF 34,W

0505: SUBLW 04

0506: BTFSS 03.0

0507: GOTO 71B
.....      }

.....      else high_ab=0;

0508: GOTO 50A

0509: CLRF 34
.....      output_low(PIN_C3);

050A: BCF 07.3
.....      set_adc_channel(i_chan);

050B: MOVLW 10

050C: MOVWF 78

050D: MOVF 1F,W

050E: ANDLW C7

050F: IORWF 78,W

0510: MOVWF 1F
.....      delay_us(10);

0511: CLRWD

0512: MOVLW 10

0513: MOVWF 77

0514: DECFSZ 77,F

0515: GOTO 514

```

```

.....      read_adc(ADC_START_ONLY);

0516: BSF   1F.2

.....      delay_us(20);

0517: CLRWDT

0518: MOVLW 20

0519: MOVWF 77

051A: DECFSZ 77,F

051B: GOTO  51A

051C: GOTO  51D

.....      curr_l=read_adc(ADC_READ_ONLY);

051D: BTFSC 1F.2

051E: GOTO  51D

051F: MOVF  1E,W

0520: MOVWF 50

.....      if(curr_l<=short_curr) {

0521: MOVF  50,W

0522: SUBWF 33,W

0523: BTFSS 03.0

0524: GOTO  52B

.....      short_curr++;

0525: INCF  33,F

.....      if(short_curr>4) break;

0526: MOVF  33,W

0527: SUBLW 04

0528: BTFSS 03.0

```

```

0529: GOTO 71B
.....    }
.....    else {
052A: GOTO 536
.....    short_curr=0;
052B: CLRF 33
.....    if (curr_l<curr_l_max){
052C: MOVF 50,W
052D: SUBLW 1F
052E: BTFSS 03.0
052F: GOTO 534
.....    over_curr_delay++;
0530: INCF 64,F
0531: BTFSC 03.2
0532: INCF 65,F
.....    //shape_corr[index+1]-=delta_i[index+1];
.....    }
.....    else over_curr_delay=0;
0533: GOTO 536
0534: CLRF 65
0535: CLRF 64
.....    }
.....    output_high(PIN_C3);
0536: BSF 07.3
.....    set_adc_channel(i_chan);

```



```

0537: MOVLW 10
0538: MOVWF 78
0539: MOVF 1F,W
053A: ANDLW C7
053B: IORWF 78,W
053C: MOVWF 1F
.....      delay_us(10);
053D: CLRWD
053E: MOVLW 10
053F: MOVWF 77
0540: DECFSZ 77,F
0541: GOTO 540
.....      read_adc(ADC_START_ONLY);
0542: BSF 1F.2
.....      delay_us(20);
0543: CLRWD
0544: MOVLW 20
0545: MOVWF 77
0546: DECFSZ 77,F
0547: GOTO 546
0548: GOTO 549
.....      curr_h=read_adc(ADC_READ_ONLY);
0549: BTFSC 1F.2
054A: GOTO 549
054B: MOVF 1E,W

```

054C: MOVWF 4F

..... curr_h_temp+=curr_h;

054D: MOVF 4F,W

054E: ADDWF 6C,F

054F: BTFSC 03.0

0550: INCF 6D,F

..... if(index==31) {

0551: MOVF 28,W

0552: SUBLW 1F

0553: BTFSS 03.2

0554: GOTO 5CB

..... curr_h_avg=curr_h_temp>>5;

0555: RRF 6D,W

0556: MOVWF 7A

0557: RRF 6C,W

0558: MOVWF 79

0559: RRF 7A,F

055A: RRF 79,F

055B: RRF 7A,F

055C: RRF 79,F

055D: RRF 7A,F

055E: RRF 79,F

055F: RRF 7A,F

0560: RRF 79,F

0561: MOVF 79,W

0562: MOVWF 51

..... if(curr_h_avg>=stdby_i_h) stdby=0;

0563: MOVF 4A,W

0564: SUBWF 51,W

0565: BTFSC 03.0

0566: CLRF 2C

..... volt_l_avg=volt_l_temp>>5;

0567: RRF 5F,W

0568: MOVWF 7A

0569: RRF 5E,W

056A: MOVWF 79

056B: RRF 7A,F

056C: RRF 79,F

056D: RRF 7A,F

056E: RRF 79,F

056F: RRF 7A,F

0570: RRF 79,F

0571: RRF 7A,F

0572: RRF 79,F

0573: MOVF 79,W

0574: MOVWF 43

..... delta_l_ref=volt_l_avg-(volt_ref_const_l-volt_ref_delta);

0575: MOVF 57,W

0576: SUBLW 57

0577: SUBWF 43,W

0578: MOVWF 56

..... if(delta_l_ref>2) for(i=0; i<32; i++) level_corr[i]+=delta_corr[i]>>1;

0579: BTFSC 56.7

057A: GOTO 59E

057B: MOVF 56,W

057C: SUBLW 02

057D: BTFSC 03.0

057E: GOTO 59E

057F: CLRF 2D

0580: MOVF 2D,W

0581: SUBLW 1F

0582: BTFSS 03.0

0583: GOTO 59E

0584: BCF 03.0

0585: RLF 2D,W

0586: ADDLW A0

0587: MOVWF 04

0588: BCF 03.7

0589: MOVF 2D,W

058A: CALL 077

058B: MOVWF 77

058C: BCF 03.0

058D: RRF 77,F

058E: MOVF 77,W

058F: ADDWF 00,W

0590: INCF 04,F
0591: MOVWF 78
0592: MOVF 00,W
0593: MOVWF 7A
0594: BTFSC 03.0
0595: INCF 7A,F
0596: DECF 04,F
0597: MOVF 78,W
0598: MOVWF 00
0599: INCF 04,F
059A: MOVF 7A,W
059B: MOVWF 00
059C: INCF 2D,F
059D: GOTO 580

..... if(delta_l_ref<-2) for(i=0; i<32; i++) level_corr[i]-=delta_corr[i]>>1;

059E: MOVF 56,W
059F: XORLW 80
05A0: SUBLW 7D
05A1: BTFSS 03.0
05A2: GOTO 5C4
05A3: CLRF 2D
05A4: MOVF 2D,W
05A5: SUBLW 1F
05A6: BTFSS 03.0
05A7: GOTO 5C4

05A8: BCF 03.0
05A9: RLF 2D,W
05AA: ADDLW A0
05AB: MOVWF 04
05AC: BCF 03.7
05AD: MOVF 2D,W
05AE: CALL 077
05AF: MOVWF 77
05B0: BCF 03.0
05B1: RRF 77,F
05B2: MOVF 77,W
05B3: SUBWF 00,W
05B4: MOVWF 77
05B5: INCF 04,F
05B6: MOVF 00,W
05B7: MOVWF 7A
05B8: MOVLW 00
05B9: BTFSS 03.0
05BA: MOVLW 01
05BB: SUBWF 7A,F
05BC: MOVF 77,W
05BD: DECF 04,F
05BE: MOVWF 00
05BF: INCF 04,F
05C0: MOVF 7A,W

```

05C1: MOVWF 00

05C2: INCF 2D,F

05C3: GOTO 5A4

.....      curr_h_temp=0;

05C4: CLRF 6D

05C5: CLRF 6C

.....      volt_l_temp=0;

05C6: CLRF 5F

05C7: CLRF 5E

.....      high_ab=0;

05C8: CLRF 34

.....      short_curr=0;

05C9: CLRF 33

.....      stdby_mode++;

05CA: INCF 2B,F

.....      }

.....      break;

05CB: GOTO 71B

.....      case 2:                                // positive sine half wave;

.....      pwm_pos=sine_wave[index] + level_corr[index];

05CC: BCF 03.0

05CD: RLF 28,W

05CE: BSF 03.6

05CF: MOVWF 32

05D0: INCF 32,W

```

05D1: BCF 03.6
05D2: CALL 033
05D3: MOVWF 7A
05D4: BSF 03.6
05D5: MOVF 32,W
05D6: BCF 03.6
05D7: CALL 033
05D8: BSF 03.6
05D9: MOVWF 33
05DA: MOVF 7A,W
05DB: MOVWF 34
05DC: BCF 03.0
05DD: BCF 03.6
05DE: RLF 28,W
05DF: ADDLW A0
05E0: MOVWF 04
05E1: BCF 03.7
05E2: INCF 04,F
05E3: MOVF 00,W
05E4: MOVWF 7A
05E5: DECF 04,F
05E6: MOVF 00,W
05E7: BSF 03.6
05E8: ADDWF 33,W
05E9: MOVWF 78


```

05EA: MOVF 34,W
05EB: BTFSC 03.0
05EC: INCFSZ 34,W
05ED: ADDWF 7A,F
05EE: MOVF 78,W
05EF: BCF 03.6
05F0: MOVWF 58
05F1: MOVF 7A,W
05F2: MOVWF 59
.....      if(pwm_pos>pwm_max) pwm_pos=pwm_max;
05F3: MOVF 59,W
05F4: SUBLW 03
05F5: BTFSC 03.0
05F6: GOTO 5FB
05F7: MOVLW 03
05F8: MOVWF 59
05F9: MOVLW FF
05FA: MOVWF 58
.....      //if(pwm_pos<0) pwm_pos=0;
.....      set_pwm1_duty(pwm_pos);
05FB: MOVF 59,W
05FC: MOVWF 79
05FD: MOVF 58,W
05FE: MOVWF 78
05FF: RRF 79,F

```

