

Here is the G8BYI Proton+ Basic Code for the G8BYI full function addon board.
(Hex file is available for download from the DigiLite website).

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```
*****
'* Name      vcop114.BAS                                     *
'* Author   : [G8BYI]                                       *
'* Notice   : Copyright (c) 2011 [Richard Burrows]         *
'*          : All Rights Reserved                           *
'* Date     : 07/11/2011                                     *
'* Version  : 1.0                                           *
'* Notes    : Program to control frequency of ADF4360-5 fitted *
'*          : to Ultram pcb for use on UK Digilite DATV Project.*
*
'*          : Use 2x16 or 2x20 LCD                             *
*
*****
Device 16F628A 'Note disable low voltage programming flag
CMCON=7
ALL_DIGITAL=true
Config pwrte_on, wdt_off,intrc_osc_noclkout, lvp_off
PORTB_PULLUPS = On
Declare FLOAT_DISPLAY_TYPE = standard
Declare LCD_TYPE 0
Declare LCD_INTERFACE 4
Declare LCD_DTPIN PORTB.0
Declare LCD_ENPIN PORTB.5
Declare LCD_RSPIN PORTB.4
Declare LCD_LINES 2
DelayMS 1000
  Print $FE,1
DelayMS 50
Print $FE,128

Dim up As Byte
Dim dwn As Byte
Dim RCL As DWord 'R-counter latch 24bit word
Dim NCL As DWord 'N-counter latch 24bit word
Dim CL As DWord 'Device Control latch 24bit word
Dim N As Float
Dim a As RCL.BYTE2
Dim b As RCL.BYTE1
Dim c As RCL.LowByte
Dim d As CL.BYTE2
Dim e As CL.BYTE1
Dim f As CL.LowByte
Dim g As NCL. BYTE2 'high freq part %000+%xxxxx
Dim h As NCL. BYTE1 'mid frq part %xxxxxxxx
Dim i As NCL. LowByte 'low freq part %0+%xxxxx+%10
Dim mode As Byte 'sets up Channel select of Tuning modes
Dim chn As Byte
Dim k As Byte

Output PORTA.1 'use pin2 RA1 16f877A then connect To pin6 pad of old pic
Output PORTA.2 'use pin3 RA2 16f877A then connect To pin7 pad of old pic
Output PORTA.3 'use pin4 RA3 16f877A then connect To pin3 pad of old pic
Input PORTA.4 'use for setting channalized of variable tuning freq
Input PORTB.6 'use for up
Input PORTB.7 'use for down
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Symbol clk = PORTA.1 ' ADF4350-5 Clock pin 17 connects to pin6 pad old pic
Symbol dta = PORTA.2 ' ADF4350-5 Dataout pin 18 connects to pin7 pad old pic
Symbol LE = PORTA.3 ' ADF4350-5 SPI LE pin 19 connects to pin3 pad old pic
Symbol SW1 = PORTB.6 ' up button
Symbol SW2 = PORTB.7 ' down button
Symbol sw4 = PORTA.4 ' toggle switch low=select channels
                    'or high select variable tune

NCL= $1862A :          'fvco=1249MHz initial power up freq 100khz step
up=0: dwn=0  :chn=0   'set initial button state

DelayMS 50
GoSub text1
Menu:      'choose the mode
  GoSub init 'sets up register on AD4360-5
start:
  mode=sw4 :DelayMS 10
    If mode=0 Then GoTo chan
    If mode=1 Then GoTo Tune
  Return

End

init: ' Set up register in pll first time
'R divider latch
  RCL=$300191 : 'use for 100khz step 10mhz ref xtal 32 div
'Control latch
  CL= $8FE924 : 'set to 100khz freq step
' N divider latch for frequency selection
' NCL=$1862A : 'use for 100Khz steps
NCL= ERead 0 :If NCL <10 Then NCL=$1862A 'only used if chip not run before
GoSub process
GoSub Mhz
Return

chan:      'Channel mode step up and down in predefined frequencies
  GoSub process
  Print At 1,13,"Chan"
chk4:
  DelayMS 10
  Button sw4,0,150,10,mode,1,Tune : 'reset mode check
  Button SW1,0,100,10,up,0,chk3
  GoSub cupp
chk3:
  Button SW2,0,100,10,dwn,0,nopress
  GoSub cdwn
  nopress:
  GoTo chk4

Return

Tune:      'Tuning Mode steps up and down frequency in 100KHz steps
  GoSub prt1 'for 100kz steps
  Print At 1,13,"Tune"
chk1:
  Button sw4,0,150,10,mode,1,chan : ' reset mode check
  Button SW1,0,10,1,up,0,chk2
  GoSub upp
chk2:
  Button SW2,0,10,1,dwn,0,chk1
  GoSub dwnn
  GoTo chk1
  Return

```

cupp:

```
chn=chn+1
GoSub chanel
Return
```

cdwn:

