

MAGICAL MUSICAL COUNTDOWN TO CHRISTMAS MACHINE

This all started with one of my grandsons asking how long until Christmas.

Well, that got me thinking of some way for a three year old to understand what how long means?

Like the relationship between Days, Hours, Minutes and seconds.

Knowing that a regular clock was at this moment beyond his ability to read and understand,

I thought that a numeric count down might be a little easier.

And, so it began,

THE ONE AND ONLY MAGICAL MUSICAL COUNTDOWN TO CHRISTMAS MACHINE!

I based my design on the Picaxe 20X2 chip, Picaxe AXE133y OLED and Mdfly.com SD-Mp3 player module.

I had used the SD-Mp3 player module from www.Mdfly.com on a few other projects. It is capable of playing specific recordings, or continuous play. Supports up to 15 folders with up to 199 songs in each folder, man that's a lot of music! If I did my math correctly that's 2985 Mp3's.

Tools you will need:

Soldering Iron

Solder

Table Saw

Router

Drill

Router

Forstner Drill Bits

Screw Drivers

Pliers

Wire cutter/stripper

Large Hammer (to bash something when something doesn't fit right!!)

Construction:

First, download all the files from:

www.flightlinecontrols.com

They are:

The Schematic, PCB (printed circuit board), BOM (Bill of Materials) and of course these instructions.

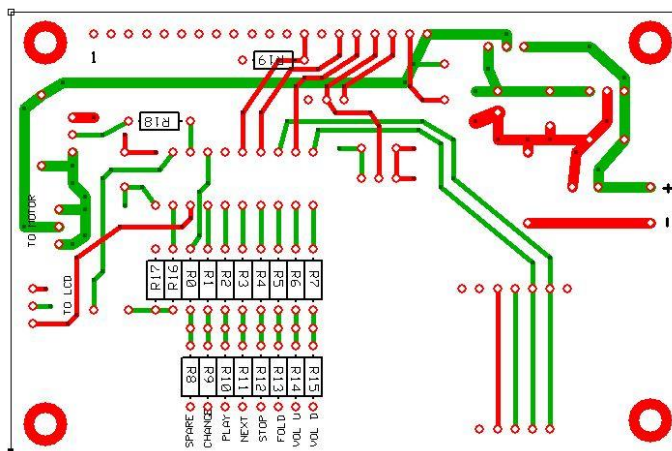
1. Gather everything shown on the BOM,
2. Build the PCB first, no use making the box if you can't get the electronics to work!!

First install all the resistors, refer to the BOM for part number like R1, R2 etc.

they have no polarity so you can solder them in in any direction, just make sure

just make sure the values match the BOM and placement on the PCB!

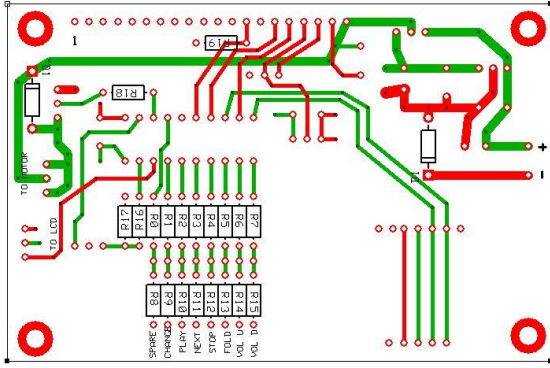
Like: R0 thru R7 are 1K, (FYI, that's 1000 ohms)



3. Install the Two Diodes,

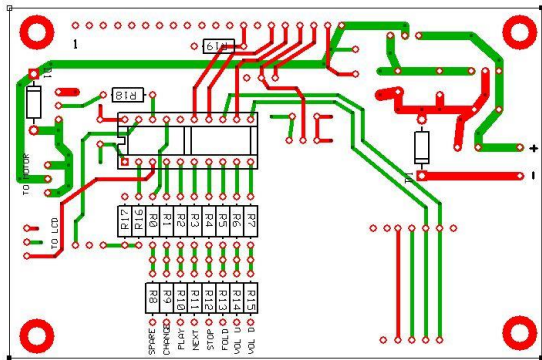
These are D1 and D2, NOTE!! They are polarity specific!! On one end there is a ring

or black mark. Match this to the silkscreen on the PCB, or something won't work right!



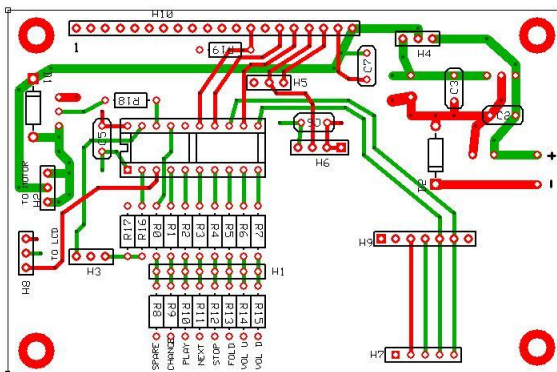
4. Install the 20 pin Chip Adapter,

It has two rows of 10 pins; the adapter allows you to change a chip without having to do any unsoldering. Be sure you get all 20 pins soldered in and no solder bridges between pins!!!



5. Install the Disk Capacitors, they are: C2, C3, C5, C6 and C7.

they are all the same value, and are not polarity specific, so you can insert them in either direction and it makes no difference!!



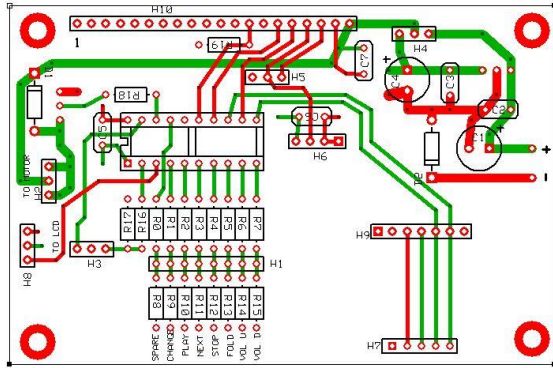
6. Install the Headers; these are used to make connections to items off the PCB such as

the switches and LCD Screen.

There are Male and Female Headers.

H1, H2, H3, H4, H5, H8 are male headers, (they have pins sticking out of both sides)

H6, H7, H8, H9 and H910 are Female Headers, (the only have pins sticking out of one side)



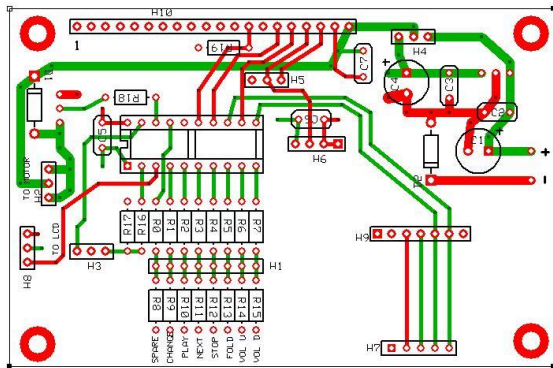
7. Install the Radial Capacitors; there are two of them, C1 and C4.

THESE ARE POLARITY SPECIFIC!!

On the side of the Capacitor there is a minus or plus sign (different manufacturers may mark them differently)

Be sure they are soldered in matching the PCB

There is a small + sign on the PCB silkscreen to denote the direction!



8. Install the Voltage Regulator.

On one side of the regulator there is a flange with a hole in it

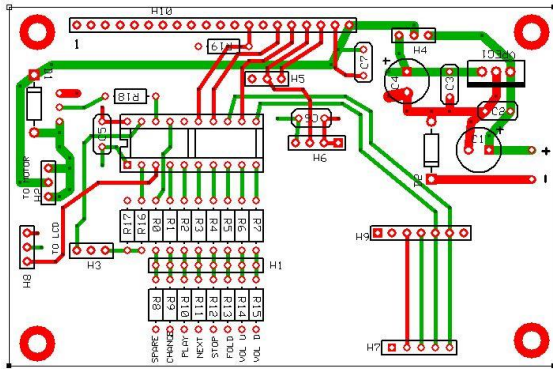
that sticks up above the plastic body.