```

0600: RRF  78,F
0601: RRF  79,F
0602: RRF  78,F
0603: RRF  79,F
0604: MOVF 78,W
0605: MOVWF 15
0606: RRF  79,F
0607: RRF  79,W
0608: ANDLW 30
0609: MOVWF 77
060A: MOVF 17,W
060B: ANDLW CF
060C: IORWF 77,W
060D: MOVWF 17
.....    output_high(PIN_C1);                // A=1;
060E: BSF  07.1
.....    output_low(PIN_C0);                // Z=0;
060F: BCF  07.0
.....    output_low(PIN_B1);
0610: BCF  06.1
.....    set_adc_channel(v_chan);
0611: MOVLW 20
0612: MOVWF 78
0613: MOVF 1F,W
0614: ANDLW C7

```

```

0615: IORWF 78,W

0616: MOVWF 1F
.....      delay_us(10);

0617: CLRWD

0618: MOVLW 10

0619: MOVWF 77

061A: DECFSZ 77,F

061B: GOTO 61A

.....      read_adc(ADC_START_ONLY);

061C: BSF 1F.2

.....      delay_us(20);

061D: CLRWD

061E: MOVLW 20

061F: MOVWF 77

0620: DECFSZ 77,F

0621: GOTO 620

0622: GOTO 623

.....      volt_h=read_adc(ADC_READ_ONLY);

0623: BTFSC 1F.2

0624: GOTO 623

0625: MOVF 1E,W

0626: MOVWF 40

.....      volt_h_temp+=volt_h;

0627: MOVF 40,W

0628: ADDWF 5C,F

```

```

0629: BTFSC 03,0

062A: INCF 5D,F
.....      set_adc_channel(ab_chan);

062B: MOVLW 00

062C: MOVWF 78

062D: MOVF 1F,W

062E: ANDLW C7

062F: IORWF 78,W

0630: MOVWF 1F
.....      delay_us(10);

0631: CLRWD

0632: MOVLW 10

0633: MOVWF 77

0634: DECFSZ 77,F

0635: GOTO 634
.....      read_adc(ADC_START_ONLY);

0636: BSF 1F,2
.....      delay_us(20);

0637: CLRWD

0638: MOVLW 20

0639: MOVWF 77

063A: DECFSZ 77,F

063B: GOTO 63A

063C: GOTO 63D
.....      volt_a=read_adc(ADC_READ_ONLY);

```

```

063D: BTFSC 1F.2

063E: GOTO 63D

063F: MOVF 1E,W

0640: MOVWF 47

.....      if(volt_a>=ab_max) {

0641: MOVF 47,W

0642: SUBLW 5F

0643: BTFSC 03.0

0644: GOTO 64B

.....      high_ab++;

0645: INCF 34,F

.....      if(high_ab>4) break;

0646: MOVF 34,W

0647: SUBLW 04

0648: BTFSS 03.0

0649: GOTO 71B

.....      }

.....      else high_ab=0;

064A: GOTO 64C

064B: CLRF 34

.....      output_low(PIN_C3);

064C: BCF 07.3

.....      set_adc_channel(i_chan);

064D: MOVLW 10

064E: MOVWF 78

```

```

064F: MOVF 1F,W
0650: ANDLW C7
0651: IORWF 78,W
0652: MOVWF 1F
.....      delay_us(10);
0653: CLRWD
0654: MOVLW 10
0655: MOVWF 77
0656: DECFSZ 77,F
0657: GOTO 656
.....      read_adc(ADC_START_ONLY);
0658: BSF 1F.2
.....      delay_us(20);
0659: CLRWD
065A: MOVLW 20
065B: MOVWF 77
065C: DECFSZ 77,F
065D: GOTO 65C
065E: GOTO 65F
.....      curr_h=read_adc(ADC_READ_ONLY);
065F: BTFSC 1F.2
0660: GOTO 65F
0661: MOVF 1E,W
0662: MOVWF 4F
.....      if(curr_h>=short_curr_h) {

```

```

0663: MOVF 4F,W
0664: SUBLW EE
0665: BTFSC 03.0
0666: GOTO 66D
.....      short_curr++;
0667: INCF 33,F
.....      if(short_curr>4) break;
0668: MOVF 33,W
0669: SUBLW 04
066A: BTFSS 03.0
066B: GOTO 71B
.....      }
.....      else {
066C: GOTO 678
.....      short_curr=0;
066D: CLRF 33
.....      if(curr_h>curr_h_max) {
066E: MOVF 4F,W
066F: SUBLW DF
0670: BTFSC 03.0
0671: GOTO 676
.....      over_curr_delay++;
0672: INCF 64,F
0673: BTFSC 03.2
0674: INCF 65,F

```

```

.....      //shape_corr[index+1]-=delta_i[index+1];
.....      }
.....      else over_curr_delay=0;
0675: GOTO 678
0676: CLRF 65
0677: CLRF 64
.....      }
.....      output_high(PIN_C3);
0678: BSF 07.3
.....      set_adc_channel(i_chan);
0679: MOVLW 10
067A: MOVWF 78
067B: MOVF 1F,W
067C: ANDLW C7
067D: IORWF 78,W
067E: MOVWF 1F
.....      delay_us(10);
067F: CLRWDT
0680: MOVLW 10
0681: MOVWF 77
0682: DECFSZ 77,F
0683: GOTO 682
.....      read_adc(ADC_START_ONLY);
0684: BSF 1F.2
.....      delay_us(20);

```



```

0685: CLRWDI
0686: MOVLW 20
0687: MOVWF 77
0688: DECFSZ 77,F
0689: GOTO 688
068A: GOTO 68B
.....      curr_l=read_adc(ADC_READ_ONLY);
068B: BTFSC 1F.2
068C: GOTO 68B
068D: MOVF 1E,W
068E: MOVWF 50
.....      curr_l_temp+=curr_l;
068F: MOVF 50,W
0690: ADDWF 6E,F
0691: BTFSC 03.0
0692: INCF 6F,F
.....      if(index==31) {
0693: MOVF 28,W
0694: SUBLW 1F
0695: BTFSS 03.2
0696: GOTO 710
.....      curr_l_avg=curr_l_temp>>5;
0697: RRF 6F,W
0698: MOVWF 7A
0699: RRF 6E,W

```

069A: MOVWF 79

069B: RRF 7A,F

069C: RRF 79,F

069D: RRF 7A,F

069E: RRF 79,F

069F: RRF 7A,F

06A0: RRF 79,F

06A1: RRF 7A,F

06A2: RRF 79,F

06A3: MOVF 79,W

06A4: MOVWF 52

..... if((curr_l_avg<=stdby_i_l)) stdby=0;

06A5: MOVF 52,W

06A6: SUBWF 4B,W

06A7: BTFSC 03.0

06A8: CLRF 2C

..... volt_h_avg=volt_h_temp>>5;

06A9: RRF 5D,W

06AA: MOVWF 7A

06AB: RRF 5C,W

06AC: MOVWF 79

06AD: RRF 7A,F

06AE: RRF 79,F

06AF: RRF 7A,F

06B0: RRF 79,F

06B1: RRF 7A,F

06B2: RRF 79,F

06B3: RRF 7A,F

06B4: RRF 79,F

06B5: MOVF 79,W

06B6: MOVWF 42

..... delta_h_ref=(volt_ref_const_h+volt_ref_delta)-volt_h_avg;

06B7: MOVLW A8

06B8: ADDWF 57,W

06B9: MOVWF 78

06BA: MOVF 42,W

06BB: SUBWF 78,W

06BC: MOVWF 55

..... if(delta_h_ref>2) for(i=0; i<32; i++) level_corr[i]+=delta_corr[i]>>1;

06BD: BTFSC 55.7

06BE: GOTO 6E3

06BF: MOVF 55,W

06C0: SUBLW 02

06C1: BTFSC 03.0

06C2: GOTO 6E3

06C3: CLRF 2D

06C4: MOVF 2D,W

06C5: SUBLW 1F

06C6: BTFSS 03.0

06C7: GOTO 6E2

06C8: BCF 03.0
06C9: RLF 2D,W
06CA: ADDLW A0
06CB: MOVWF 04
06CC: BCF 03.7
06CD: MOVF 2D,W
06CE: CALL 077
06CF: MOVWF 77
06D0: BCF 03.0
06D1: RRF 77,F
06D2: MOVF 77,W
06D3: ADDWF 00,W
06D4: INCF 04,F
06D5: MOVWF 78
06D6: MOVF 00,W
06D7: MOVWF 7A
06D8: BTFSC 03.0
06D9: INCF 7A,F
06DA: DECF 04,F
06DB: MOVF 78,W
06DC: MOVWF 00
06DD: INCF 04,F
06DE: MOVF 7A,W
06DF: MOVWF 00
06E0: INCF 2D,F

06E1: GOTO 6C4

..... else if(delta_h_ref<-2) for(i=0; i<32; i++) level_corr[i]-=delta_corr[i]>>1;

06E2: GOTO 709

06E3: MOVF 55,W

06E4: XORLW 80

06E5: SUBLW 7D

06E6: BTFSS 03.0

06E7: GOTO 709

06E8: CLRF 2D

06E9: MOVF 2D,W

06EA: SUBLW 1F

06EB: BTFSS 03.0

06EC: GOTO 709

06ED: BCF 03.0

06EE: RLF 2D,W

06EF: ADDLW A0

06F0: MOVWF 04

06F1: BCF 03.7

06F2: MOVF 2D,W

06F3: CALL 077

06F4: MOVWF 77

06F5: BCF 03.0

06F6: RRF 77,F

06F7: MOVF 77,W

06F8: SUBWF 00,W