```
chn=chn-1
GoSub chanel
```

Return

chanel:

```
If chn >25 Then chn=0
If chn <1 Then chn=24
```

Select chn

```
Case 1
  NCL=$18412      '1242 MHz
  GoSub process
Case 2
  NCL=$18462      '1244 Mhz
  GoSub process
Case 3
  NCL=$18532      '1246 Mhz
  GoSub process
Case 4
  NCL=$18602      '1248 Mhz
  GoSub process
Case 5
  NCL=$1862A      '1249 Mhz
  GoSub process
Case 6
  NCL=$18652      '1250 Mhz
  GoSub process
Case 7
  NCL=$18722      '1252 Mhz
  GoSub process
Case 8
  NCL=$18772      '1254 Mhz
  GoSub process
Case 9
  NCL=$18842      '1256 Mhz
  GoSub process
Case 10
  NCL=$18912      '1258 Mhz
  GoSub process
Case 11
  NCL=$18962      '1260 Mhz
  GoSub process
Case 12
  NCL=$18A32      '1262 Mhz
  GoSub process
Case 13
  NCL=$19002      '1280 Mhz
  GoSub process
Case 14
  NCL=$19742      '1304 Mhz
  GoSub process
Case 15
  NCL=$1976A      '1305 Mhz
  GoSub process
Case 16
  NCL=$19812      '1306 Mhz
  GoSub process
Case 17
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        NCL=$19862          '1308 Mhz
        GoSub process
Case 18
        NCL=$1990A        '1309 Mhz

        GoSub process
Case 19
        NCL=$19932        '1310 Mhz
        GoSub process
Case 20
        NCL=$1996E        '1311.5 Mhz
        GoSub process
Case 21
        NCL=$19A02        '1312 Mhz
        GoSub process
Case 22
        NCL=$19A52        '1314 Mhz
        GoSub process
Case 23
        NCL=$19B22        '1316 Mhz
        GoSub process
Case 24
        NCL=$19C06        '1318.5 Mhz
        GoSub process
Case 25
        chn=0 ':Return
EndSelect
Return
prt1:
Print At 1,1, DEC2 N
Return
text1:

Cls
Print At 1,1, "          DIGILITE          "
Print At 2,1, "          DATV Tx Freq.    "
DelayMS 3000
Cls
Print At 1,1,"ADF4360-5"
Print At 1,10," Ctrl    "
DelayMS 2500

Cls
Print At 2,1," Tx Freq.   Mode    "
Return
Mhz:
Print At 1,9,"MHZ"
Return
upp:
NCL=ncl+$4
If i >= $82 Then h = h+1: i=$2
GoSub process
GoSub Mhz

GoTo chk1
Return
dwnn:
NCL=ncl-$4          ' N freq   register to pll
If i <= $2 Then h=h-1: i=$7e
GoSub process
GoSub Mhz
GoTo chk1
Return
process:

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        GoSub load: GoSub calc:GoSub prt1
Return
calc:
N=NCL
N=n-i : N=N/256
N=n*32      'N=regB*32+regA
k=i/4
N=(N+k)/10
EWrite 0,[NCL]
Return

load:

Low LE
SHOut dta,clk,msbfirst_l,[a,b,c] ' Set ref divisor
High LE:DelayUS 1: Low LE
        DelayMS 2
SHOut dta,clk,msbfirst_l,[d,e,f] ' initiate control latch
High LE:DelayUS 1:Low LE
        DelayMS 2
SHOut dta,clk,msbfirst_l,[g,h,i] 'Set N divisor
High LE:DelayUS 1:Low LE
        DelayMS 2

Return

'++++ Programming notes ++++

'DWORD usage - lowbytes=1st 8bits byte1=2nd 8bits, byte2=3rd 8bits

'++++ setfreq:
'reg A= 0-31 max      5bit
'reg B= 0-2096986 13bit max
'1240MHz= N=12400   b=387  a=16  P=32
'1320Mhz= N=13200   B=412  a=16  (p=32 prescaler is in function register)
'div=bp+a for 100khz steps this is freq as well which is convenient
'++++ lcd display calc
'Areg=areg+1 :If Areg >32 Then Inc Breg: Areg=0
'n=b*p+a
' N=(32*Breg)+Areg :'shows freq. on lcd

'Initial Freq as defined for 100khz steps

'+++Other adf4360-5 chip Parameters that are set+++
' PFD Freq 100Khz
' Ref Freq 10MHz
' RF Prescaler 32/33
' Internal /2 not selected
' Output /2 not selected
' CP Gain=0Current setting 2.5mA
' RF PD Polarity Positive
' Charge pump active
' Counter Reset Disabled
' Lock detect Precision=3
' Band Select Clock Divider Value=8
' O/P power -6dbm
' Muxout = digital lock detect
' Core Power 10mA
' Mute till lock enabled

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