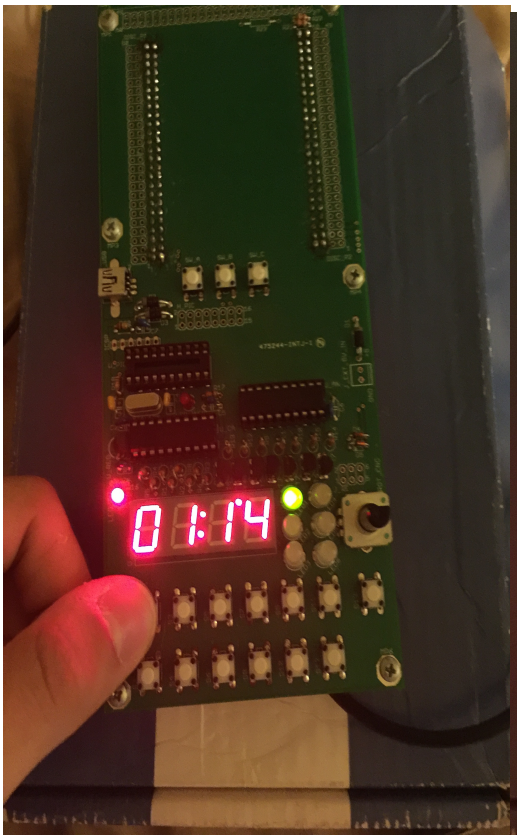
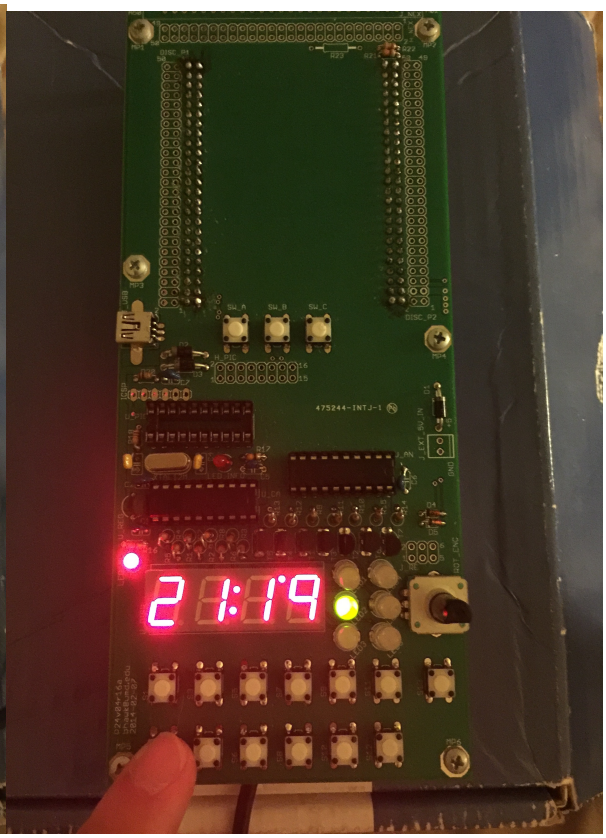
User Manual: STM32F407 – P24 with Clock Interface and other Peripherals

STARTUP: (Refer P24 board diagram for assistance)

- Download and install the STLink software for the STM32 series
  [http://www.st.com/web/en/catalog/tools/PF258168]
- Run the MakeBlinky.bat by double clicking in the ENEE440_Final_Project directory.
  [The compiler will generate a Blinky.hex to be programmed on the board]
- First Perform a *Full Chip Erase* using the STLink Software
- Now use the STLink utility to *Program and Verify* the USBvcp13.hex file to the board
- Now use the STLink utility to *Program and Verify* the Blinky.hex file to the board
- You should now see 00:00 shown on the 7-segment display (***Refer to pg6***)
- Calibrate the time using the rotary encoder and BUTTONS 1-4 on the left side of the board
- Press BUTTON 13 (the rightmost button under the rotary encoder) to enter the Home Menu

Toggling LEDs (GRN→RED→OFF) Buttons 1-6 will toggle corresponding LEDs 1-6 between states GREEN→RED→OFF



