

NTP Based dual zone clock.

This is a brief document describing a dual time clock based on the work by Bruce E. Hall, w8bh.net, [GitHub - bhall66/NTP-clock](https://github.com/bhall66/NTP-clock) and using it on a TTGO T display board.

This document assumes you have the Arduino IDE installed and are familiar with compiling a sketch.

The version described here uses a ready-made module obtained from ebay. No extra parts are required, although you may require a USB type-C cable to connect to it for programming.

Bruce's original sketch was based on the use of an ESP32 module connected to a 2.2" or 2.8" TFT display using a ILI9341 control chip. Details of connections are on Bruce's web pages/Github.

I took Bruce's sketch and modified it to use on the smaller 1.14" TTGO T module. These modules are about US\$10 or so on eBay.

This is the module I used: As you can see, the TFT display is part of the module and it uses the same connections to the ports of the ESP32 as Bruce's project did. As a bonus, this PCB also contains a Li-Po battery charger and the module is supplied with a battery cable. Make sure, if you use the battery, that you connect it correctly! It draws about 90mA from the battery. Depending on the capacity of your battery, you will have to re-connect to your PC at some point, via the USB cable to charge it. Or, just run it from the USB cable.



Since the TFT display is much smaller than the one Bruce used, the modifications to the sketch just involve re-sizing of the dual display to fit the smaller display. (To simplify things, as I also have the larger display version, there is a #define TTGO statement in the sketch which can be set 'true' for the small display or 'false' to use the original larger display in the project, default is 'true'.)

Follow Bruce's information for the other #defines. [Link to his Tutorial and my example](#), is below.

The sketch uses the TFT_eSPI Library. To use this Library for the smaller display a small change has to be made to the file "User_Setup_Select.h"

The file is located in your PC, normally in
C:\Documents\Arduino\libraries\TFT_eSPI\User_Setup_Select.h
Open it with a text editor, make the changes as below, then save it.

Enable the **Setup25** by removing the "//" in this line:-

```
#include <User_Setups/Setup25_TTGO_T_Display.h> //Setup file for  
ESP32 and TTGO T-Display ST7789V SPI bus TFT
```

And disable **Setup1** by adding "//" to this line:-

```
//#include <User_Setups/Setup1_ILI9341.h> // Setup file configured  
for ILI9341
```

Then save the file.

Only ONE line should be uncommented.

In some cases, a user might have different files already enabled. For the LIB, of the box, the default is: `#include <User_Setup.h>` If so, disable this line with "//"

If you don't make these changes, the sketch will load OK, but the screen will be blank.

The sketch is named as "NTP_Dual_Clock_V1.3a" (or later)

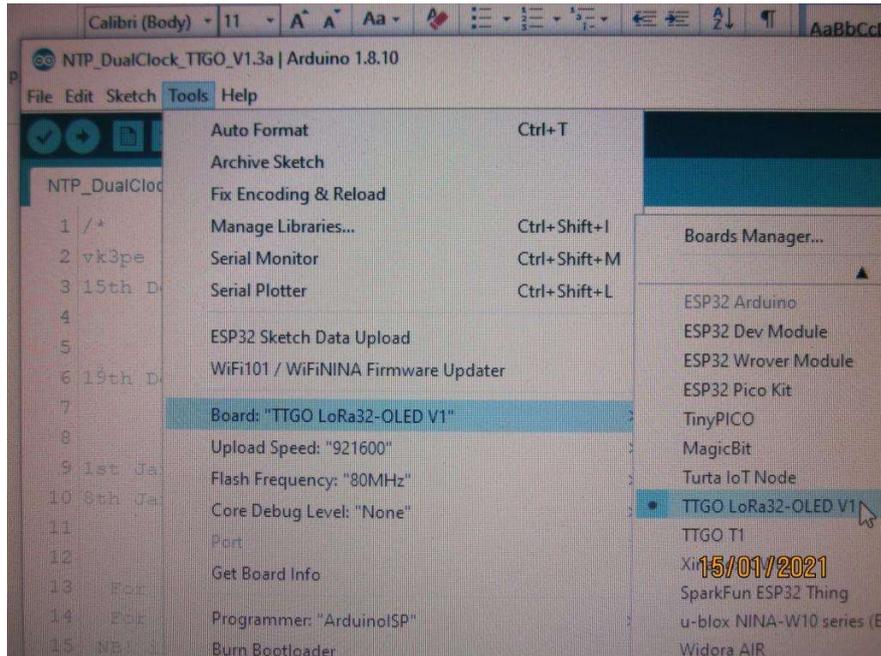
NOTE:- You will need to have installed ESP32 into the Arduino IDE in order to compile this code. Information to do this is available on the Web and youtube.

Eg. <https://randomnerdtutorials.com/installing-the-esp32-board-in-arduino-ide-windows-instructions/>

Or <https://microcontrollerslab.com/install-esp32-arduino-ide/>

Once the Arduino IDE is running and the sketch file (named as above) is loaded, you can compile the sketch and load it into the TTGO board.

To use the ESP32 board you need to select:-



References:

TTGO T-display pinout https://github.com/loboris/MicroPython_ESP32_psRAM_LoBo/issues/310

Bruce's Github account: [GitHub - bhall66/NTP-clock](https://github.com/bhall66/NTP-clock)

The ORIGINAL ILI9341 2.2" display code is here:

<https://github.com/bhall66/NTP-clock>

Bruce's tutorial is here:

http://w8bh.net/NTP_DualClock.pdf


```

#define TZ_RULE      "AEST-10AEDT,M10.1.0/2:00:00,M4.1.0/2:00:00"      // Glenn –
Melbourne Aus Eastern time
//#define      TZ_RULE      "GMT0BST,M3.5.0/1:00:00,M10.5.0/2:00:00"  // Jim - England
//#define TZ_RULE "MET-1METDST,M3.5.0/1:00:00,M10.5.0/2:00:00" // Jean-Marie Belgium GMT+1
time zone (Brussels, Paris

#define DEBUGLEVEL      INFO          // NONE, ERROR, INFO, or DEBUG
#define PRINTED_TIME      1          // 0=NONE, 1=UTC, or 2=LOCAL
#define TIME_FORMAT      COOKIE      // COOKIE, ISO8601, RFC822, RFC850, RFC3339, RSS
#define BAUDRATE          115200     // serial output baudrate
#define LEADING_ZERO      false      // show "01:00" vs " 1:00"
#define SYNC_MARGINAL     3600       // orange status if no sync for 1 hour
#define SYNC_LOST         86400      // red status if no sync for 1 day
#define LOCAL_FORMAT_12HR true       // local time format 12hr "11:34" vs 24hr "23:34"
#define UTC_FORMAT_12HR  false      // UTC time format 12 hr "11:34" vs 24hr "23:34"
#define DISPLAY_AMPM      true       // if true, show 'A' for AM, 'P' for PM
#define SCREEN_ORIENTATION 3        // screen portrait mode: use 1 or 3
#define TIMECOLOR         TFT_CYAN   // color of 7-segment time display
#define DATECOLOR         TFT_YELLOW // color of displayed month & day
#define LABEL_FG_COLOR    TFT_YELLOW // color of label text
#define LABEL_BG_COLOR    TFT_BLUE   // color of label background

#define TTGO              true       // alternate ESP32 TTGO board with in built 1.16" TFT display ('true' if
used)

// set 'true' for TTGO, false for 2.8" ILI9341 display

```

<VK3PE, 15th Jan 2021>