```

06F9: MOVWF 77
06FA: INCF 04,F
06FB: MOVF 00,W
06FC: MOVWF 7A
06FD: MOVLW 00
06FE: BTFSS 03.0
06FF: MOVLW 01
0700: SUBWF 7A,F
0701: MOVF 77,W
0702: DECF 04,F
0703: MOVWF 00
0704: INCF 04,F
0705: MOVF 7A,W
0706: MOVWF 00
0707: INCF 2D,F
0708: GOTO 6E9
.....      curr_l_temp=0;
0709: CLRF 6F
070A: CLRF 6E
.....      volt_h_temp=0;
070B: CLRF 5D
070C: CLRF 5C
.....      high_ab=0;
070D: CLRF 34
.....      short_curr=0;

```

```

070E: CLRF 33
.....        stdby_mode++;

070F: INCF 2B,F
.....        }
.....        break;

0710: GOTO 71B
.....        case 3:
.....        sine_pwm_stop();

0711: CALL 3EF
.....        if(index==31) {

0712: MOVF 28,W

0713: SUBLW 1F

0714: BTFSS 03.2

0715: GOTO 71A
.....        high_ab=0;

0716: CLRF 34
.....        short_curr=0;

0717: CLRF 33
.....        stdby_mode=0;

0718: CLRF 2B
.....        inv_mode++;

0719: INCF 2A,F
.....        }
.....        break;

071A: GOTO 71B

```

```

..... }

..... }

071B: BSF  0A.3

071C: BCF  0A.4

071D: GOTO 081 (RETURN)

.....

.....

..... #int_timer0

..... void sine_pwm(void)

..... {

..... restart_wdt();

*

0800: CLRWDT

..... clear_interrupt(int_timer0);

0801: BCF  0B.2

..... set_timer0(60);

0802: MOVLW 3C

0803: MOVWF 01

..... if((!low_acc)&&(!high_acc)&&(!inv_off)) {           // check acc value and
inverter state;

0804: MOVF  36,F

0805: BTFSS 03.2

0806: GOTO 1AB

0807: MOVF  37,F

0808: BTFSS 03.2

0809: GOTO 1AB

```



```

080A: MOVF 2F,F
080B: BTFSS 03.2
080C: GOTO 1AB
..... switch (inv_mode) {                                // check inverter mode;
080D: MOVF 2A,W
080E: ADDLW FB
080F: BTFSC 03.0
0810: GOTO 0AD
0811: ADDLW 05
0812: GOTO 277
..... case 0:                                              // start mode;
..... sine_pwm_start();
0813: BCF 0A.3
0814: CALL 09B
0815: BSF 0A.3
..... if(index==31) {
0816: MOVF 28,W
0817: SUBLW 1F
0818: BTFSS 03.2
0819: GOTO 01E
..... high_ab=0;
081A: CLRF 34
..... short_curr=0;
081B: CLRF 33
..... sine_pol=0;

```

```

081C: CLRF  29
.....      inv_mode++;

081D: INCF  2A,F
.....      }

.....      break;

081E: GOTO  0AD
.....      case 1:                                // normal mode;

.....      if((!high_t_stop)&&(!low_curr)&&(!low_acc_delay)) {

081F: MOVF  38,F

0820: BTFSS 03.2

0821: GOTO  02A

0822: MOVF  3A,F

0823: BTFSS 03.2

0824: GOTO  02A

0825: MOVF  3B,F

0826: BTFSS 03.2

0827: GOTO  02A

.....      output_high(PIN_B4);                    // Green LED-ON;

0828: BSF   06.4

.....      output_low(PIN_B5);                     // Red LED-OFF;

0829: BCF   06.5

.....      }

.....      sine_pwm_norm();

082A: BCF   0A.3

082B: GOTO  127

```

```

082C: BSF  0A.3
.....      if(index==31) {
082D: MOVF  28,W
082E: SUBLW 1F
082F: BTFSS 03.2
0830: GOTO  072
.....      if((low_curr_l)&&(low_curr_h)) {           // check for low current;
0831: MOVF  31,F
0832: BTFSC 03.2
0833: GOTO  06D
0834: MOVF  30,F
0835: BTFSC 03.2
0836: GOTO  06D
.....      low_curr=1;
0837: MOVLW 01
0838: MOVWF 3A
.....      stdby_go_delay++;
0839: INCF  68,F
083A: BTFSC 03.2
083B: INCF  69,F
.....      if((!low_acc_delay)&&(!high_t_stop)) {
083C: MOVF  3B,F
083D: BTFSS 03.2
083E: GOTO  052
083F: MOVF  38,F

```

```

0840: BTFSS 03.2
0841: GOTO 052
..... if(stdby_go_blink>30) {
0842: MOVF 35,W
0843: SUBLW 1E
0844: BTFSC 03.0
0845: GOTO 049
..... output_high(PIN_B4); // Blink Green&Red LEDs;
0846: BSF 06.4
..... output_high(PIN_B5);
0847: BSF 06.5
..... }
..... else {
0848: GOTO 04B
..... output_low(PIN_B4);
0849: BCF 06.4
..... output_low(PIN_B5);
084A: BCF 06.5
..... }
..... if(!stdby_go_blink) stdby_go_blink=60;
084B: MOVF 35,F
084C: BTFSS 03.2
084D: GOTO 051
084E: MOVLW 3C
084F: MOVWF 35

```

```

.....      else stdby_go_blink--;

0850: GOTO  052

0851: DECF  35,F

.....      }

.....      if((stdby_go_delay>600)&&(!sine_pol)) {

0852: MOVF  69,W

0853: SUBLW  01

0854: BTFSC 03.0

0855: GOTO  06C

0856: XORLW  FF

0857: BTFSS 03.2

0858: GOTO  05D

0859: MOVF  68,W

085A: SUBLW  58

085B: BTFSC 03.0

085C: GOTO  06C

085D: MOVF  29,F

085E: BTFSS 03.2

085F: GOTO  06C

.....      stdby=1;

0860: MOVLW  01

0861: MOVWF  2C

.....      stdby_go_delay=0;

0862: CLRF  69

0863: CLRF  68

```

```

.....          stdby_go_blink=60;

0864: MOVLW 3C

0865: MOVWF 35

.....          low_curr_l=0;

0866: CLRF 31

.....          low_curr_h=0;

0867: CLRF 30

.....          low_curr=0;

0868: CLRF 3A

.....          inv_mode++;

0869: INCF 2A,F

.....          output_low(PIN_B4);

086A: BCF 06.4

.....          output_low(PIN_B5);

086B: BCF 06.5

.....          }

.....          }

.....          else {

086C: GOTO 072

.....          low_curr=0;

086D: CLRF 3A

.....          stdby_go_delay=0;

086E: CLRF 69

086F: CLRF 68

.....          stdby_go_blink=60;

```

```

0870: MOVLW 3C
0871: MOVWF 35
.....    }
.....    }
.....    break;
0872: GOTO 0AD
.....    case 2:                                // stop mode;
.....    sine_pwm_stop();
0873: BCF 0A.3
0874: CALL 3EF
0875: BSF 0A.3
.....    if(index==31) {
0876: MOVF 28,W
0877: SUBLW 1F
0878: BTFSS 03.2
0879: GOTO 07E
.....    high_ab=0;
087A: CLRF 34
.....    short_curr=0;
087B: CLRF 33
.....    inv_mode=4;
087C: MOVLW 04
087D: MOVWF 2A
.....    }
.....    break;

```

```

087E: GOTO 0AD

.....      case 3:                                // standby mode;

.....      sine_pwm_stdby();

087F: BCF 0A.3

0880: GOTO 47B

0881: BSF 0A.3

.....      stdby_delay--;

0882: MOVF 66,W

0883: BTFSC 03.2

0884: DECF 67,F

0885: DECF 66,F

.....      break;

0886: GOTO 0AD

.....      case 4:                                // idle mode;

.....      set_pwm1_duty(0);                        // M=0;