Align it as shown on the PCB Silkscreen.

Be sure it aligned properly, if its backwards, it won't work!!

And, remember when you power it up,

Backwards May = Smoke,,,, Smoke is BAD!!!!



10. Install the Transistor.

This is what makes the motor that turns the Tree run!

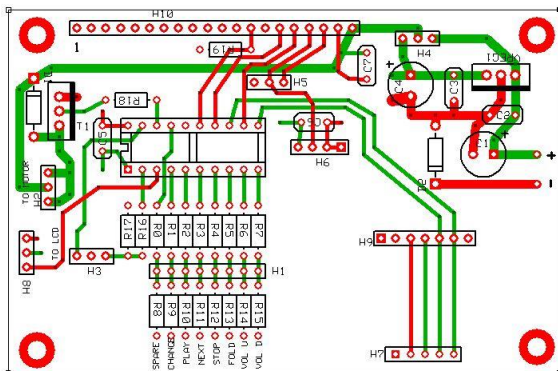
It too is specific as to its orientation on the PCB Board.

It too has a metal flange with a hole in it that sticks up above the plastic body.

Be sure it is aligned as shown on the Silkscreen!

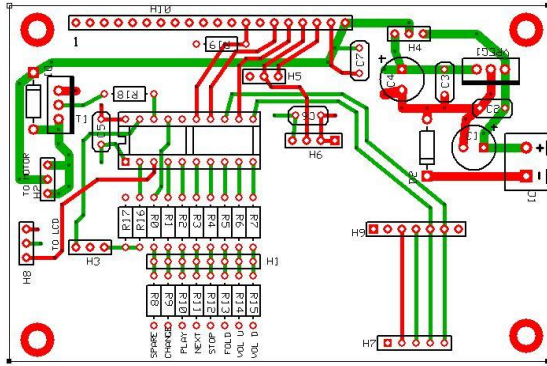
If its backwards,, it won't work!!

Again! Backwards May = Smoke,,,Smoke is BAD!! :))



11. Install the Power Terminal

Be sure the slots for wire insertion are pointed to the outside edge of the PCB!



12. You may now put the Picaxe 20x2 Chip in the Adapter. Be sure to align it as shown on the PCB!!

Backwards may = Smoke,,,,, Smoke is BAD!!!

Most times when first inserting a chip into the adapter, you will find that the pins are a little sprung out.

I normally insert one row of the chip pins against one side of the adapter and give them a little push to bend them inwards slightly. Then reverse the chip and do the same to the other side. Then install in the adapter.

Sometimes you need to do this more than once to get them in the correct alignment.

Be careful not to break or over bend them!!

12. Your PCB should now be completely populated! Congratulations!

I SUGGEST YOU TAKE A FEW MINUTES TO CHECK CONTINUITY BETWEEN ALL INTERCONNECTING PINS AND TRACES ON YOUR BOARD WITH A MULTIMETER SET TO AUBIBLE CONTINUITY CHECK.

That's the setting where when you put the two leads together a buzzer sounds.

Once you are sure you have a good connection on everything move onto the next step!

13. The LCD!

The project uses the Picaxe AX133Y Serial LCD.

They are available at: www.picaxe.com unassembled or from me assembled and tested.

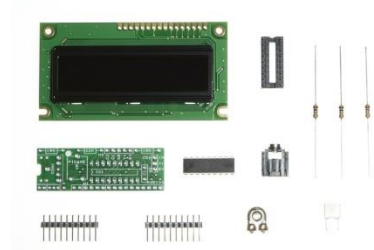
See the CTC Parts page on this website for more information.

The AX133Y connects to the PCB via a double male radio control servo extension.

Also available on my CTC Parts page or on Ebay.com

There is a three pin male header on the rear of the LCD run the servo extension between it and the male header on the PCB marked H8.

if it doesn't light up when power is applied, just turn one end of the extension around, don't worry about shorting it out, as the power pin is in the center so you can't reverse the polarity!!! cool Huh?

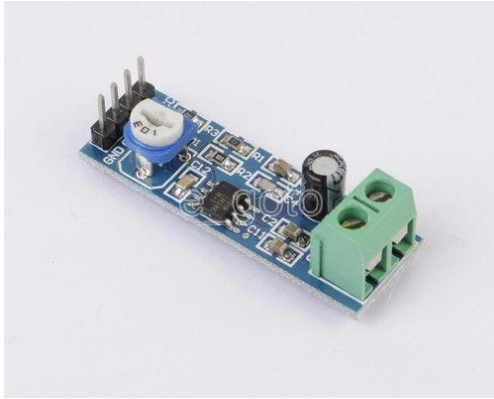


14. The Amplifier!

The Mp3 module has a very low amplitude, it's more of a line out, so to drive your speakers you will need some type of amplifier.

I have used two types, one a small module available on EBay or from me that will plug directly into the female header marked H6.

You will however have to move the male header that comes attached to it to the bottom side for the polarity to be correct and to have access to the small 10k pot on it that you use to adjust the volume.



The other option is to purchase a set of cheap computer speakers.

Be sure they are powered by 12v dc. at less than 1 amp.

I found them for \$8.00 at BIG LOTS.

Open them up and scarf out the Speakers and the small Amplifier.

You can then tap into the power input to your PCB and use the speakers for the project!

Later on when you power up the project, you will need to adjust the amplifier

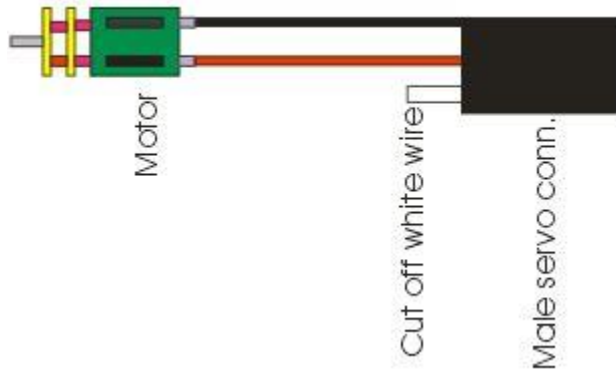
I will refer to that later.

15. The Motor!

The project is designed to use a small gear motor to drive the disk that the tree mounts to. They are available on EBay or,, yes, from me. See the CTC Parts page or the BOM for specifications and availability.

To wire up your motor, again using a double male servo extension, cut one of the ends from the extension and solder the black wire to one of the solder terminals on the motor and the red wire to the other one. Plug the remaining extension lead onto the male header marked H2 on the PCB. If you want your tree to turn a specific direction

clockwise or counter clockwise, you may need to switch the wires where they connect at the motor.



16. The MP3 Module!

You will need to load your songs onto the SD card.

The Module is capable of holding 199 Mp3 files in each folder.

The Module is capable of holding 15 folders.

Folder #1 is directly on the SD card,

You may then add folders and put up to 199 files in each folder

I suggest you only load a couple of CD's worth though.

Load a few directly onto the SD Card, no folder for right now.

Then insert the SD card into the MP3 player.

Mounting the Mp3 Player on the PCB!

Looking at the base of the Mp3 player near the pins

you will see pin1 is marked with a number 1.

Insert the Mp3 player into the female header marked H10 with

Pin1 at the end marked 1 on the PCB silkscreen.

Do not remove or insert the Mp3 player while power is applied to the PCB!!!

Do not remove or insert the SD card while the Mp3 Module is powered up!!!