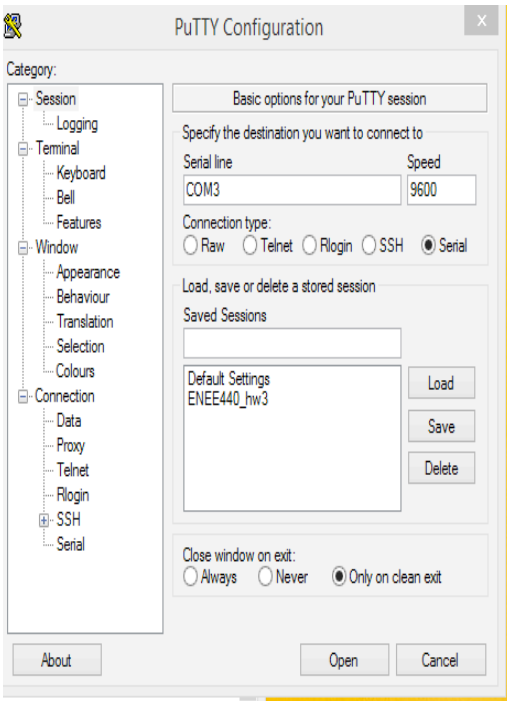


Setting up COM Link with PUTTY for Remote Control

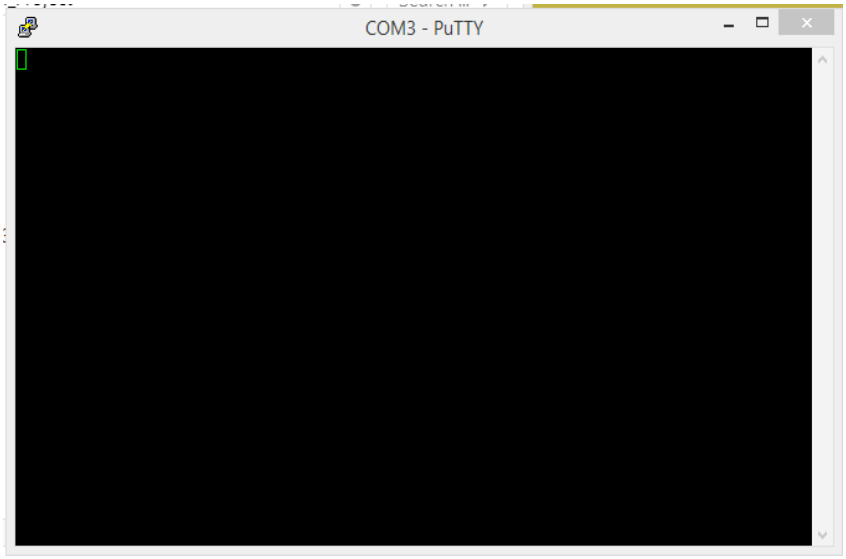
- Download the software PUTTY

- Open PUTTY by double clicking on the icon → 

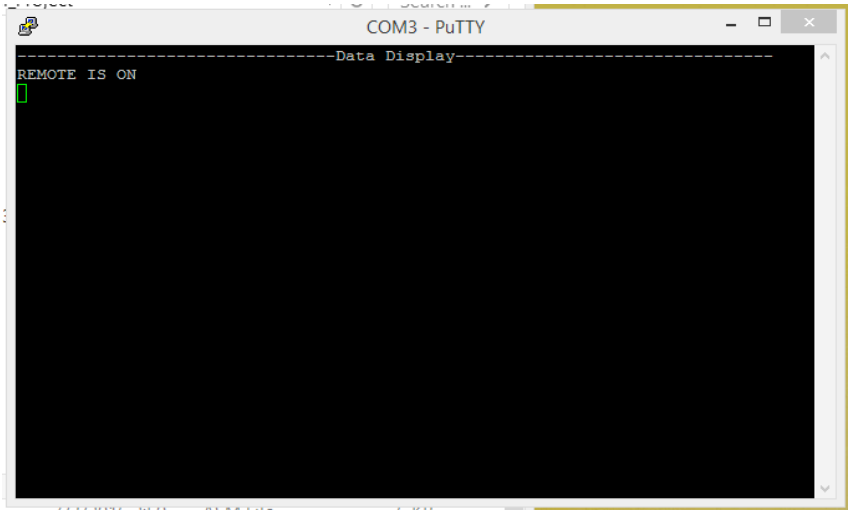
- Make sure Serial is selected for Connection type →