0887: CLRF 15

.....      if(!high_t_stop)&&!low_curr&&!low_acc_delay) {

0888: MOVF 38,F

0889: BTFSS 03.2

088A: GOTO 098

088B: MOVF 3A,F

088C: BTFSS 03.2

088D: GOTO 098

088E: MOVF 3B,F

088F: BTFSS 03.2

```



```

0890: GOTO 098
.....      if(stdby_delay>1023) output_high(PIN_B4);           // Blink Green LED;

0891: MOVF 67,W

0892: SUBLW 03

0893: BTFSC 03.0

0894: GOTO 097

0895: BSF 06.4

.....      else output_low(PIN_B4);

0896: GOTO 098

0897: BCF 06.4

.....      }

.....      if(!stdby_delay) {

0898: MOVF 66,W

0899: IORWF 67,W

089A: BTFSS 03.2

089B: GOTO 0A8

.....      stdby_delay=2047;

089C: MOVLW 07

089D: MOVWF 67

089E: MOVLW FF

089F: MOVWF 66

.....      if(stdby) inv_mode=3;

08A0: MOVF 2C,F

08A1: BTFSC 03.2

08A2: GOTO 0A6

```

```

08A3: MOVLW 03

08A4: MOVWF 2A

.....     else inv_mode=0;

08A5: GOTO 0A7

08A6: CLRF 2A

.....     }

.....     else stdby_delay--;

08A7: GOTO 0AC

08A8: MOVF 66,W

08A9: BTFSC 03.2

08AA: DECF 67,F

08AB: DECF 66,F

.....     break;

08AC: GOTO 0AD

.....     }

.....     if(index==15) {

08AD: MOVF 28,W

08AE: SUBLW 0F

08AF: BTFSS 03.2

08B0: GOTO 123

.....     set_adc_channel(acc_chan);

08B1: MOVLW 18

08B2: MOVWF 78

08B3: MOVF 1F,W

08B4: ANDLW C7

```

```

08B5: IORWF 78,W

08B6: MOVWF 1F

.....      delay_us(10);

08B7: CLRWD

08B8: MOVLW 10

08B9: MOVWF 77

08BA: DECFSZ 77,F

08BB: GOTO 0BA

.....      read_adc(ADC_START_ONLY);

08BC: BSF 1F.2

.....      delay_us(20);

08BD: CLRWD

08BE: MOVLW 20

08BF: MOVWF 77

08C0: DECFSZ 77,F

08C1: GOTO 0C0

08C2: GOTO 0C3

.....      acc_v=read_adc(ADC_READ_ONLY);

08C3: BTFSC 1F.2

08C4: GOTO 0C3

08C5: MOVF 1E,W

08C6: MOVWF 45

.....      acc_v_temp+=acc_v;

08C7: MOVF 45,W

08C8: ADDWF 62,F

```

```

08C9: BTFSC 03.0

08CA: INCF 63,F
.....      acc_avg_counter++;

08CB: INCF 3C,F
.....      if(acc_avg_counter==32) {

08CC: MOVF 3C,W

08CD: SUBLW 20

08CE: BTFSS 03.2

08CF: GOTO 0FB
.....      acc_avg_counter=0;

08D0: CLRF 3C
.....      acc_v_avg=acc_v_temp>>5;

08D1: RRF 63,W

08D2: MOVWF 7A

08D3: RRF 62,W

08D4: MOVWF 79

08D5: RRF 7A,F

08D6: RRF 79,F

08D7: RRF 7A,F

08D8: RRF 79,F

08D9: RRF 7A,F

08DA: RRF 79,F

08DB: RRF 7A,F

08DC: RRF 79,F

08DD: MOVF 79,W

```

```

08DE: MOVWF 46
.....      if(acc_v_avg<=acc_min_l) {
08DF: MOVF 46,W
08E0: SUBLW 3C
08E1: BTFSS 03.0
08E2: GOTO 0F1
.....      low_acc_delay++;
08E3: INCF 3B,F
.....      if(!high_t_stop) {
08E4: MOVF 38,F
08E5: BTFSS 03.2
08E6: GOTO 0E9
.....      output_low(PIN_B4);
08E7: BCF 06.4
.....      output_high(PIN_B5);
08E8: BSF 06.5
.....      }
.....      if(low_acc_delay==16) {
08E9: MOVF 3B,W
08EA: SUBLW 10
08EB: BTFSS 03.2
08EC: GOTO 0F0
.....      low_acc=1;
08ED: MOVLW 01
08EE: MOVWF 36

```

```

.....          low_acc_delay=0;

08EF: CLRF  3B

.....          }

.....          }

.....          else {

08F0: GOTO  0F8

.....          if(acc_v_avg>=acc_max_h) high_acc=1;

08F1: MOVF  46,W

08F2: SUBLW  61

08F3: BTFSC  03.0

08F4: GOTO  0F7

08F5: MOVLW  01

08F6: MOVWF  37

.....          low_acc_delay=0;

08F7: CLRF  3B

.....          }

.....          acc_v_temp=0;

08F8: CLRF  63

08F9: CLRF  62

.....          acc_v_avg=0;

08FA: CLRF  46

.....          }

.....          output_low(PIN_C3);                // check vref value;

08FB: BCF   07.3

.....          set_adc_channel(stdby_chan);

```

```

08FC: MOVLW 08
08FD: MOVWF 78
08FE: MOVF 1F,W
08FF: ANDLW C7
0900: IORWF 78,W
0901: MOVWF 1F
.....      delay_us(10);
0902: CLRWD
0903: MOVLW 10
0904: MOVWF 77
0905: DECFSZ 77,F
0906: GOTO 105
.....      read_adc(ADC_START_ONLY);
0907: BSF 1F.2
.....      delay_us(20);
0908: CLRWD
0909: MOVLW 20
090A: MOVWF 77
090B: DECFSZ 77,F
090C: GOTO 10B
090D: GOTO 10E
.....      volt_ref=read_adc(ADC_READ_ONLY);
090E: BTFSC 1F.2
090F: GOTO 10E
0910: MOVF 1E,W

```

```

0911: MOVWF 4D
.....      volt_ref_temp+=volt_ref;

0912: MOVF 4D,W

0913: ADDWF 60,F

0914: BTFSC 03.0

0915: INCF 61,F
.....      volt_ref_counter++;

0916: INCF 3D,F
.....      if(volt_ref_counter==32) {

0917: MOVF 3D,W

0918: SUBLW 20

0919: BTFSS 03.2

091A: GOTO 123
.....      volt_ref_avg=volt_ref_temp>>8;

091B: MOVF 61,W

091C: MOVWF 4E
.....      volt_ref_delta=volt_ref_avg-30;

091D: MOVLW 1E

091E: SUBWF 4E,W

091F: MOVWF 57
.....      volt_ref_counter=0;

0920: CLRF 3D
.....      volt_ref_temp=0;

0921: CLRF 61

0922: CLRF 60

```



```

.....    }

.....    }

.....    if(index==31) {

0923: MOVF  28,W

0924: SUBLW 1F

0925: BTFSS 03.2

0926: GOTO  1A5

.....    if(over_curr_delay>1600) over_curr=1;

0927: MOVF  65,W

0928: SUBLW 05

0929: BTFSC 03.0

092A: GOTO  134

092B: XORLW FF

092C: BTFSS 03.2

092D: GOTO  132

092E: MOVF  64,W

092F: SUBLW 40

0930: BTFSC 03.0

0931: GOTO  134

0932: MOVLW 01

0933: MOVWF 32

.....    if(!input(PIN_C4)) {

0934: BTFSC 07.4

0935: GOTO  159

.....    high_t_delay++;

```

```

0936: INCF 6A,F
0937: BTFSC 03.2
0938: INCF 6B,F
.....      output_high(PIN_C5);
0939: BSF 07.5
.....      if((high_t_delay>255)&&(high_t_delay<1024)) {
093A: MOVF 6B,W
093B: SUBLW 00
093C: BTFSC 03.0
093D: GOTO 154
093E: MOVF 6B,W
093F: SUBLW 03
0940: BTFSS 03.0
0941: GOTO 154
.....      high_t_stop=1;
0942: MOVLW 01
0943: MOVWF 38
.....      output_low(PIN_B4);
0944: BCF 06.4
.....      if(high_t_blink>45) output_high(PIN_B5);           // Blink Red LED;
0945: MOVF 39,W
0946: SUBLW 2D
0947: BTFSC 03.0
0948: GOTO 14B
0949: BSF 06.5

```

```

.....      else output_low(PIN_B5);

094A: GOTO 14C

094B: BCF 06.5

.....      if(!high_t_blink) high_t_blink=90;

094C: MOVF 39,F

094D: BTFSS 03.2

094E: GOTO 152

094F: MOVLW 5A

0950: MOVWF 39

.....      else high_t_blink--;

0951: GOTO 153

0952: DECF 39,F

.....      }

.....      else if(high_t_delay>1023) high_t_stop++;

0953: GOTO 158

0954: MOVF 6B,W

0955: SUBLW 03

0956: BTFSS 03.0

0957: INCF 38,F

.....      }

.....      else {

0958: GOTO 15F

.....      high_t_delay=0;