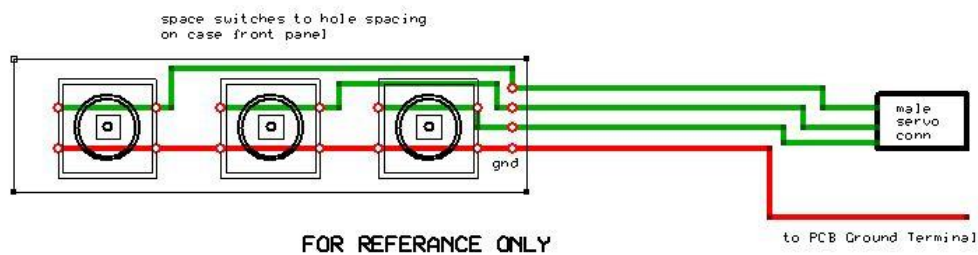


17. The Switches!

You will need 6 switches. Refer to the BOM for specifications.

I mounted mine to pieces of Perf. board spaced to match the openings on the front panel of the case. One side of each switch is connected to the appropriate pin on the PCB male header H1, while the other goes to the Ground Terminal on the PCB Power Connection Terminal.

See the Switch Mounting PDF on the Download page.



18. The RTC Clock Module!

The Clock Module. You will need to solder male header pins onto the bottom side of your module. (Backup battery is on top). Insert the battery into the module and

then insert the module into the female headers H7 and H9.

The Clock Module is available on EBay or,, yes,, from me, visit the CTC Parts page or the BOM for more information.

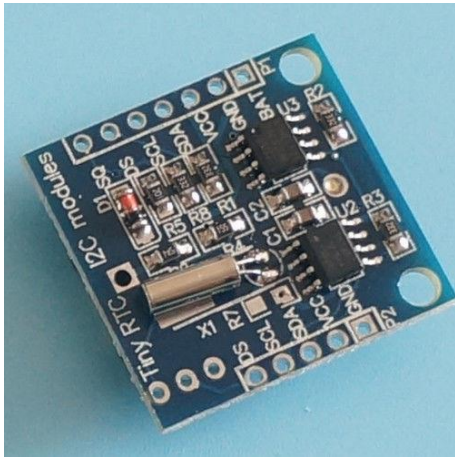
if you purchase your module from me, it will be already programed to the correct time and date.

If you purchase elsewhere you will need to program it yourself.

Visit www.picaxe.com and go to the Forum, there you can search for the procedure to program the clock module.

The Clock Module needs to have power all the times once it is programed. The backup battery should keep it going for about three years. If you need to replace it and don't want to reprogram it. Remove the battery with power applied to the PCB and then replace the battery before removing the power from the PCB.

Thus keeping power to the clock at all times!! :)



19. OK,, Got the PCB assembled, Got the Amplifier hooked up, Got the Switches plugged in and the Clock is ready to go!

What's left? OH,, Power. I have been running my CTC via a Wall Wart power supply.

Its 110-120 AC in and 12V DC, 1 amp output.

You can either, cut the wire on the Power Supply and directly attach it to the PCB or get the appropriate frame mount female connector to match your Power Supply Connector.

They are available at Radio Shack in several different sizes, I suggest you take your Power Supply with you to be certain you get the correct one. Then solder two wires to the Connector and attach them to the Power Terminal on the PCB.

Plug in the Power Supply and,, NO SMOKE? GREAT!

After a few seconds of boot time your LCD should start to display the current time and date!

20. How do I get it to Count Down To Christmas?

you must connect a switch between the Male Header H1 pin marked Change and ground.

with the pin marked "Change" unconnected the software sends the "Current Time and Date" to the LCD.

With the Switch flipped so that the pin is grounded, The Software sends the Count Down To Christmas to the LCD.

This switch should be a frame mount toggle two pin switch, On/Off.

That way you can mount it to the back panel of the case for easy access.

I also suggest you mount the Power Supply Connector to the rear case panel.

21. If everything is working ok, that is, when you have with the "Change" switch in one position

you have the current time and date, and the other way you have "Count Down To Christmas"

and when you push play you get music out of the speakers,, then your good to go!
if not, send me an email and I will try to get you pointed in the right direction to get
everything working!

NOTE: To adjust the amplifier: With the “ Vol U” switch, push it until the LCD displays
“Maximum Volume”.

Then turn the adjustment pot on whichever type amplifier you have used to the loudest you
wish it to be.

You can then use the “VOL D” switch to adjust the volume to the level you want.

The Case!

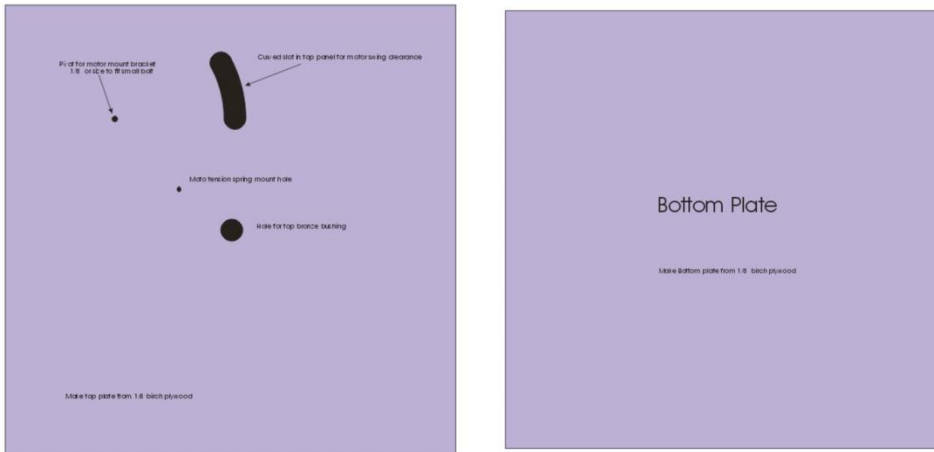
1. Download the PDF of the CAD Drawing files if you haven't already.

The material for the Top and Bottom Panels is Birch Aircraft Plywood 1/8 in thick.

It is available in several different sheet sizes at most Hobby Shops
or online, I will leave it to you to find your supplier.

When making the purchase be sure to get enough to make the Top,
Bottom, Front, Back and Both sides. as they are all the same thickness
material.

Cut the two squares, the Top and Bottom they are 10 3/8 inch square.



The Top Panel has several holes and a curved slot.

The slot is to allow the motor to move to and away from the Tree Mount Disk.

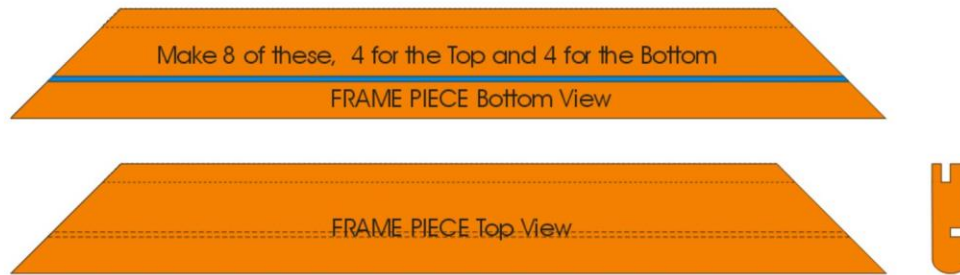
I cut mine using my CNC router, but most of you wont have access to one of these, so you can mark out the curve for the slot and using a drill bit, drill successive holes inside the curve then using a Dermal Tool, grind or sand the edges smooth.

You may have to do some adjusting to it after you install the motor and its pivot mount to get it to mover back and forth freely.

2. The Case Fame.

The material for this part is 1 x 1-1/2 inch stock, readily available at your local home improvement store. You will need 8 pieces 15 inch long. With each piece, you will need to cut a slot in one edge 1/8 wide X 1/4 inch deep. these are for the top to slide into when you assemble the frame. Next you will need to cut a slot on one side, 1/8 wide X 1/4 deep, these are for the sides of the box to slip into.

Once the slots are cut. You will need to cut the 45 degree angles on the ends.



When cutting the angles I suggest you use a cutoff saw accurately set to 45 degrees.

