```
;*****************************************************************
;  UNTERPROGRAMME
;*****************************************************************
; ITNOSC fosc =1MHz      fdac ca. > 500mHHz - 130Hz
; INTOSC fosc =4MHz      fdac ca.   2Hz     - 540Hz
; INTOSC fosc =4x8MHz    fdac ca.   13Hz    - 4,43kHz
Sinus:
        movlw      .3
        movwf   PCLATH             ; vorbereiten fuer Sin-Tabelle im
Bereich 0x300..0x3ff
   GOTO  next_wave
Triangle:
        movlw      .4
        movwf   PCLATH
next_wave:
        movf       f0,w           ;Lo-Byte,w
        addwf      Akku0,f        ;Akku,f
        movf       f1,w           ;Hi-Byte,w
        btfsc      STATUS,C
        incfsz  f1,w           ;Hi-Byte,w
        addwf      Akku1,f        ;Hi-Byte,f Akku = Akku + f1  (16 Bit)

        movf       Akku1,w        ;Hi-Byte1,w
        call       getsine        ;w = sin(w) (Page 3) ; ca. 6 cyc
        movwf      PORTB                     ;-> DAC
        ;
   BANKSEL  ADCON0         ;
   BTFSC           ADCON0,GO       ; ist der ADC fertig?
        GOTO       subst_wc               ;Ersatzfür ADRESH....next_wave
        ;
        BANKSEL  ADRESH
        movfw      ADRESH                 ; obere 2 Bit auslesen
        BANKSEL  0
        movwf      f1             ;Hi-Byte      obere 2 Bit nach f1
        BANKSEL  ADRESL       ;Bank1
        movfw      ADRESL                 ;untere 8 Bit auslesen
        BANKSEL  0
        movwf    f0             ;untere 8 Bit nach f0
        BANKSEL  ADCON0
        BSF        ADCON0, GO      ;ADC starten
        BANKSEL  0
        GOTO     next_wave
   ;
subst_wc:
   BANKSEL  0  ;15wc für delay wenn ADC noch nicht bereit ist
   nop         ;fosc/4 = 8MHz
   nop         ;Loop gesamt 30wc -> 3,75µs/durchlauf
   nop         ;D
   nop
   nop
   nop
   btfss LCD_PORT,RA2
   GOTO  Triangle
        GOTO  Sinus
   RETURN
;*****************************************************************************
**************
; Sinustabelle aus 256 Werten
; Wert =  (sin(w/256*2*Pi) + 1) *127.5 ; fuer w = 0 ...255
; PCLATCH = 0x03
; dadurch landet addwf im Bereich 3xxh
        ORG   0x02ff
getsine:        addwf   PCL,f
sintab:
        dt   .126, .129, .132, .135, .138, .141, .144, .148
;,Anfang,der,positiven,Halbwelle
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        dt   .151, .154, .157, .160, .163, .166, .168, .171
        dt   .174, .177, .180, .183, .185, .188, .191, .193
        dt   .196, .199, .201, .204, .206, .208, .211, .213
        dt   .215, .217, .219, .221, .223, .225, .227, .229
        dt   .231, .232, .234, .236, .237, .239, .240, .241
        dt   .242, .244, .245, .246, .247, .247, .248, .249
        dt   .250, .250, .251, .251, .251, .252, .252, .252
        dt   .252, .252, .252, .252, .251, .251, .251, .250
        dt   .250, .249, .248, .247, .247, .246, .245, .244
        dt   .242, .241, .240, .239, .237, .236, .234, .232
        dt   .231, .229, .227, .225, .223, .221, .219, .217