0959: CLRF 6B

095A: CLRF 6A

```

```

.....      high_t_stop=0;

095B: CLRF  38

.....      high_t_blink=90;

095C: MOVLW 5A

095D: MOVWF 39

.....      output_low(PIN_C5);

095E: BCF   07.5

.....      }

.....      output_high(PIN_C3);                      // check stdby current value;

095F: BSF   07.3

.....      set_adc_channel(stdby_chan);

0960: MOVLW 08

0961: MOVWF 78

0962: MOVF  1F,W

0963: ANDLW C7

0964: IORWF 78,W

0965: MOVWF 1F

.....      delay_us(10);

0966: CLRWDI

0967: MOVLW 10

0968: MOVWF 77

0969: DECFSZ 77,F

096A: GOTO  169

.....      read_adc(ADC_START_ONLY);

096B: BSF   1F.2

```

```

.....      delay_us(20);

096C: CLRWDT

096D: MOVLW 20

096E: MOVWF 77

096F: DECFSZ 77,F

0970: GOTO 16F

0971: GOTO 172

.....      stdby_i=read_adc(ADC_READ_ONLY);

0972: BTFSC 1F.2

0973: GOTO 172

0974: MOVF 1E,W

0975: MOVWF 49

.....      stdby_i_temp+=stdby_i;

0976: MOVF 49,W

0977: ADDWF 70,F

0978: BTFSC 03.0

0979: INCF 71,F

.....      stdby_i_avg_counter++;

097A: INCF 4C,F

.....      if(stdby_i_avg_counter==32) {

097B: MOVF 4C,W

097C: SUBLW 20

097D: BTFSS 03.2

097E: GOTO 1A5

.....      stdby_i=stdby_i_temp>>5;

```

097F: RRF 71,W

0980: MOVWF 7A

0981: RRF 70,W

0982: MOVWF 79

0983: RRF 7A,F

0984: RRF 79,F

0985: RRF 7A,F

0986: RRF 79,F

0987: RRF 7A,F

0988: RRF 79,F

0989: RRF 7A,F

098A: RRF 79,F

098B: MOVF 79,W

098C: MOVWF 49

..... if(stdby_i>=stdby_max) inv_on=1;

098D: MOVF 49,W

098E: SUBLW FC

098F: BTFSC 03.0

0990: GOTO 194

0991: MOVLW 01

0992: MOVWF 2E

..... else inv_on=0;

0993: GOTO 195

0994: CLRF 2E

..... if(stdby_i<=stdby_min) inv_off=1;

0995: MOVF 49,W

0996: SUBLW 02

0997: BTFSS 03.0

0998: GOTO 19B

0999: MOVLW 01

099A: MOVWF 2F

..... stdby_i_h=(stdby_i>>1)+128;

099B: BCF 03.0

099C: RRF 49,W

099D: ADDLW 80

099E: MOVWF 4A

..... //if(stdby_i_h>stdby_i_h_max) stdby_i_h=stdby_i_h_max;

..... //else if(stdby_i_h<stdby_i_h_min) stdby_i_h=stdby_i_h_min;

..... stdby_i_l=255-stdby_i_h;

099F: MOVF 4A,W

09A0: SUBLW FF

09A1: MOVWF 4B

..... stdby_i_avg_counter=0;

09A2: CLRF 4C

..... stdby_i_temp=0;

09A3: CLRF 71

09A4: CLRF 70

..... }

..... }

..... index++;

```

09A5: INCF 28,F
..... if(index>31) index=0;

09A6: MOVF 28,W

09A7: SUBLW 1F

09A8: BTFSS 03.0

09A9: CLRF 28
..... }
..... else {                                     // acc low mode;

09AA: GOTO 273

..... set_pwm1_duty(0);                           // M=0;

09AB: CLRF 15

..... output_high(PIN_C0);                         // Z=1;

09AC: BSF 07.0

..... output_low(PIN_B4);                          // Green LED-OFF;

09AD: BCF 06.4

..... if(!inv_off) output_high(PIN_B5);            // Red LED-ON;

09AE: MOVF 2F,F

09AF: BTFSC 03.2

09B0: BSF 06.5

..... inv_mode=0;

09B1: CLRF 2A

..... index=0;

09B2: CLRF 28

..... short_curr=0;

09B3: CLRF 33

```



```
.....    over_curr=0;

09B4: CLRf 32

.....    over_curr_delay=0;

09B5: CLRf 65

09B6: CLRf 64

.....    high_ab=0;

09B7: CLRf 34

.....    high_t_delay=0;

09B8: CLRf 6B

09B9: CLRf 6A

.....    high_t_stop=0;

09BA: CLRf 38

.....    stdby=0;

09BB: CLRf 2C

.....    pwm_pos=0;

09BC: CLRf 59

09BD: CLRf 58

.....    pwm_neg=0;

09BE: CLRf 5B

09BF: CLRf 5A

.....    delta_h_v=0;

09C0: CLRf 53

.....    delta_l_v=0;

09C1: CLRf 54

.....    //delta_h_ref_v=0;
```

..... //delta_l_ref_v=0;

..... //diff_h_v=0;

..... //diff_l_v=0;

..... delta_h_ref=0;

09C2: CLRf 55

..... delta_l_ref=0;

09C3: CLRf 56

..... //delta_h_ref_adj=0;

..... //delta_l_ref_adj=0;

..... low_curr_h=0;

09C4: CLRf 30

..... low_curr_l=0;

09C5: CLRf 31

..... curr_h_temp=0;

09C6: CLRf 6D

09C7: CLRf 6C

..... curr_h_avg=0;

09C8: CLRf 51

..... curr_l_temp=0;

09C9: CLRf 6F

09CA: CLRf 6E

..... curr_l_avg=0;

09CB: CLRf 52

..... low_curr=0;

09CC: CLRf 3A

```
..... volt_h_temp=0;
09CD: CLRf 5D
09CE: CLRf 5C
..... volt_h_avg=0;
09CF: CLRf 42
..... volt_l_temp=0;
09D0: CLRf 5F
09D1: CLRf 5E
..... volt_l_avg=0;
09D2: CLRf 43
..... volt_ref_temp=0;
09D3: CLRf 61
09D4: CLRf 60
..... volt_ref_avg=0;
09D5: CLRf 4E
..... volt_ref_delta=0;
09D6: CLRf 57
..... volt_ref_counter=0;
09D7: CLRf 3D
..... volt_h_avg_counter=0;
09D8: CLRf 3F
..... volt_l_avg_counter=0;
09D9: CLRf 3E
..... //volt_l_avg_counter=0;
..... stdby_i_temp=0;
```

```

09DA: CLRF 71

09DB: CLRF 70

..... //stdby_i_avg_counter=0;

..... stdby_go_delay=0;

09DC: CLRF 69

09DD: CLRF 68

..... stdby_delay=2047;

09DE: MOVLW 07

09DF: MOVWF 67

09E0: MOVLW FF

09E1: MOVWF 66

..... high_t_blink=90;

09E2: MOVLW 5A

09E3: MOVWF 39

..... low_acc_delay=0;

09E4: CLRF 3B

..... stdby_go_blink=60;

09E5: MOVLW 3C

09E6: MOVWF 35

..... //level=0;

..... //level_corr=0;

..... //level_l_corr=0;

..... for(i=0; i<32; i++) {

09E7: CLRF 2D

09E8: MOVF 2D,W

```

```

09E9: SUBLW 1F

09EA: BTFSS 03.0

09EB: GOTO 1FC

.....    shape_corr[i]=0;

09EC: MOVLW 10

09ED: ADDWF 2D,W

09EE: MOVWF 04

09EF: BSF 03.7

09F0: CLRF 00

.....    //shape_l_corr[i]=0;

.....    level_corr[i]=0;

09F1: BCF 03.0

09F2: RLF 2D,W

09F3: ADDLW A0

09F4: MOVWF 04

09F5: BCF 03.7

09F6: INCF 04,F

09F7: CLRF 00

09F8: DECF 04,F

09F9: CLRF 00

.....    //level_adj[i]=0;

.....    //shape_h_corr_temp[i]=0;

.....    //shape_l_corr_temp[i]=0;

.....    }

09FA: INCF 2D,F

```

```

09FB: GOTO 1E8

.....    output_high(PIN_C3);                // check stdby current value;

09FC: BSF  07.3

.....    set_adc_channel(stdby_chan);

09FD: MOVLW 08

09FE: MOVWF 78

09FF: MOVF 1F,W

0A00: ANDLW C7

0A01: IORWF 78,W

0A02: MOVWF 1F

.....    delay_us(10);

0A03: CLRWD

0A04: MOVLW 10

0A05: MOVWF 77

0A06: DECFSZ 77,F

0A07: GOTO 206

.....    read_adc(ADC_START_ONLY);

0A08: BSF  1F.2

.....    delay_us(20);