Be sure to cut them so that the slot in the edge is facing the inside of the frame. And be sure that all 8 pieces are exactly the same size! if not your square box will end up a trapezoid!! :)

I choose to round the outside edge of my frame using a 1/4 inch round over bit in my router table, but you can do as you please.

Now glue up/assemble your frame around the Top and Bottom plywood parts fitted into the edge slot.

Be careful to keep excess glue off all exposed wood as it tends to mess up any staining you might plan to do later!

Also be sure both frames are FLAT as if they are not your box won't come together correctly!

3. The Sides.

From the drawings, cut each side to length and width, they all must be the same size!!

Pick one to be the Front and make the cut out for the LCD and Switches.



Pick one for the Back make the holes for the Power Connector and "Change" Switch.



For the sides, again I used my CNC Router, but you can make the slots for the speakers using the same process you used on the top for the Motor Slot.



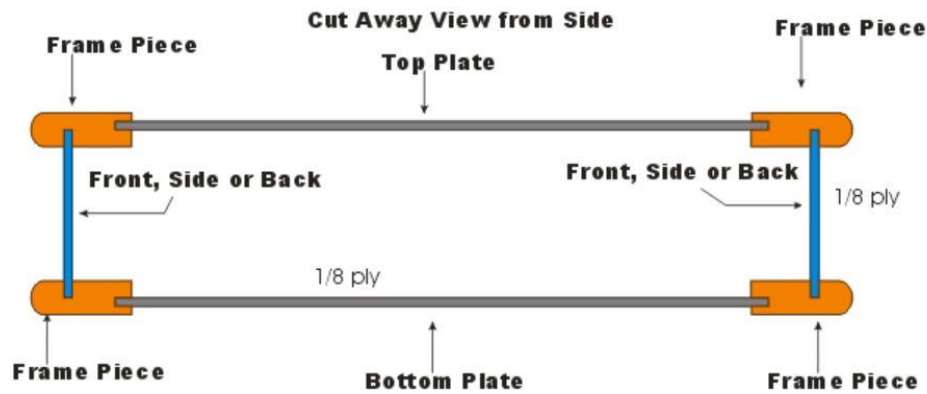
4. Lower Section Assembly.

Put your Bottom Frame on your building surface with the slots facing up.

Insert the Front, Back and Sides into the slots. Don't worry if the corners don't mate up perfectly.

Take the Top with the slots facing down, and insert the Front, Back and Sides

into the slots on it. This will align all four sides.



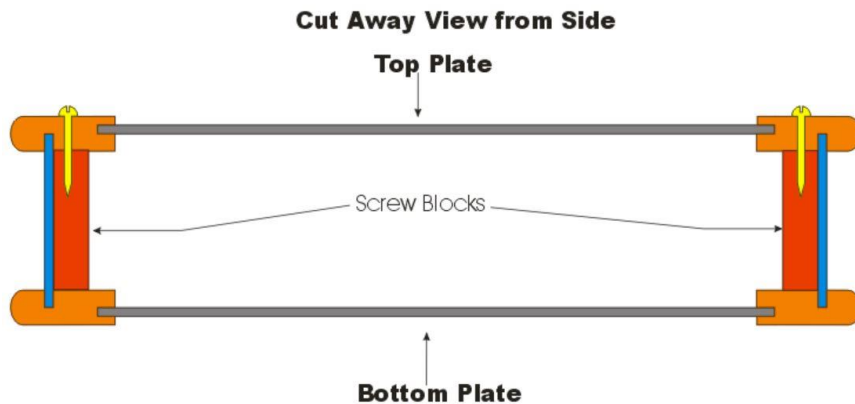
Next, Tack glue all four sides to the Bottom ONLY!!

When the glue is set, remove the To

Then, securely Glue all four sides to the bottom from the inside.

Now, inside at each corner, insert the vertical 1/2 X 1/2 X 2 inch screw mounts.

These are to accept the 4 screws that go in thru the top for its attachment.



5. The Tree Rotation Bearing.

On the drawing, you will see 4 disks with holes in the center,

These make up the bearing mounts for the tree to rotate on.

I suggest you use slow setting glue for this as alignment may

take a few minutes to accomplish.



Locate the Two 1/4 in. ID Bronze Bushings.

Before any gluing, be sure they fit snugly into the holes thru the center of the disks.

Now, apply glue to all 4 disks so they can be stacked together, as shown in the drawing.

Once stacked press one of the bronze bushings into the top side and one into the bottom side of the stack.

This should align all the disks with each other.

At this point it is a good idea to insert a 1/4 dia. bolt thru the bushings to be sure they are aligned to each other and that your shaft will rotate freely later on!

Make any adjustments now to get the bolt to rotate freely as after the glue has set you will not be able to change anything!

When the glue has set, remove one of the bushings from the stack.

Insert the removed bushing thru the top side of the Top Panel center hole.

Then apply glue to the side of the bearing stack that you just removed the bearing from and press it onto the protruding part of the bushing that comes thru the top and against the bottom of the Top Panel as shown above.

7. The Tree Rotation Shaft.

You will need:

1 piece of 1/4 inch OD Brass shaft material, Two 1/4 in ID Shaft Collars,

One 1/4 in Fender Washer and 1- 1/4 x 1 inch bolt and nut.

Remove the setscrew from one of the shaft collars and sand or grind the outside of the collar until it has any/all coating removed.

Slide the Fender Washer on the bolt until it is against the bolt head

Slide the shaft collar on the bolt until it is against the fender washer.

Thread the Nut on until it is against the shaft collar and tighten.

You must now either Braze or Solder the shaft collar to the fender washer.

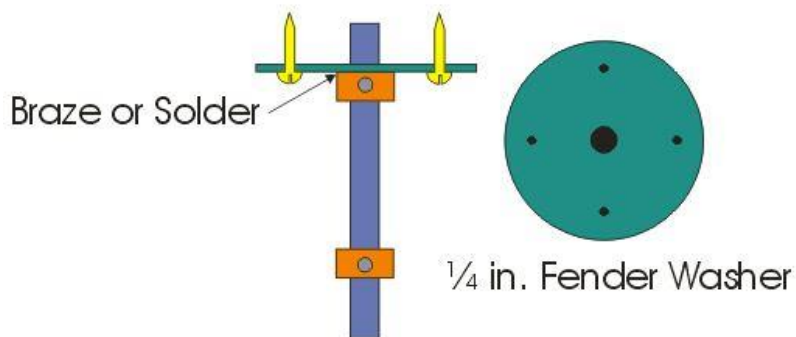
When cool, remove the nut and slide the collar/washer assembly off the bolt.

Drill 4 holes thru the fender washer for screws to be inserted thru and into the tree mount disk.

Reinsert the setscrew into the shaft collar that you removed earlier.

Insert the shaft into the collar/washer assembly.

Let the shaft protrude above the collar about 1/4 inch.



Insert the longer part of the shaft from the top side of the Top Plate, thru bushing both bushings.

verify that the collar/washer assembly will rotate freely in the bushings.

Sand or polish the shaft if necessary to have it rotate freely!

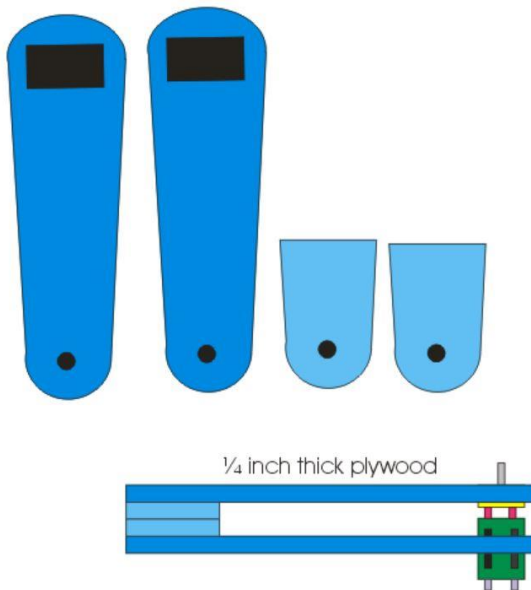
5. The Motor and its Mount.