- Click open [A black screen should now display]



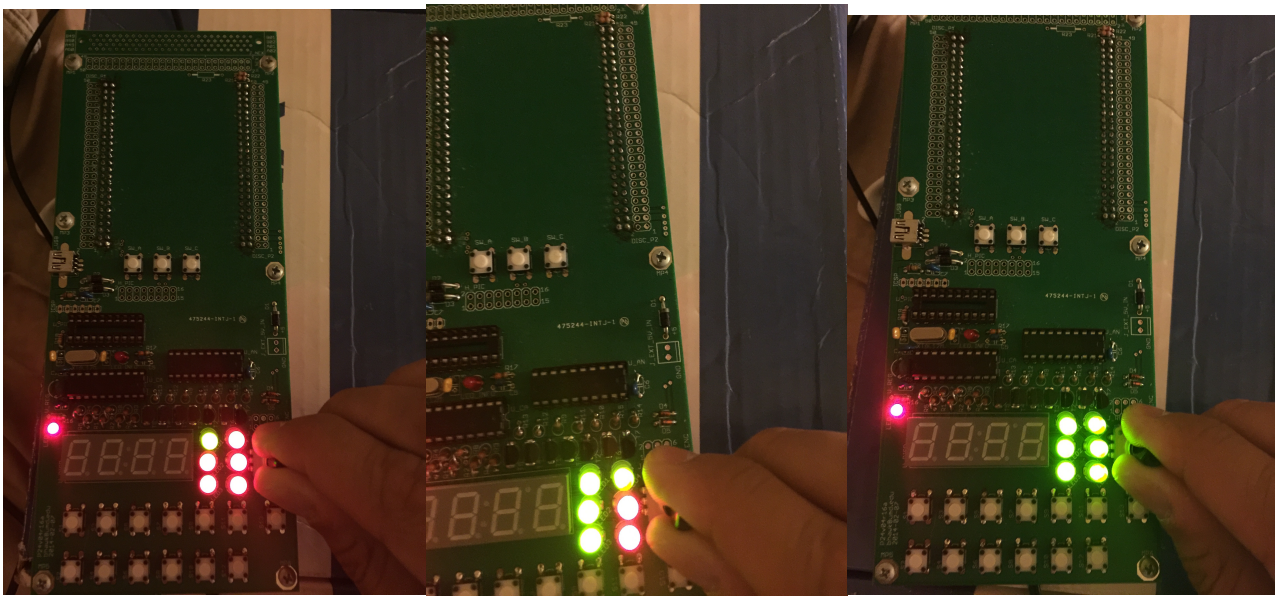
- Press ‘Enter’ to wake up the Data Display [NOTE: Pressing ‘Enter’ twice may turn on the remote. Data Display may take up to 40 sec at most to wake up, so please be patient.]
- Press ‘Enter’ again to turn the remote on



You may now type commands to talk to different components of the P24!