0A09: CLRWD

0A0A: MOVLW 20

0A0B: MOVWF 77

0A0C: DECFSZ 77,F

0A0D: GOTO 20C

0A0E: GOTO 20F

```

..... stdby_i=read_adc(ADC_READ_ONLY);

0A0F: BTFSC 1F.2

0A10: GOTO 20F

0A11: MOVF 1E,W

0A12: MOVWF 49

..... stdby_i_temp+=stdby_i;

0A13: MOVF 49,W

0A14: ADDWF 70,F

0A15: BTFSC 03.0

0A16: INCF 71,F

..... stdby_i_avg_counter++;

0A17: INCF 4C,F

..... if(stdby_i_avg_counter==32) {

0A18: MOVF 4C,W

0A19: SUBLW 20

0A1A: BTFSS 03.2

0A1B: GOTO 238

..... stdby_i=stdby_i_temp>>5;

0A1C: RRF 71,W

0A1D: MOVWF 7A

0A1E: RRF 70,W

0A1F: MOVWF 79

0A20: RRF 7A,F

0A21: RRF 79,F

0A22: RRF 7A,F

0A23: RRF 79,F

0A24: RRF 7A,F

0A25: RRF 79,F

0A26: RRF 7A,F

0A27: RRF 79,F

0A28: MOVF 79,W

0A29: MOVWF 49

..... if(stdby_i>stdby_min) inv_off=0;

0A2A: MOVF 49,W

0A2B: SUBLW 02

0A2C: BTFSS 03.0

0A2D: CLRF 2F

..... //else inv_off=0;

..... stdby_i_h=(stdby_i>>1)+128;

0A2E: BCF 03.0

0A2F: RRF 49,W

0A30: ADDLW 80

0A31: MOVWF 4A

..... //if(stdby_i_h>stdby_i_h_max) stdby_i_h=stdby_i_h_max;

..... //else if(stdby_i_h<stdby_i_h_min) stdby_i_h=stdby_i_h_min;

..... stdby_i_l=255-stdby_i_h;

0A32: MOVF 4A,W

0A33: SUBLW FF

0A34: MOVWF 4B

..... stdby_i_avg_counter=0;


```

0A35: CLRF 4C
.....    stdby_i_temp=0;

0A36: CLRF 71

0A37: CLRF 70
.....    }

.....    set_adc_channel(acc_chan);

0A38: MOVLW 18

0A39: MOVWF 78

0A3A: MOVF 1F,W

0A3B: ANDLW C7

0A3C: IORWF 78,W

0A3D: MOVWF 1F

.....    delay_us(10);

0A3E: CLRWD

0A3F: MOVLW 10

0A40: MOVWF 77

0A41: DECFSZ 77,F

0A42: GOTO 241

.....    read_adc(ADC_START_ONLY);

0A43: BSF 1F.2

.....    delay_us(20);

0A44: CLRWD

0A45: MOVLW 20

0A46: MOVWF 77

0A47: DECFSZ 77,F

```

```

0A48: GOTO 247

0A49: GOTO 24A

.....    acc_v=read_adc(ADC_READ_ONLY);

0A4A: BTFSC 1F.2

0A4B: GOTO 24A

0A4C: MOVF 1E,W

0A4D: MOVWF 45

.....    acc_v_temp+=acc_v;

0A4E: MOVF 45,W

0A4F: ADDWF 62,F

0A50: BTFSC 03.0

0A51: INCF 63,F

.....    acc_avg_counter++;

0A52: INCF 3C,F

.....    if(acc_avg_counter==32) {

0A53: MOVF 3C,W

0A54: SUBLW 20

0A55: BTFSS 03.2

0A56: GOTO 271

.....    acc_avg_counter=0;

0A57: CLRF 3C

.....    acc_v_avg=acc_v_temp>>5;

0A58: RRF 63,W

0A59: MOVWF 7A

0A5A: RRF 62,W

```

0A5B: MOVWF 79

0A5C: RRF 7A,F

0A5D: RRF 79,F

0A5E: RRF 7A,F

0A5F: RRF 79,F

0A60: RRF 7A,F

0A61: RRF 79,F

0A62: RRF 7A,F

0A63: RRF 79,F

0A64: MOVF 79,W

0A65: MOVWF 46

..... if(acc_v_avg<=acc_max_l) high_acc=0;

0A66: MOVF 46,W

0A67: SUBLW 5C

0A68: BTFSC 03.0

0A69: CLRF 37

..... if(acc_v_avg>=acc_min_h) low_acc=0;

0A6A: MOVF 46,W

0A6B: SUBLW 41

0A6C: BTFSS 03.0

0A6D: CLRF 36

..... acc_v_temp=0;

0A6E: CLRF 63

0A6F: CLRF 62

..... acc_v_avg=0;

0A70: CLRF 46

..... }

..... if(input(PIN_C4)) output_low(PIN_C5);

0A71: BTFSC 07.4

0A72: BCF 07.5

..... }

..... }

.....

.....

0A73: BCF 0B.2

0A74: BCF 0A.3

0A75: BCF 0A.4

0A76: GOTO 01D

..... void main()

..... {

*

0A80: CLRF 04

0A81: BCF 03.7

0A82: MOVLW 1F

0A83: ANDWF 03,F

0A84: BSF 03.5

0A85: BSF 1F.0

0A86: BSF 1F.1

0A87: BSF 1F.2

0A88: BCF 1F.3

```

0A89: MOVLW 07

0A8A: MOVWF 1C
..... set_tris_b(0xCD);

0A8B: MOVLW CD

0A8C: MOVWF 06
..... set_tris_c(0x90);

0A8D: MOVLW 90

0A8E: MOVWF 07
..... output_high(PIN_C0);                // Z=1;

0A8F: BCF 03.5

0A90: BSF 07.0
..... //output_high(PIN_B4);                // test LED's;
..... //output_low(PIN_B5);
..... //delay_ms(1000);
..... output_low(PIN_B4);

0A91: BCF 06.4
..... //output_high(PIN_B5);
..... //delay_ms(1000);
..... output_low(PIN_B5);

0A92: BCF 06.5
..... index=0;

0A93: CLRF 28
..... inv_mode=0;                // init to normal start mode;

0A94: CLRF 2A
..... inv_on=0;

```

0A95: CLRf 2E

..... inv_off=0;

0A96: CLRf 2F

..... stdby_mode=0;

0A97: CLRf 2B

..... short_curr=0;

0A98: CLRf 33

..... over_curr=0;

0A99: CLRf 32

..... over_curr_delay=0;

0A9A: CLRf 65

0A9B: CLRf 64

..... high_ab=0;

0A9C: CLRf 34

..... high_t_delay=0;

0A9D: CLRf 6B

0A9E: CLRf 6A

..... high_t_stop=0;

0A9F: CLRf 38

..... low_acc=0;

0AA0: CLRf 36

..... high_acc=0;

0AA1: CLRf 37

..... acc_v_temp=0;

0AA2: CLRf 63

0AA3: CLRF 62
..... acc_avg_counter=0;

0AA4: CLRF 3C
..... acc_v_avg=0;

0AA5: CLRF 46
..... stdbv=0;

0AA6: CLRF 2C
..... pwm_pos=0;

0AA7: CLRF 59

0AA8: CLRF 58
..... pwm_neg=0;

0AA9: CLRF 5B

0AAA: CLRF 5A
..... delta_h_v=0;

0AAB: CLRF 53
..... delta_l_v=0;

0AAC: CLRF 54
..... //delta_h_ref_v=0;
..... //delta_l_ref_v=0;
..... //diff_h_v=0;
..... //diff_l_v=0;
..... delta_h_ref=0;

0AAD: CLRF 55
..... delta_l_ref=0;

0AAE: CLRF 56

..... //delta_h_ref_corr=0;

..... //delta_l_ref_corr=0;

..... low_curr_h=0;

0AAF: CLRF 30

..... low_curr_l=0;

0AB0: CLRF 31

..... low_curr=0;

0AB1: CLRF 3A

..... curr_h_temp=0;

0AB2: CLRF 6D

0AB3: CLRF 6C

..... curr_h_avg=0;

0AB4: CLRF 51

..... curr_l_temp=0;

0AB5: CLRF 6F

0AB6: CLRF 6E

..... curr_l_avg=0;

0AB7: CLRF 52

..... low_curr=0;

0AB8: CLRF 3A

..... volt_h_temp=0;

0AB9: CLRF 5D

0ABA: CLRF 5C

..... volt_h_avg=0;

0ABB: CLRF 42


```
..... volt_l_temp=0;

0ABC: CLRf 5F

0ABD: CLRf 5E

..... volt_l_avg=0;

0ABE: CLRf 43

..... volt_ref_temp=0;

0ABF: CLRf 61

0AC0: CLRf 60

..... volt_ref_avg=0;

0AC1: CLRf 4E

..... volt_ref_delta=0;

0AC2: CLRf 57

..... volt_ref_counter=0;

0AC3: CLRf 3D

..... volt_h_avg_counter=0;

0AC4: CLRf 3F

..... volt_l_avg_counter=0;

0AC5: CLRf 3E

..... //volt_l_avg_counter=0;