From 1/4 inch thick plywood, make the 4 pieces that are the motor mount.

The dimensions shown for the rectangular holes are for the motor I used.

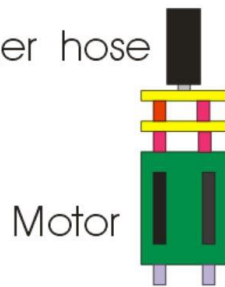
Yours may differ, assemble as shown in the drawing and then press in the motor assembly. You may want to CA or epoxy the motor in place as it could work its way out of the motor mount.

Be careful not to get glue in the gear section of the motor as it will lock it up!!!



Press a piece of rubber windshield washer hose on the output shaft of the motor. You only need a piece about 1/2 in long. This should be available from the local auto parts store. This thru friction is what turns the tree mount disk.

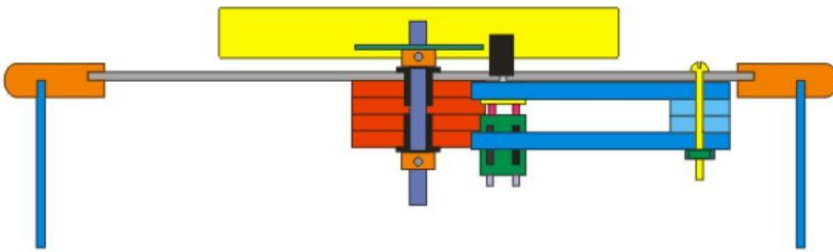
Rubber windshield washer hose



Motor

Install the motor mount to the lower side of the Top with a 6-32 machine screw, flat washer and a self-locking nut.

View From Rear



Install the Spring from the Motor Mount to the bolt/screw hole as shown in the CAD drawing.

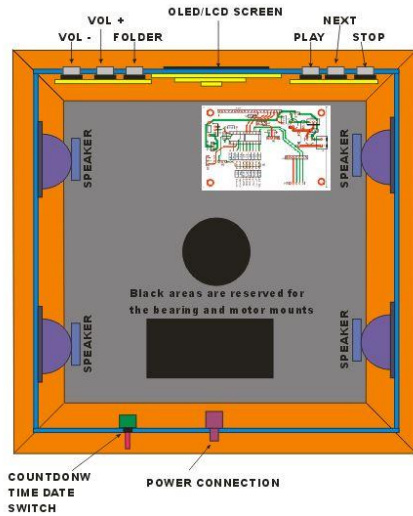
This holds the motor at tension against the tree mount, causing it to turn with the motor rotation.

Be sure the motor with the rubber hose on its shaft move freely thru the curve of the slot on the top. If needed, sand the slot to make it so.

6. Final Assembly.

It's time to fill up the case,

Refer to the drawing below to install the interior parts.



The Code for the Picaxe 20X2:

' !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!NOTICE !!!!!!!!!!!!!!!!!!!!!!!!!!!!!

'The Magical Musical Count Down To Christmas Machine

'Copyright (C) 2014 Randy Charles rcharles@cinci.rr.com

For more information and file download pleas visit:

www.flightlinecontrols.com

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'It is the user's responsibility to periodically check for updates or changes

'A link to the GNU is available on our web page: www.flightlinecontrol.com

'SOFTWARE VERSION NUMBER: 1.0.0.2 DATE 01/01/2014

#picaxe 20x2

'BOARD PIN OUT AND VARIABLES

'-----CHIP SYMBOLS-----

SYMBOL MP3_BAUD = T4800 'BAUD RATE FOR MP3 PLAYER MODULE

SYMBOL LCD_Baud = N2400 'BAUD RATE FOR OLED/LCD DISPLAY

```

SYMBOL LCD           = c.7      'DATA OUTPUT PIN TO OLED/LCD DISPLAY
SYMBOL MP3TRANS      = B.3      'TXD PIN ON MP3 MODULE
SYMBOL MP3PLAY       = B.6      'RXD PIN ON MP3 MODULE
SYMBOL MP3BUSY       = PinB.3   'BUSY PIN ON MP3 MODULE
SYMBOL PLAY_SWITCH   = PinC.5   ;STARTS PLAY ON MP3 MODULE
SYMBOL NEXT_SWITCH   = PinC.4   ;JUMPS TO NEXT FILE ON SD CARD
SYMBOL STOP_SWITCH   = PinC.3   ;STOPS PLAY
SYMBOL FOLDER_SWITCH = PinC.2   ;CHANGES FOLDER ON MP3 PLAYER SD CARD
SYMBOL VOL_UP_SWITCH = PinC.1   ;RAISES MP3 MODULE VOLUME
SYMBOL VOL_DN_SWITCH = PinC.0   ;LOWERS MP3 MODULE VOLUME
SYMBOL CHRISTMASCOUNT = PINC.6 'TOGGLE SWITCH ON SIDE OF BOX SWITCHES
BETWEEN REG TIME AND COUNTDOWN
SYMBOL SPARE_SWITCH  = PINB.1    'CURRENTLY UNUSED
SYMBOL MOTOR_ON      = B.1      'TURNS MOTOR ON OR OFF

'-----MP3 SYMBOLS-----

SYMBOL SONG_NUMBER   = b0        'HOLDS THE CURRENT RECORDING VALUE
SYMBOL FOLDER_NUMBER = b1        'HOLDS THE CURRENT FOLDER VALUE
SYMBOL VOLUME        = b17      'SETS AND SENDS VOLUMELEVEL TO MP3
MODULE

'-----OLED/LCD READOUT SYMBOLS-----

SYMBOL CHARACTER1    = B2        'HOUR CHARACTER
SYMBOL CHARACTER2    = B3        'HOUR CHARACTER
SYMBOL CHARACTER3    = B4        'MINUTE CHARACTER
SYMBOL CHARACTER4    = B5        'MINUTE CHARACTER
SYMBOL CHARACTER5    = B6        'SECONDS CHARACTER

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SYMBOL CHARACTER6 = B7 'SECONDS CHARACTER

SYMBOL VOLUME_NUM = b24 'CONVERTS VOLUMELEVEL TO BINARY
"VOLUME1,2,3,4 ETC.

SYMBOL FOLDER_NUM = b21 'CONVERTS FOLDER HEX VALUE TO BINARY "FOLDER
1,2,3,4 ETC.

'-----I2c CLOCK SYMBOLS-----'

SYMBOL HOURS = B8 'READS HOURS FROM CLOCK MODULE

SYMBOL MINS = B9 'READS MINUTES FROM CLOCK MODULE

SYMBOL SECS = B10 'READS SECONDS FROM CLOCK MODULE

SYMBOL DAY = B11 'READS DAYS FROM CLOCK MODULE

SYMBOL DATE = B12 'READS DATE FROM CLOCK MODULE

SYMBOL MONTH = B13 'READS MONTH FROM CLOCK MODULE

SYMBOL YEAR = B14 'READS YEAR FROM CLOCK MODULE

SYMBOL PM_AM = B16 'SETS TIME TO AM OR PM

'-----'

'-----'

SYMBOL INT_DAY = b18 'CONVERTS HEX TO BINARY NUMERIC

SYMBOL DAY_CALCULATION = w13 'PART OF LEAP YEAR CALCULATION

SYMBOL LEAP_YEAR_CALC = w14 'LEAPYEAR CALCULATOR

'-----clock setting symbols-----'

SYMBOL Clock_Set = b25 'keeps track if clock is being set

INIT:

```
    PAUSE 2000                                'allows time for everything to power up.