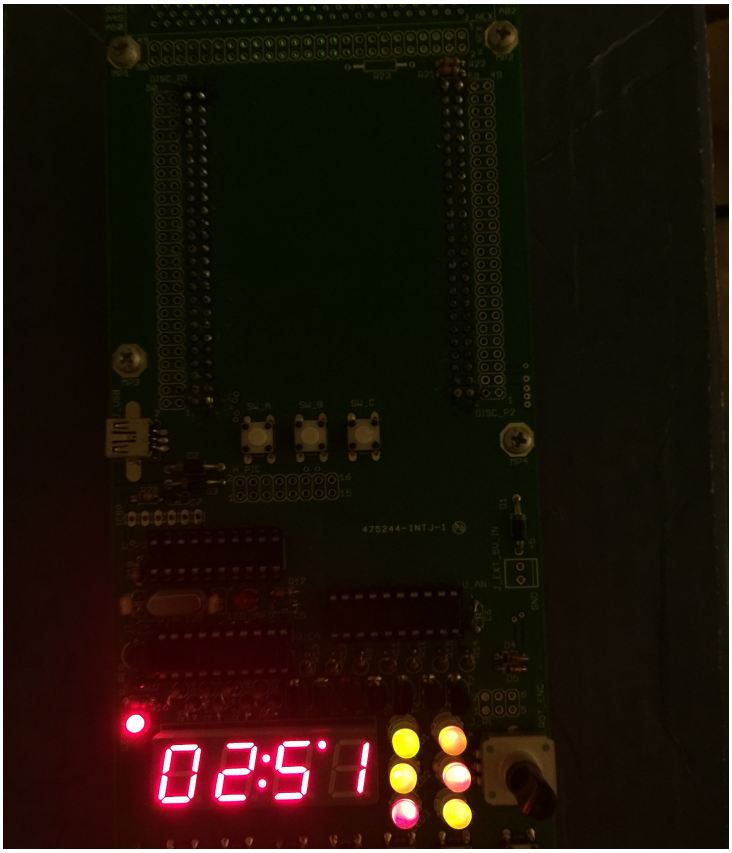
Valid Commands: [Type a valid command ***followed by pressing the space*** bar to execute]

- 'adcon' (Turns on ADC; P24 responds "--->ADCON\n")
  'adcoff' (Turns off ADC; P24 responds "--->ADCOFF\n") *Both of these will just print a confirmation message on the COM screen*
- 'adccal' **NOTE: ADC must be off to enter this mode!** (Enters calibration mode; P24 responds "--->TURN CLOCKWISE TO CALIBRATE\n") The LEDs will all be red indicating you have entered calibration mode and you may now turn the rotary encoder to calibrate [Example below turns right]
  'stop' (Exits calibration mode; "--->DONE CALIBRATING\n") If you accidently turned off the remote by pressing 'Enter' during calibration mode, it will not exit. Press 'Enter' again to turn the remote back on



- '1' (Toggles LED1; P24 responds "---->BUTTON 1 PRESSED\n")
- '2' (Toggles LED2; P24 responds "---->BUTTON 2 PRESSED\n")
- '3' (Toggles LED3; P24 responds "---->BUTTON 3 PRESSED\n")
- '4' (Toggles LED4; P24 responds "---->BUTTON 4 PRESSED\n")
- '5' (Toggles LED5; P24 responds "---->BUTTON 5 PRESSED\n")
- '6' (Toggles LED6; P24 responds "---->BUTTON 6 PRESSED\n")

- ‘DANCE’ (Make the P24 happy by typing this command; P24 responds “DANCE!\n”)
  ‘dance’ (This will make the P24 unhappy, and it will stop dancing; P24 responds “Party’s over bud\n”)



- ‘bye’ (Pretend to exit; P24 responds “See you later\n”)

Invoking a Task Switch (Buttons 7-13):

When the remote is off, pressing buttons 7-13 to get a response from the P24
P24 will not print a new line in response to these button presses.

Button Press	Response
7	"SVC 0 Task"
8	"SVC 1 Task"
9	"SVC 2 Task"
10	"SVC 3 Task"
11	"SVC 4 Task"
12	"SVC 5 Task"
13	"SVC 6 Task"

TroubleShooting:

REMOTE

- Waking up the COM link on PUTTY may take more than 30sec. Pressing 'Enter' a couple of times doesn't hurt anything. It will just display whether the remote is in the OFF/ON state

- COM Link fails if you did not close the previous session in PUTTY before plugging in the device in after leaving INIT Mode. Do not have to reset. Just close the session in PUTTY, unplug the device and wait a couple of seconds before plugging it back in.