..... stdby_i_temp=0;

0AC6: CLRf 71

0AC7: CLRf 70

..... stdby_i_avg_counter=0;

0AC8: CLRf 4C

..... stdby_go_delay=0;
```

```

0AC9: CLRF 69

0ACA: CLRF 68

..... stdby_delay=2047;

0ACB: MOVLW 07

0ACC: MOVWF 67

0ACD: MOVLW FF

0ACE: MOVWF 66

..... high_t_blink=90;

0ACF: MOVLW 5A

0AD0: MOVWF 39

..... low_acc_delay=0;

0AD1: CLRF 3B

..... stdby_go_blink=60;

0AD2: MOVLW 3C

0AD3: MOVWF 35

..... //level=0;

..... //level_corr=0;

..... //level_l_corr=0;

..... for(i=0; i<32; i++) {

0AD4: CLRF 2D

0AD5: MOVF 2D,W

0AD6: SUBLW 1F

0AD7: BTFSS 03.0

0AD8: GOTO 2E9

..... shape_corr[i]=0;

```

```

0AD9: MOVLW 10

0ADA: ADDWF 2D,W

0ADB: MOVWF 04

0ADC: BSF 03.7

0ADD: CLRF 00

..... //shape_l_corr[i]=0;

..... level_corr[i]=0;

0ADE: BCF 03.0

0ADF: RLF 2D,W

0AE0: ADDLW A0

0AE1: MOVWF 04

0AE2: BCF 03.7

0AE3: INCF 04,F

0AE4: CLRF 00

0AE5: DECF 04,F

0AE6: CLRF 00

..... //shape_h_corr_temp[i]=0;

..... //shape_l_corr_temp[i]=0;

..... //level_adj[i]=0;

..... }

0AE7: INCF 2D,F

0AE8: GOTO 2D5

..... setup_adc_ports(ALL_ANALOG); // init the ADC;

0AE9: BSF 03.5

0AEA: BCF 1F.0

```

```

0AEB: BCF  1F.1

0AEC: BCF  1F.2

0AED: BCF  1F.3

.....  setup_adc(ADC_CLOCK_DIV_32);           // Tad=1.6us;

0AEE: BCF  1F.6

0AEF: BCF  03.5

0AF0: BCF  1F.6

0AF1: BSF  1F.7

0AF2: BSF  03.5

0AF3: BCF  1F.7

0AF4: BCF  03.5

0AF5: BSF  1F.0

.....  set_adc_channel(acc_chan);

0AF6: MOVLW 18

0AF7: MOVWF 78

0AF8: MOVF  1F,W

0AF9: ANDLW C7

0AFA: IORWF 78,W

0AFB: MOVWF 1F

.....  delay_us(10);

0AFC: CLRWDI

0AFD: MOVLW 10

0AFE: MOVWF 77

0AFF: DECFSZ 77,F

0B00: GOTO  2FF

```

```

.....   for(i=0; i<32; i++) {

OB01: CLRF  2D

OB02: MOVF  2D,W

OB03: SUBLW 1F

OB04: BTFSS 03.0

OB05: GOTO  332

.....   acc_v=read_adc();

OB06: BSF   1F.2

OB07: BTFSC 1F.2

OB08: GOTO  307

OB09: MOVF  1E,W

OB0A: MOVWF 45

.....   acc_v_temp+=acc_v;

OB0B: MOVF  45,W

OB0C: ADDWF 62,F

OB0D: BTFSC 03.0

OB0E: INCF  63,F

.....   if(i==31) {

OB0F: MOVF  2D,W

OB10: SUBLW 1F

OB11: BTFSS 03.2

OB12: GOTO  330

.....   acc_v_avg=acc_v_temp>>5;

OB13: RRF   63,W

OB14: MOVWF 7A

```

0B15: RRF 62,W

0B16: MOVWF 79

0B17: RRF 7A,F

0B18: RRF 79,F

0B19: RRF 7A,F

0B1A: RRF 79,F

0B1B: RRF 7A,F

0B1C: RRF 79,F

0B1D: RRF 7A,F

0B1E: RRF 79,F

0B1F: MOVF 79,W

0B20: MOVWF 46

..... if(acc_v_avg<=acc_min_l) low_acc=1;

0B21: MOVF 46,W

0B22: SUBLW 3C

0B23: BTFSS 03.0

0B24: GOTO 327

0B25: MOVLW 01

0B26: MOVWF 36

..... if(acc_v_avg>=acc_max_h) high_acc=1;

0B27: MOVF 46,W

0B28: SUBLW 61

0B29: BTFSC 03.0

0B2A: GOTO 32D

0B2B: MOVLW 01

```

0B2C: MOVWF 37

.....    acc_v_temp=0;

0B2D: CLRF 63

0B2E: CLRF 62

.....    acc_v_avg=0;

0B2F: CLRF 46

.....    }

.....    }

0B30: INCF 2D,F

0B31: GOTO 302

.....    output_high(PIN_C3);                // check stdby current value;

0B32: BSF 07.3

.....    set_adc_channel(stdby_chan);

0B33: MOVLW 08

0B34: MOVWF 78

0B35: MOVF 1F,W

0B36: ANDLW C7

0B37: IORWF 78,W

0B38: MOVWF 1F

.....    delay_us(10);

0B39: CLRWD

0B3A: MOVLW 10

0B3B: MOVWF 77

0B3C: DECFSZ 77,F

0B3D: GOTO 33C

```

```

.....    for(i=0; i<32; i++) {

0B3E: CLRF  2D

0B3F: MOVF  2D,W

0B40: SUBLW 1F

0B41: BTFSS 03.0

0B42: GOTO  376

.....    stdby_i=read_adc();

0B43: BSF   1F.2

0B44: BTFSC 1F.2

0B45: GOTO  344

0B46: MOVF  1E,W

0B47: MOVWF 49

.....    stdby_i_temp+=stdby_i;

0B48: MOVF  49,W

0B49: ADDWF 70,F

0B4A: BTFSC 03.0

0B4B: INCF  71,F

.....    if(i==31) {

0B4C: MOVF  2D,W

0B4D: SUBLW 1F

0B4E: BTFSS 03.2

0B4F: GOTO  374

.....    stdby_i=stdby_i_temp>>5;

0B50: RRF   71,W

0B51: MOVWF 7A

```


0B52: RRF 70,W

0B53: MOVWF 79

0B54: RRF 7A,F

0B55: RRF 79,F

0B56: RRF 7A,F

0B57: RRF 79,F

0B58: RRF 7A,F

0B59: RRF 79,F

0B5A: RRF 7A,F

0B5B: RRF 79,F

0B5C: MOVF 79,W

0B5D: MOVWF 49

..... if(stdby_i<=stdby_min) inv_off=1;

0B5E: MOVF 49,W

0B5F: SUBLW 02

0B60: BTFSS 03.0

0B61: GOTO 365

0B62: MOVLW 01

0B63: MOVWF 2F

..... else if(stdby_i>=stdby_max) inv_on=1;

0B64: GOTO 36B

0B65: MOVF 49,W

0B66: SUBLW FC

0B67: BTFSC 03.0

0B68: GOTO 36B

```

0B69: MOVLW 01

0B6A: MOVWF 2E

.....    stdby_i_h=(stdby_i>>1)+128;

0B6B: BCF  03.0

0B6C: RRF  49,W

0B6D: ADDLW 80

0B6E: MOVWF 4A

.....    stdby_i_l=255-stdby_i_h;

0B6F: MOVF  4A,W

0B70: SUBLW FF

0B71: MOVWF 4B

.....    stdby_i_temp=0;

0B72: CLRF  71

0B73: CLRF  70

.....    }

.....    }

0B74: INCF  2D,F

0B75: GOTO  33F

.....    output_low(PIN_C3);

0B76: BCF  07.3

.....    set_adc_channel(stdby_chan);           // check vref value;

0B77: MOVLW 08

0B78: MOVWF 78

0B79: MOVF  1F,W

0B7A: ANDLW C7

```

```

0B7B: IORWF 78,W

0B7C: MOVWF 1F

..... delay_us(10);

0B7D: CLRWD

0B7E: MOVLW 10

0B7F: MOVWF 77

0B80: DECFSZ 77,F

0B81: GOTO 380

..... for(i=0; i<32; i++) {

0B82: CLRF 2D

0B83: MOVF 2D,W

0B84: SUBLW 1F

0B85: BTFSS 03.0

0B86: GOTO 39D

..... volt_ref=read_adc();

0B87: BSF 1F.2

0B88: BTFSC 1F.2

0B89: GOTO 388

0B8A: MOVF 1E,W

0B8B: MOVWF 4D

..... volt_ref_temp+=volt_ref;

0B8C: MOVF 4D,W

0B8D: ADDWF 60,F

0B8E: BTFSC 03.0

0B8F: INCF 61,F

```

```

.....    if(i==31) {

0B90: MOVF  2D,W

0B91: SUBLW 1F

0B92: BTFSS 03.2

0B93: GOTO  39B

.....    volt_ref_avg=volt_ref_temp>>8;