    SEROUT LCD,LCD_BAUD,(254,1)                'CLEARS SCREEN BEFORE GOING TO COUNTDOWN

    PAUSE 200

    SEROUT MP3PLAY,MP3_BAUD,($EF)             'STOP module

    LET FOLDER_NUMBER = $0F1                   'SETS FOLDER TO FOLDER 1 (FOLDER NUMBER
ONE. $0EF IS EQUAL TO 241)

    LET VOLUME= $0DF                           ' $DF = 223---VOLUME runs from low:200 to
highest 231

    SEROUT MP3PLAY,MP3_BAUD,($D8)             'sets VOLUME on module to midpoint (THIS IS
HEX FOR 216)

    serout mp3play,mp3_baud,($DF)

    SEROUT MP3PLAY,MP3_BAUD,($EF)             'STOP module

    GOTO COUNTDOWN                             'SENDS PROGRAM TO EITHER COUNT DOWN
OR CURRENT TIME/DATE

    SEROUT LCD,LCD_BAUD,(254,1)                'CLEARS OLED SCREEN TO PREPARE FOR COUNTDOWN

    PAUSE 2000

clearscreen:

    SEROUT LCD,LCD_BAUD,(254,1)

    PAUSE 200

    SEROUT LCD,LCD_BAUD,(254,128,"FOLDER = ",#FOLDER_NUM)

    SEROUT LCD,LCD_BAUD,(254,192,"SONG NUMBER: ",#SONG_NUMBER)

SwitchCheck:
```

```

IF SONG_NUMBER >= 198 then
    LET SONG_NUMBER = $001          'RESETS SONG_NUMBER TO
RECORDING NUMBER 1
    PAUSE 200
ENDIF

    LET VOLUME_NUM = VOLUME- 201    'VOLUME_NUM IS THE
VOLUMEREADOUT FOR OLED SCREEN
    PAUSE 200

    LET FOLDER_NUM = FOLDER_NUMBER - 240 'FOLDER_NUM IS THE OLED READOUT
CONVERTS FOLDER_NUMBER FROM 240 TO NUMERIC VALUE 1
    PAUSE 200

```

' ____PLAY SWITCH____

```

IF PLAY_SWITCH = 0 and MP3BUSY = 1 then 'MP3BUSY = 1 means that no song is playing
    HIGH MOTOR_ON                       'STARTS THE TREE MOTOR
    PAUSE 200
    LET SONG_NUMBER = $001              'SETS SONG_NUMBER TO #1
    SEROUT MP3PLAY,MP3_BAUD,(SONG_NUMBER) 'SENDS THE CURRENT RECORDING
NUMBER TO THE MP3 PLAYER
    PAUSE 200
    SEROUT LCD,LCD_BAUD,(254,1)
    PAUSE 200

```

```
SEROUT LCD,LCD_BAUD,(254,128,"FOLDER = ",#FOLDER_NUM) 'DISPLAYS THE  
CURRENT FOLDER NUMBER ON THE OLED
```

```
SEROUT LCD,LCD_BAUD,(254,192,"SONG NUMBER: ",#SONG_NUMBER) 'DISPLAYS THE  
CURRENT RECORDING NUMBER ON THE OLED
```

```
PAUSE 2000
```

```
ENDIF
```

```
' ___NEXT SONG SWITCH___
```

```
IF NEXT_SWITCH = 0 and MP3BUSY = 0 and SONG_NUMBER <= 198 then
```

```
LET SONG_NUMBER = SONG_NUMBER + 1      'INCREASES RECORDING NUMBER BY  
1 TO PLAY NEXT SONG
```

```
PAUSE 200
```

```
SEROUT MP3PLAY,MP3_BAUD,(SONG_NUMBER) 'SENDS RECORDING NUMBER TO  
MP3 PLAYER
```

```
PAUSE 200
```

```
SEROUT lcd lcd_baud,(254,1)
```

```
PAUSE 200
```

```
SEROUT LCD,LCD_BAUD,(254,128,"FOLDER = ",#FOLDER_NUM) 'DISPLAYS THE  
CURRENT FOLDER NUMBER ON THE OLED
```

```
SEROUT LCD,LCD_BAUD,(254,192,"SONG NUMBER: ",#SONG_NUMBER) 'DISPLAYS THE  
CURRENT RECORDING NUMBER ON THE OLED
```

```
ENDIF
```

```
' ___STOP SWITCH___
```

```
IF STOP_SWITCH = 0 then
```

```
SONG_NUMBER = 0      'SETS RECORDING NUMBER TO 0 SO  
WHEN PLAY IS PUSHED RECORDING NUMBER INCREASES TO #1
```

```

    PAUSE 200

    SEROUT MP3PLAY,MP3_BAUD,($EF)      'STOPS THE MP3 PLAYER

    SEROUT LCD,LCD_BAUD,(254,1)

    PAUSE 200

    SEROUT LCD,LCD_BAUD,(254,128,"  STOP") 'DISPLAYS STOP ON OLED

    PAUSE 200

    LOW MOTOR_ON                        'SHUTS OFF TREE MOTOR

    GOTO COUNTDOWN                      'SENDS PROGRAM BACK TO
COUNTDOWN OR CURRENT TIME/DATE

ENDIF

' ___ FOLDER SWITCH ___

IF FOLDER_SWITCH = 0 then

    SEROUT MP3PLAY,MP3_BAUD,($EF)      'STOP module

    PAUSE 200

    LET FOLDER_NUMBER = FOLDER_NUMBER +1 'ADDS #1 TO FOLDER NUMBER HEX

    PAUSE 200

    SEROUT MP3PLAY,MP3_BAUD,(FOLDER_NUMBER) 'SENDS THE NEXT FOLDER NUMBER
TO THE MP3 MODULE

    LET FOLDER_NUM = FOLDER_NUMBER - 240 'CONVERTS 240 DOWN TO 1,2,3,4,5
ETC.

    SEROUT lcd,lcd_baud,(254,1)

    PAUSE 200

    SEROUT lcd,lcd_baud,(254,128," Current Folder") 'OLED DISPLAY

    SEROUT lcd,lcd_baud,(254,192," Number Is, ",#FOLDER_NUM) 'DISPLAYS CURRENT
FOLDER NUMBER IN OLED

    PAUSE 2000

```

```
        LET SONG_NUMBER = $001                'SETS RECORDING NUMBER TO #1 TO  
PLAY FIRST SONG IN FOLDER  
  
        PAUSE 200  
  
        SEROUT MP3PLAY,MP3_BAUD,(SONG_NUMBER) 'SENDS RECORDING NUMBER TO  
MP3 PLAYER
```

```
        ELSEIF FOLDER_NUMBER >= 244 then      'Folder numbers available are: $240 (folder  
1)(default) to $255(folder 15)
```

```
                LET FOLDER_NUMBER = 240      'LIMITS FOLDERS TO 1,2,3,4,5  
  
        ENDIF
```

```
' ___ VOLUMEUP SWITCH ___
```

```
IF VOL_UP_SWITCH = 0 and VOLUME<= $0E2 then '$0E2 IS EQUAL TO 226
```

```
LET VOLUME = VOLUME+ 1                        'INCREASES VOLUME BY 1
```

```
PAUSE 200
```

```
SEROUT MP3PLAY,MP3_BAUD,(Volume)            'SENDS CURRENT VOLUME HEX TO  
MP3 MODULE
```

```
PAUSE 200
```

```
SEROUT LCD,LCD_BAUD,(254,1)
```

```
SEROUT LCD,LCD_BAUD,(254,128,"VOLUMELEVEL= ",#VOLUME_NUM) 'DISPLAYS  
VOLUMELEVEL IN OLED
```

```
PAUSE 200
```

```
goto clearscreen                              'CLEARSCREEN DISPLAYS CURRENT  
FOLDER AND CURRENT RECORDING NUMBER IN OLED
```