- Sometimes the format is unpredictable when an incorrect command is entered, so again pressing 'Enter' a couple of times will clear that issue (Still make sure you see "REMOTE IS ON" before trying to execute one of the commands)

BUTTONS

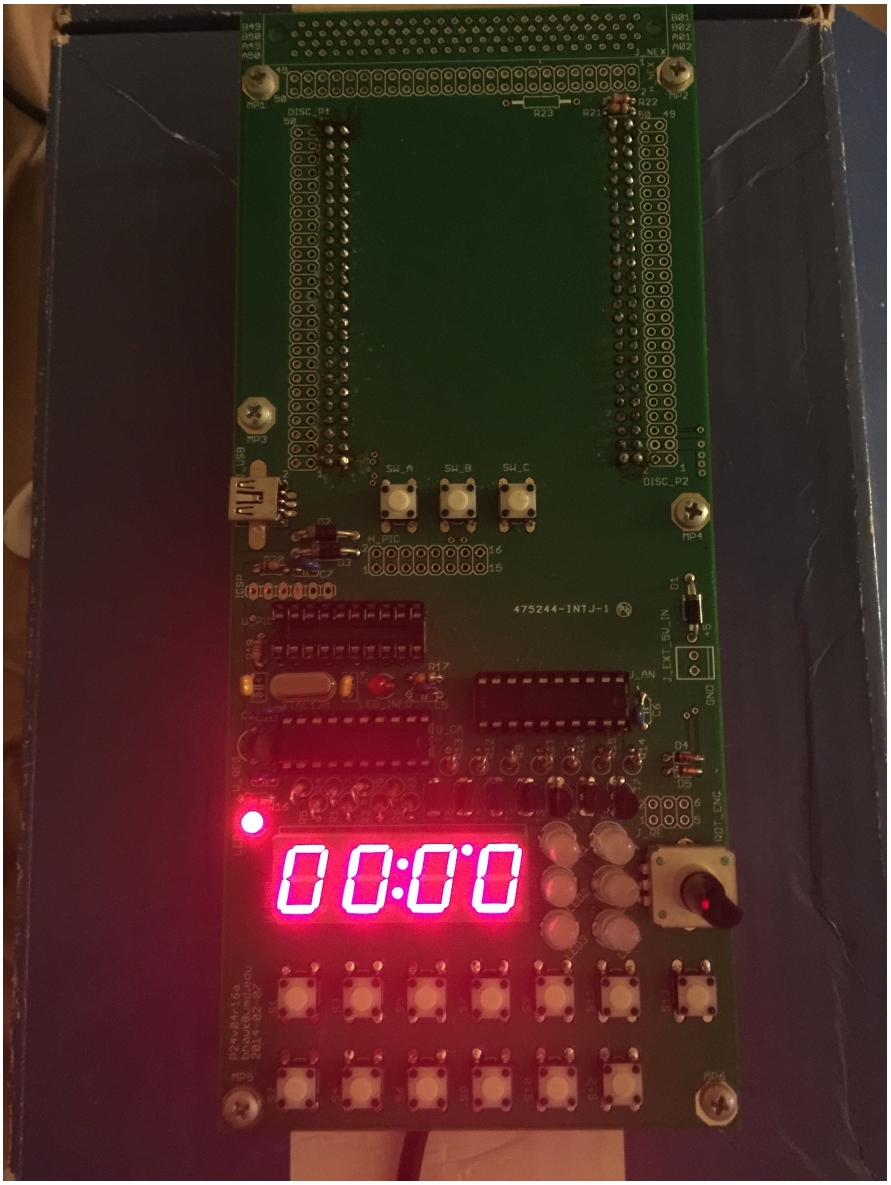
- When the remote is off and you press any of the buttons 7-13, there will be no new line on display, so again press 'Enter' until you see "REMOTE IS ON"

- As for the buttons, pressing more than one simultaneously will produce unexpected results on the 7-segment display due to their wiring on the P24

Rotary Encoder

- Turning the rotary encoder too fast may produce unexpected results during calibration in INIT mode and also in the ADC Calibration state. For this mode in particular, it is best to hold the rotary encoder firmly during turns since it is very sensitive in this state

- When calibrating the clock in INIT mode, you may turn the encoder as fast as you want in this state! However the digits may jump up or down if the board experiences any sudden movements while the encoder is enabled, or while it settles into a stable state



P24 Board in INIT Mode