```
'****************************************************************
'*  Name    : Mushroom CLOCK.pbp                                *
'*  Author  : Guy Marsden                                       *
'*  Date    : 1/28/19                                           *
'*  Version : 1.6                                               *
'*  Notes   : Clock control for Dave Bruckenstein
'*              For Mushroom lamp clock
'*            uses 12 LED NeoPixel from AdaFruit to show hour and 5-min
'*              sends sync pulses to color changing 16 LED NeoPixel ring
'****************************************************************

#IF __PROCESSOR__ = "12F683"
    #CONFIG
    __config _EC_OSC & _WDT_ON & _MCLRE_OFF & _CP_OFF & _IESO_OFF
    #ENDCONFIG
#ELSE
    #MSG "Wrong Processor selected!"
#ENDIF

DEFINE OSC 20       ' uses external 20MHz crystal oscillator
DEFINE NO_CLRWDT 1  ' Don't waste cycles clearing WDT

'------------ Const -------------------------

NEO_NUM     CON 13  'Number of pixels + 1

'------------ Variables -------------------------

NeoGreen    VAR BYTE[NEO_NUM]
NeoBlue     VAR BYTE[NEO_NUM]
NeoRed      VAR BYTE[NEO_NUM]
NeoPixel    VAR BYTE            'Looping variable
NeoPixValue VAR BYTE            'Value to be bit-banged

Time        VAR BYTE
Mins        VAR BYTE
Hour        VAR BYTE
X           VAR WORD

'------------ ALIAS -------------------------

Mode_1      VAR gpio.0
Mode_2      VAR gpio.1
NeoPin      VAR GPIO.2      ' NeoPixel data out
Sync_in     VAR gpio.3
Sync_out    VAR gpio.4


'-----------  Initialization -------------------------------

INCLUDE "..\_Include\NeoPixelDump.pbp"

ANSEL = 0       ' all digital
CMCON0 = 7      ' Comparator disabled
CCP1CON = 0     ' comparator OFF
OPTION_REG.7 = 0 ' ENABLE WEAK PULL-UPS
WPU = %00000011     ' select pull-up pins
TRISIO = %101011 'I/o config

CLEAR           ' Clear RAM before entry
```

```
NeoPin = 0      ' initialize level for data signal
HIGH Sync_out   ' set level

'-----------  Main program ------------------------

Init:
Mins = 0
Hour = 0
    GOSUB ColorFill             ' set background color
    GOSUB HourColor
    GOSUB MinColor
    GOSUB neopixeldump          ' initialize
    GOSUB neopixeldump          ' initialize

Main:   ' 520 X 576mS/nap = 300,000 mS = 5 minutes
    FOR X = 1 TO 519' !!!!!!!!!! nap 5 = 576mS timing +/- calibration !!!!!!!
        NAP 5                           ' nap 5 = 576mS delay
        IF (Mode_1 = 0) OR (Mode_2 = 0) THEN
            GOSUB SetMode               ' check set buttons
            X = 1                       ' re-start 5 min timing
        ENDIF
    NEXT X

    Mins = Mins + 1             ' increment minutes by 5
    IF Mins > 11 THEN           ' if past 12:00
        LOW Sync_out : NAP 5 : HIGH Sync_out    ' sync to color of lamp
        Mins = 0                    ' reset to 12:00 position
        Hour = Hour + 1             ' increment hour
        IF Hour > 11 THEN
            Hour = 0
        ENDIF
    ENDIF
    GOSUB Update    ' update the NeoPixel ring
    GOTO Main

SetMode:
    WHILE (Mode_1 = 0)      ' set hours
        Hour = Hour + 1
        IF Hour > 11 THEN Hour = 0
        LOW Sync_out : NAP 3 : HIGH Sync_out    ' sync to color of lamp
        GOSUB Update
        NAP 5                   ' delay for set mode
    WEND

    WHILE (Mode_2 = 0)      ' set mins
        Mins = Mins + 1
        IF Mins > 11 THEN Mins = 0
        GOSUB Update
        NAP 5                   ' delay for set mode
    WEND
    RETURN

Update:     ' update display
    GOSUB ColorFill             ' fill ALL LEDs to background color
    GOSUB HourColor             ' set color
    GOSUB MinColor
    GOSUB neopixeldump          ' update
    RETURN

HourColor:     'set color of hour
```

```
    IF Mins = Hour THEN
        NeoGreen[Hour] = 0  ' set combined color for overlap
        NeoBlue[Hour] = 200
        NeoRed[Hour] = 200
    ELSE
        NeoGreen[Hour] = 0  ' set color blue
        NeoBlue[Hour] = 200
        NeoRed[Hour] = 0
    ENDIF
    RETURN

MinColor:     'set color of hour
    IF Mins = Hour THEN
        NeoGreen[Hour] = 0  ' set combined color for overlap
        NeoBlue[Hour] = 100 ' dialed down a bit
        NeoRed[Hour] = 100
    ELSE
        NeoGreen[Mins] = 0  ' set red
        NeoBlue[Mins] = 0
        NeoRed[Mins] = 100
    ENDIF
    RETURN

ColorFill:   ' fill background color
    FOR X = 0 TO NEO_NUM -1     ' fill all 12 LEDs
        NeoGreen[X] = 5             ' set all light blue
        NeoBlue[X] = 5
        NeoRed[X] = 5
    NEXT X
    RETURN
```