```
ENDIF
```

```
IF VOL_UP_SWITCH = 0 and VOLUME= $0E3 then
```

```
SEROUT LCD,LCD_BAUD,(254,1)
```

PAUSE 200

SEROUT LCD,LCD_BAUD,(254,128," VOLUMELEVEL=") 'DISPLAYS VOLUMEMAXED OUT IN OLED

SEROUT LCD,LCD_BAUD,(254,192," MAXIMUM!")

PAUSE 500

ENDIF

IF VOL_DN_SWITCH = 0 and VOLUME= \$0D7 then

SEROUT LCD,LCD_BAUD,(254,1)

PAUSE 200

SEROUT LCD,LCD_BAUD,(254,128," VOLUMELEVEL=") 'DISPLAYS VOLUMELOWEST IN OLED

SEROUT LCD,LCD_BAUD,(254,192," MINIMUM!")

PAUSE 500

ENDIF

' __VOLUMEDOWN SWITCH____

IF VOL_DN_SWITCH = 0 and VOLUME> \$0D7 then

LET VOLUME= VOLUME- 1

'LOWERS CURRENT VOLUMELEVEL BY

1

PAUSE 200

SEROUT MP3PLAY,MP3_BAUD,(Volume)

'SENDS CURRENT VOLUMEHEX VALUE

TO MP3 PLAYER

PAUSE 200

SEROUT LCD,LCD_BAUD,(254,1)

SEROUT LCD,LCD_BAUD,(254,128,"VOLUMELEVEL= ", #VOLUME_NUM) 'DISPLAYS CURRENT
VOLUMELEVEL IN OLED

PAUSE 200

```

goto clearscreen

ENDIF

' ___CONTINUOUS PLAY CODE___

IF MP3BUSY = 1 and SONG_NUMBER >= 1 then

SONG_NUMBER = SONG_NUMBER + $001           'INCREASES RECORDING NUMBER BY
1

SEROUT MP3PLAY,MP3_BAUD,(SONG_NUMBER)      'SENDS CURRENT RECORDING
NUMBER TO MP3 PLAYER

PAUSE 200

SEROUT lcd,lcd_baud,(254,1)

PAUSE 200

SEROUT lcd,lcd_baud,(254,128,"Folder ",#FOLDER_NUM," Song ",#SONG_NUMBER)

SEROUT lcd,lcd_baud,(254,192," Continuous Play")

ENDIF

GOTO SWITCHCHECK

return

COUNTDOWN:

SEROUT MP3PLAY,MP3_BAUD,($EF) 'STOP module

timeDATE:

' _____ Clock and DATE
Display _____

'low C.2

sertxd ("HOURS=",#hours," MINS=",#mins," SECS=",#secs," DAY=",#day,"
DATE=",#date," MONTH=",#month," YEAR=",#year,CR,LF)

```



```

sertxd ("HOURS=",hours," MINS=",mins," SECS=",secs," DAY=",day," DATE=",date,"
MONTH=",month," YEAR=",year,CR,LF)

If Vol_Dn_Switch = 0 and Stop_Switch = 0 then

    let Clock_Set = 1

        Goto SetClock

endif

IF PLAY_SWITCH =0 OR STOP_SWITCH =0 THEN

GOTO SWITCHCHECK

ENDIF

IF CHRISTMASCOUNT = 0 then

goto DAYsToChristmas

ENDIF

HI2Csetup I2Cmaster, %11010000, I2Cslow, I2Cbyte           ' setup 3702 clock
module

    HI2Cin $0, (SECS,MINS,HOURS,DAY,DATE,MONTH,YEAR)       ' read time

    PM_AM ="P" : IF HOURS < $12 then :PM_AM = "A" : ENDIF  'indicate PM or AM

IF HOURS = $20 OR HOURS = $21 THEN

    LET HOURS = HOURS - $6

ENDIF

IF HOURS > $12 THEN : LET HOURS = HOURS - $12 : ENDIF     '24 to 12 hour format

IF HOURS = $0 THEN : HOURS = $12 : ENDIF

```

```

        BcdTOASCII HOURS,CHARACTER1,CHARACTER2 : IF CHARACTER1 = "0" THEN :
CHARACTER1 = " " : ENDIF ' zero blanking CHARACTER1

        BcdTOASCII MINS ,CHARACTER3,CHARACTER4

        BcdTOASCII SECS,CHARACTER5,CHARACTER6

'sertxd
(CR,LF,CHARACTER1,CHARACTER2,":",CHARACTER3,CHARACTER4,":",CHARACTER5,CHARACTER6,"
",PM_AM,"M ") '(11.58.00 PM)

        SEROUT lcd,lcd_baud,(254,1)

        SEROUT lcd,lcd_baud,(254,128,"The Current Time")

        SEROUT lcd,lcd_baud,(254,192,"Is:
",CHARACTER1,CHARACTER2,":",CHARACTER3,CHARACTER4,":",CHARACTER5,CHARACTER6,"
",PM_AM,"M ")

        PAUSE 3000

'DATEMONTHYEARDisplay

        BcdTOASCII DATE ,CHARACTER1,CHARACTER2

        BcdTOASCII MONTH,CHARACTER3,CHARACTER4

        BcdTOASCII YEAR ,CHARACTER5,CHARACTER6

'sertxd
(CHARACTER3,CHARACTER4,"/",CHARACTER1,CHARACTER2,"/20",CHARACTER5,CHARACTER6,CR,LF)'
(05/11/13 MONTH,DAY,YEAR)

        SEROUT lcd,lcd_baud,(254,1)

        SEROUT lcd,lcd_baud,(254,128,"The Current DATE")

        SEROUT lcd,lcd_baud,(254,192,"Is:
",CHARACTER3,CHARACTER4,"/",CHARACTER1,CHARACTER2,"/20",CHARACTER5,CHARACTER6)

        PAUSE 3000

        SEROUT lcd,lcd_baud,(254,1)

```

sertxd (secs,cr,lf)
sertxd (#secs,cr,lf)
sertxd (mins,cr,lf)
sertxd (#mins,cr,lf)
sertxd (hours,cr,lf)
sertxd (#hours,cr,lf)
sertxd (Day,cr,lf)
sertxd (#day,cr,lf)
sertxd (date,cr,lf)
sertxd (#date,cr,lf)
sertxd (month,cr,lf)
sertxd (#month,cr,lf)
sertxd (year,cr,lf)
sertxd (#year,cr,lf)

goto TimeDATE

DAYsToChristmas:

' _____ 'CALCULATE DAYS TO CHRISTMAS AND DETURMINE IF LEAP
YEAR _____

'low C.2

```
IF PLAY_SWITCH =0 OR STOP_SWITCH =0 THEN
```

```
GOTO SWITCHCHECK
```

```
ENDIF
```

```
IF VOL_DN_SWITCH = 0 AND STOP_SWITCH = 0 THEN
```

```
LET CLOCK_SET = 1
```

```
GOTO SETCLOCK
```

```
ENDIF
```

```
HI2Csetup I2Cmaster, %11010000, I2Cslow, I2Cbyte
```

```
HI2Cin $0, (SECS,MINS,HOURS,DAY,DATE,MONTH,YEAR)
```

```
' read time
```

```
b20=bcdtobin YEAR 'b6
```

```
'determine IF it
```

```
is a leap YEAR
```

```
LET b19 =b20 // 4
```

```
' IF
```

```
YEAR is divisable by 4 then it is a leapYEAR (manual change is required for leapcentry).
```

```
IF b19 <> 0 then
```

```
LET LEAP_YEAR_CALC=364
```

```
'normal
```

```
YEAR
```

```
b19 = 0
```

```
ELSE
```

```
b19 = 1
```

```
'leapYEAR
```

```
LET LEAP_YEAR_CALC=364
```

```
ENDIF
```

INT_DAY =bcdtobin b12 + 1
to binary for calculation

' Convert data

' Calculate the number of DAYS remaining to christmas INT_DAY = current DATE (DAY)

select case MONTH

case \$01

'January

DAY_CALCULATION = LEAP_YEAR_CALC - 6 - INT_DAY + b19

case \$02

'February

DAY_CALCULATION = LEAP_YEAR_CALC - 36 - INT_DAY + b19

case \$03

'March

DAY_CALCULATION = LEAP_YEAR_CALC - 64 - INT_DAY

case \$04

'April

DAY_CALCULATION = LEAP_YEAR_CALC - 95 - INT_DAY

case \$05

'May

DAY_CALCULATION = LEAP_YEAR_CALC - 125 - INT_DAY

case \$06

'June

DAY_CALCULATION = LEAP_YEAR_CALC - 156 - INT_DAY

case \$07

'July

DAY_CALCULATION = LEAP_YEAR_CALC - 186 - INT_DAY

case \$08

'August

DAY_CALCULATION = LEAP_YEAR_CALC - 217 - INT_DAY

case \$09

'September

DAY_CALCULATION = LEAP_YEAR_CALC - 248 - INT_DAY