0B94: MOVF  61,W

0B95: MOVWF 4E

.....    volt_ref_delta=volt_ref_avg-29;

0B96: MOVLW 1D

0B97: SUBWF 4E,W

0B98: MOVWF 57

.....    volt_ref_temp=0;

0B99: CLRF  61

0B9A: CLRF  60

.....    }

.....    }

0B9B: INCF  2D,F

0B9C: GOTO  383

.....    setup_timer_2(T2_DIV_BY_1, 255, 1);           // Init the PWM;

0B9D: MOVLW 00

0B9E: MOVWF 78

0B9F: IORLW 04

0BA0: MOVWF 12

0BA1: MOVLW FF

```

```

0BA2: BSF  03.5

0BA3: MOVWF 12
.....  setup_ccp1(CCP_PWM);

0BA4: BCF  03.5

0BA5: BCF  07.2

0BA6: MOVLW 0C

0BA7: MOVWF 17
.....  set_pwm1_duty(0);

0BA8: CLRF 15
.....  //setup_ccp2(CCP_PWM);
.....  //set_pwm2_duty(0);
.....  setup_wdt(WDT_18MS);

0BA9: BSF  03.5

0BAA: MOVF 01,W

0BAB: ANDLW F0

0BAC: MOVWF 01

0BAD: CLRWDT
.....  set_timer0(60);

0BAE: MOVLW 3C

0BAF: BCF  03.5

0BB0: MOVWF 01
.....  setup_timer_0(RTCC_INTERNAL|RTCC_DIV_8);           // Init the TIMER0;

0BB1: BSF  03.5

0BB2: MOVF 01,W

0BB3: ANDLW C0

```

```

0BB4: IORLW 02

0BB5: MOVWF 01

..... enable_interrupts(INT_TIMER0);

0BB6: BCF 03.5

0BB7: BSF 0B.5

..... enable_interrupts(GLOBAL);

0BB8: MOVLW C0

0BB9: IORWF 0B,F

..... while(TRUE) {

..... restart_wdt();

0BBA: CLRWDT

..... if((short_curr)|| (high_ab)|| (over_curr)|| (high_t_stop>1)) { // stop and wait for
60 sec;

0BBB: MOVF 33,F

0BBC: BTFSS 03.2

0BBD: GOTO 3C8

0BBE: MOVF 34,F

0BBF: BTFSS 03.2

0BC0: GOTO 3C8

0BC1: MOVF 32,F

0BC2: BTFSS 03.2

0BC3: GOTO 3C8

0BC4: MOVF 38,W

0BC5: SUBLW 01

0BC6: BTFSC 03.0

0BC7: GOTO 439

```

```

.....      set_pwm1_duty(0);                      // M=0;

OBC8: CLRF  15

.....      output_high(PIN_C0);                    // Z=1;

OBC9: BSF   07.0

.....      disable_interrupts(GLOBAL);

OBCA: BCF   0B.6

OBCB: BCF   0B.7

OBCC: BTFSC 0B.7

OBCD: GOTO  3CB

.....      output_low(PIN_B4);

OBCE: BCF   06.4

.....      output_low(PIN_B5);

OBCF: BCF   06.5

.....      short_curr=0;

OBD0: CLRF  33

.....      over_curr=0;

OBD1: CLRF  32

.....      over_curr_delay=0;

OBD2: CLRF  65

OBD3: CLRF  64

.....      high_ab=0;

OBD4: CLRF  34

.....      high_t_stop=0;

OBD5: CLRF  38

.....      high_t_delay=0;

```

0BD6: CLRf 6B

0BD7: CLRf 6A

..... low_acc=0;

0BD8: CLRf 36

..... high_acc=0;

0BD9: CLRf 37

..... acc_avg_counter=0;

0BDA: CLRf 3C

..... acc_v_temp=0;

0BDB: CLRf 63

0BDC: CLRf 62

..... acc_v_avg=0;

0BDD: CLRf 46

..... low_curr_h=0;

0BDE: CLRf 30

..... low_curr_l=0;

0BDF: CLRf 31

..... index=0;

0BE0: CLRf 28

..... inv_mode=0;

0BE1: CLRf 2A

..... inv_on=0;

0BE2: CLRf 2E

..... inv_off=0;

0BE3: CLRf 2F


```
.....    stdby_mode=0;

OBE4: CLRf 2B

.....    stdby=0;

OBE5: CLRf 2C

.....    pwm_pos=0;

OBE6: CLRf 59

OBE7: CLRf 58

.....    pwm_neg=0;

OBE8: CLRf 5B

OBE9: CLRf 5A

.....    delta_h_v=0;

OBEA: CLRf 53

.....    delta_l_v=0;

OBEB: CLRf 54

.....    //delta_h_ref_v=0;

.....    //delta_l_ref_v=0;

.....    //diff_h_v=0;

.....    //diff_l_v=0;

.....    delta_h_ref=0;

OBEC: CLRf 55

.....    delta_l_ref=0;

OBED: CLRf 56

.....    //delta_h_ref_corr=0;

.....    //delta_l_ref_corr=0;

.....    //level=0;
```

```

..... //level_corr=0;

..... //level_l_corr=0;

..... for(i=0; i<32; i++) {

0BEE: CLRF 2D

0BEF: MOVF 2D,W

0BF0: SUBLW 1F

0BF1: BTFSS 03.0

0BF2: GOTO 403

..... shape_corr[i]=0;

0BF3: MOVLW 10

0BF4: ADDWF 2D,W

0BF5: MOVWF 04

0BF6: BSF 03.7

0BF7: CLRF 00

..... //shape_l_corr[i]=0;

..... level_corr[i]=0;

0BF8: BCF 03.0

0BF9: RLF 2D,W

0BFA: ADDLW A0

0BFB: MOVWF 04

0BFC: BCF 03.7

0BFD: INCF 04,F

0BFE: CLRF 00

0BFF: DECF 04,F

0C00: CLRF 00

```

```

..... //level_adj[i]=0;

..... //shape_h_corr_temp[i]=0;

..... //shape_l_corr_temp[i]=0;

..... }

0C01: INCF 2D,F

0C02: GOTO 3EF

..... curr_h_temp=0;

0C03: CLRF 6D

0C04: CLRF 6C

..... curr_h_avg=0;

0C05: CLRF 51

..... curr_l_temp=0;

0C06: CLRF 6F

0C07: CLRF 6E

..... curr_l_avg=0;

0C08: CLRF 52

..... low_curr=0;

0C09: CLRF 3A

..... volt_h_temp=0;

0C0A: CLRF 5D

0C0B: CLRF 5C

..... volt_h_avg=0;

0C0C: CLRF 42

..... volt_l_temp=0;

0C0D: CLRF 5F

```

0C0E: CLRf 5E
..... volt_l_avg=0;
0C0F: CLRf 43
..... volt_ref_temp=0;
0C10: CLRf 61
0C11: CLRf 60
..... volt_ref_avg=0;
0C12: CLRf 4E
..... volt_ref_delta=0;
0C13: CLRf 57
..... volt_ref_counter=0;
0C14: CLRf 3D
..... volt_h_avg_counter=0;
0C15: CLRf 3F
..... volt_l_avg_counter=0;
0C16: CLRf 3E
..... //volt_l_avg_counter=0;
..... stdby_i_temp=0;
0C17: CLRf 71
0C18: CLRf 70
..... stdby_i_avg_counter=0;
0C19: CLRf 4C
..... stdby_go_delay=0;
0C1A: CLRf 69
0C1B: CLRf 68

..... stbby_delay=2047;

0C1C: MOVLW 07

0C1D: MOVWF 67

0C1E: MOVLW FF

0C1F: MOVWF 66

..... high_t_blink=90;

0C20: MOVLW 5A

0C21: MOVWF 39

..... low_acc_delay=0;

0C22: CLRF 3B

..... stbby_go_blink=60;

0C23: MOVLW 3C

0C24: MOVWF 35

..... delay_ms(30000);

0C25: MOVLW 78

0C26: BSF 03.6

0C27: MOVWF 30

0C28: MOVLW FA

0C29: MOVWF 31

0C2A: BCF 0A.3

0C2B: BCF 03.6

0C2C: GOTO 726

0C2D: BSF 0A.3

0C2E: BSF 03.6

0C2F: DECFSZ 30,F

```

0C30: GOTO 428

.....    if(input(PIN_C4)) output_low(PIN_C5);

0C31: BCF 03.6

0C32: BTFSC 07.4

0C33: BCF 07.5

.....    clear_interrupt(int_timer0);

0C34: BCF 0B.2

.....    set_timer0(60);

0C35: MOVLW 3C

0C36: MOVWF 01

.....    enable_interrupts(GLOBAL);

0C37: MOVLW C0

0C38: IORWF 0B,F

.....    }

.....    }

0C39: GOTO 3BA

.....    }

0C3A: SLEEP

```

Configuration Fuses:

Word 1: 3F76 HS WDT PUT NODEBUG NOPROTECT BROWNOUT NOLVP NOCPD NOWRT