        dt   .215, .213, .211, .208, .206, .204, .201, .199
        dt   .196, .193, .191, .188, .185, .183, .180, .177
        dt   .174, .171, .168, .166, .163, .160, .157, .154
        dt   .151, .148, .144, .141, .138, .135, .132, .129
;,Ende,der,positiven,Halbwelle
        dt   .126, .123, .120, .117, .114, .111, .108, .104
;,Anfang,der,negativen,Halbwelle
        dt   .101,  .98,  .95,  .92,  .89,  .86,  .84,  .81
        dt    .78,  .75,  .72,  .69,  .67,  .64,  .61,  .59
        dt    .56,  .53,  .51,  .48,  .46,  .44,  .41,  .39
        dt    .37,  .35,  .33,  .31,  .29,  .27,  .25,  .23
        dt    .21,  .20,  .18,  .16,  .15,  .13,  .12,  .11
        dt    .10,   .8,   .7,   .6,   .5,   .5,   .4,   .3
        dt     .2,   .2,   .1,   .1,   .1,   .0,   .0,   .0
        dt     .0,   .0,   .0,   .0,   .1,   .1,   .1,   .2
        dt     .2,   .3,   .4,   .5,   .5,   .6,   .7,   .8
        dt    .10,  .11,  .12,  .13,  .15,   .16, .18,  .20
        dt    .21,  .23,  .25,  .27,  .29,   .31, .33,  .35
        dt    .37,  .39,  .41,  .44,  .46,   .48, .51,  .53
        dt    .56,  .59,  .61,  .64,  .67,   .69, .72,  .75
        dt    .78,  .81,  .84,  .86,  .89,   .92, .95,  .98
        dt   .101, .104, .108, .111, .114,  .117, .120,.123             ;
Ende der negativen Halbwelle

        ORG   0x0400
gettriangle:    addwf   PCL,f

triangle:       ; 256 step trianglewave table
        dt
0x00,0x02,0x04,0x06,0x08,0x0a,0x0c,0x0e,0x10,0x12,0x14,0x16,0x18,0x1a,0x1c,
0x1e
        dt
0x20,0x22,0x24,0x26,0x28,0x2a,0x2c,0x2e,0x30,0x32,0x34,0x36,0x38,0x3a,0x3c,
0x3e
        dt
0x40,0x42,0x44,0x46,0x48,0x4a,0x4c,0x4e,0x50,0x52,0x54,0x56,0x58,0x5a,0x5c,
0x5e
        dt
0x60,0x62,0x64,0x66,0x68,0x6a,0x6c,0x6e,0x70,0x72,0x74,0x76,0x78,0x7a,0x7c,
0x7e
        dt
0x80,0x82,0x84,0x86,0x88,0x8a,0x8c,0x8e,0x90,0x92,0x94,0x96,0x98,0x9a,0x9c,
0x9e
        dt
0xa0,0xa2,0xa4,0xa6,0xa8,0xaa,0xac,0xae,0xb0,0xb2,0xb4,0xb6,0xb8,0xba,0xbc,
0xbe
        dt
0xc0,0xc2,0xc4,0xc6,0xc8,0xca,0xcc,0xce,0xd0,0xd2,0xd4,0xd6,0xd8,0xda,0xdc,
0xde
        dt
0xe0,0xe2,0xe4,0xe6,0xe8,0xea,0xec,0xee,0xf0,0xf2,0xf4,0xf6,0xf8,0xfa,0xfc,
0xfe
        dt
0xff,0xfd,0xfb,0xf9,0xf7,0xf5,0xf3,0xf1,0xef,0xef,0xeb,0xe9,0xe7,0xe5,0xe3,
0xe1
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```
        dt
0xdf,0xdd,0xdb,0xd9,0xd7,0xd5,0xd3,0xd1,0xcf,0xcf,0xcb,0xc9,0xc7,0xc5,0xc3,
0xc1
        dt
0xbf,0xbd,0xbb,0xb9,0xb7,0xb5,0xb3,0xb1,0xaf,0xaf,0xab,0xa9,0xa7,0xa5,0xa3,
0xa1
        dt
0x9f,0x9d,0x9b,0x99,0x97,0x95,0x93,0x91,0x8f,0x8f,0x8b,0x89,0x87,0x85,0x83,
0x81
        dt
0x7f,0x7d,0x7b,0x79,0x77,0x75,0x73,0x71,0x6f,0x6f,0x6b,0x69,0x67,0x65,0x63,
0x61
        dt
0x5f,0x5d,0x5b,0x59,0x57,0x55,0x53,0x51,0x4f,0x4f,0x4b,0x49,0x47,0x45,0x43,
0x41
        dt
0x3f,0x3d,0x3b,0x39,0x37,0x35,0x33,0x31,0x2f,0x2f,0x2b,0x29,0x27,0x25,0x23,
0x21
        dt
0x1f,0x1d,0x1b,0x19,0x17,0x15,0x13,0x11,0x0f,0x0f,0x0b,0x09,0x07,0x05,0x03,
0x01
```