```

        case $10
'October

        DAY_CALCULATION = LEAP_YEAR_CALC - 278 - INT_DAY

        case $11
'November

        DAY_CALCULATION = LEAP_YEAR_CALC - 309 - INT_DAY

        case $12
'December up to 24th

        DAY_CALCULATION = LEAP_YEAR_CALC - 339 - INT_DAY

endselect

```

```

        IF MONTH = $12 and DATE > $25 then                                'December
(after christmas DAY)

        DAY_CALCULATION = LEAP_YEAR_CALC - INT_DAY +27

        ENDIF

        HOURS = HOURS / 16 * 250 + HOURS                                ' convert BCD to Binary

        HOURS = 23-HOURS

        MINS = MINS / 16 * 250 + MINS                                    ' convert BCD
to Binary

        MINS = 59-MINS

        SECS = SECS / 16 * 250 + SECS                                    ' convert BCD to Binary

        SECS= 60-SECS

```

' _____ output section: _____

'Insert code in this section to direct output to what ever system you are using,

'for instance LCD or Segmented LED etc.

IF MONTH >= \$12 and DATE = \$25 THEN

sertxd ("0 DAYs 0 HOURS 0 Minutes 0 seconds",cr,lf)

goto message

ELSE

'sertxd (" ",#DAY_CALCULATION," DAYS ",#HOURS," HOURS ",#MINS," MINS
",#SECS," SECONDS-",CR,LF)

'SEROUT LCD,LCD_BAUD,(254,1)

SEROUT

LCD,LCD_BAUD,(254,128,#DAY_CALCULATION,"D:",#HOURS,"H:",#MINS,"M:",#SECS,"S ")

SEROUT LCD,LCD_BAUD,(254,192,"UNTIL CHRISTMAS!")

goto COUNTDOWN

ENDIF

Message:

sertxd ("Merry Christmas EveryOne!")

SEROUT LCD,LCD_BAUD,(254,1)

serout lcd,lcd_baud,(254,128,"MERRY CHRISTMAS")

SEROUT LCD,LCD_BAUD,(254,192," EVERYONE!!")

IF PinC.0 = 1 then

'PIN C.6 CONNECTED

TO TOGGLE SWITCH TO FLIP BETWEEN COUNTDOWN AND CURRENT TIME/DATE

goto timeDATE

'DIRECTS

PROGRAM TO CURRENT TIME/DATE

ELSEIF PinC.0 = 0 then

```
goto DAYsToChristmas  
PROGRAM TO COUNTDOWN
```

```
'DIRECTS
```

```
ENDIF
```

```
return
```

```
'_____end outputsection_____
```

```
"((((((((((ATTEMPT TO BE ABLE TO PROGRAM CLOCK MANUALLY))))))))))))))))"
```

```
SetClock:
```

```
SEROUT LCD,LCD_BAUD,(254,192,"VOLUME DN OR UP")
```

```
LET SECS = $000
```

```
PAUSE 2000
```

```
SetMin:
```

```
If Vol_Up_Switch = 0 and Mins >= 1 and Mins <= 59 then
```

```
pause 200
```

```
LET Mins = Mins + $001
```

```
EndIf
```

```
If Vol_Dn_Switch = 0 and Mins >= 2 and Mins <= 59 then
```

```
LET Mins = Mins - $001
```

```
pause 200
```



```
EndIf
IF MINS >= 60 THEN
LET HOURS = HOURS + $001
GOTO HOURSET
ENDIF
serout Lcd,Lcd_Baud,(254,128,"Minutes = ",#Mins," ")
Pause 200
if NEXT_SWITCH = 0 then
Clock_Set = 3
Pause 200
goto HOURSET
Endif
Goto SetMin
HourSet:
If Vol_Up_Switch = 0 and Hours >= 1 and Hours <= 23 then
pause 200
LET Hours = Hours + $001
EndIf
If Vol_Dn_Switch = 0 and Hours >= 2 then
LET Hours = Hours - $001
pause 500
EndIf
serout Lcd,Lcd_Baud,(254,128,"Hours = ",#Hours," ")
if NEXT_SWITCH = 0 then
Clock_Set = 2
```

```
'sertxd (#clock_set)

Pause 200

goto SETDAYS

Endif

goto HourSet

SetDays:

If Vol_Up_Switch = 0 and Day >= 0 and Day <= 7 then

pause 200

LET Day = Day + $001

Endif

If Vol_Dn_Switch = 0 and Day >= 2 and Day <= 7 then

LET Day = Day - $001

pause 200

Endif

serout Lcd,Lcd_Baud,(254,128,"Day = ",#Day," ")

Pause 200

if NEXT_SWITCH = 0 then

Clock_Set = 5

Pause 200

goto SetDate

Endif

GoTo SetDays

SetDate:

If Vol_Up_Switch = 0 and Day >= 1 and Day <= 31 then

pause 200
```

```
LET Date = Date + $001

Endif

If Vol_Dn_Switch = 0 and Day >= 2 and Day <= 31 then

LET Date = Date - $001

pause 500

Endif

serout Lcd,Lcd_Baud,(254,128,"Date = ",#Date," ")

Pause 500

if NEXT_SWITCH = 0 then

Clock_Set = 6

Pause 2000

goto SetMonth

Endif

Goto SetDate

SetMonth:

If Vol_Up_Switch = 0 and Month >= 1 and Month <= 12 then

pause 200

Month = Month + $001

Endif

If Vol_Dn_Switch = 0 and Month >= 2 and Month <= 12 then

Month = Month - $001

pause 200

Endif

serout Lcd,Lcd_Baud,(254,128,"Month = ",#Month," ")
```

```
Pause 200

if NEXT_SWITCH = 0 then

Clock_Set = 7

Pause 200

goto SetYear

Endif

goto SetMonth

SetYear:

If Vol_Up_Switch = 0 and Year >= 10 and Year <= 50 then

pause 200

LET Year = Year + $001

Endif

If Vol_Dn_Switch = 0 and Year >= 10 and Year <= 50 then

LET Year = Year - $001

pause 200

Endif

serout Lcd,Lcd_Baud,(254,128,"Year = ",#Year," ")

Pause 200

if NEXT_SWITCH = 0 then

Clock_Set = 8

Pause 200

goto Write_Time

Endif

GoTo SetYear

Write_Time:
```

```

if Clock_Set = 8 then

high 5 ' write protect eeprom

i2cslave %11010000, i2cslow,i2cbyte

writei2c 0, (secs,mins,hours,day,date,month,year,$10)          'write data to clock'

'HI2Cout $0 , ( $00, $59, $23 , 0 , $31, $12 , $13) ' Uncomment to Program    example
(11.59.00 PM)

'      HI2Cout $0 , ( b10,B9, B8, 0 , B12,B13,B14)

;Progam Registers ( secs,mins,hours,day,date,month,year) ' Enter in BCD      hours example ( $0 to
$23 )

      pause 2000                                          'wait while data
is writen

'      srtxd ("AFTER SENT OUT,,,HOURS=",#hours," MINS=",#mins," SECS=",#secs," DAY=",#day,"
DATE=",#date," MONTH=",#month," YEAR=",#year,CR,LF)

      let secs = 0

      let mins = 0

      let hours = 0

      let day = 0

      let date = 0

      let month = 0

      let year = 0

      let clock_set = 0

      goto COUNTDOWN

endif

'i2cslave %11010000, i2cslow, i2cbyte

'writei2c 0, ($00, $04, $23, $07, $14, $12, $13, $10)

```