F3X Uni-Timer Version 1.0

Contents

1. Introduction

Version 1 of the Uni-Timer is an early development of the full potential of the unit. Some functionality has not yet been implemented. Web pages are very simplistic. Bluetooth is very experimental and subject to failure. However, the unit does operate as either a central timing unit or as a base unit.

2. Switches and ports




1. Display
2. Menu and operation switches
3. USB port – connect to phone charger to charge the battery
4. Audio out – connect headphones or a powered speaker
5. Expansion port
6. On/off switch
7. Antenna
8. Case screw
9. Charging LED

3. Battery

The system is designed to be powered by a single cell (1S, 3.7V) LiPo or LiIon battery. A flat 1,200 mAh or 2,000 mAh battery will fit. The unit has been fitted with a female JR style 3 pin connector.

Installation

The case must be opened to install the battery. Remove the case screw and antenna nut. The case can then be hinged open from the antenna end. The battery can then be mounted to the case back using double sided tape.

Charging

The unit has a USB charger built in. Connecting a USB power source and turning the unit on will initiate charging. Charge time is approximately 8 hours for a 1,200 mAh battery. Charging is indicated by a red LED visible to the left of the display. The LED has three modes when the USB is connected:

1. Flashing – USB power has been applied, but power switch is off – unit is not charging
2. Solid red – unit is charging
3. Off – battery is fully charged

Note that the unit can be used whilst charging. It will turn on as soon as USB power is connected.

Battery voltage indicator

The battery voltage is

4. Starting

When powered on, either by battery or USB, the unit will go through start-up stages dependent on its settings:

1. Power on screen
    a. Startup
    b. Wifi initialisation (if wifi enabled)
    c. Bluetooth initialisation (if Bluetooth enabled)
2. Information screen – shows web server URL, wifi mode, Bluetooth status
3. Pressing the yellow button then shows the main menu

5. Navigation

There are three buttons used to navigate the system:

1. Red – flight reset
2. Yellow – menu item select
3. Green – menu item navigation and flight start

4. System Menus

Main Menu

The main menu has the following (in Base Unit configuration the Setup Bases item is not present):

1. F3F Flights – flight menus
2. Setup Bases – base and camera unit selection
3. Options – setup options
4. Sleep – puts the unit into low power sleep mode. Use when charging.
5. Network Info – displays network connection information

F3F Flights

1. Practice Flights
2. Practice Laps
3. Contest Flights

Options

1. Volume – Cycles through 10 steps by pressing Yellow button
2. Unit Type – CD, Base A, Base B, Audio, or Wind (changing requires a restart)
3. Wifi – Normal, AP, or Off (changing forces a restart)
4. Bluetooth – On or Off Off (changing forces a restart)

Bases

Allows binding of base or camera units to use with the system.

Binding process

1. Ensure that the relevant base or camera unit is turned on
2. Select the unit in the Base menu. It will show ‘On’ and should also show ‘Linked’ to confirm that binding has been successful
3. Navigating away from the selected base, will clear the ‘Linked’ message, but the unit will remain bound.
4. This process only needs to be done once. The configuration is saved and subsequent use of the system uses the saved configuration.
5. Units should be deselected if they are not being used (‘-‘ shown next to unit name)

Signal indicator

A small Y or N will show in the bottom right of the display on the flights pages and setup menu. When using the unit as a base unit, this indicates connection to the central timing unit. Y=connected. N=not connected.

6. Wifi

Wifi Modes

The unit has three wifi modes:

1. Normal Mode – connects to a wifi access point, e.g. a router or phone set to be a mobile hotspot
2. AP Mode – runs its own access point that other devices can connect to
3. Off – wifi disabled

When in Normal or AP mode, devices such as smart phones can connect to the unit's web pages for information and configuration.

Normal Mode

If Normal mode is selected then the unit will attempt to connect to a local wifi access point using saved credentials. The first time it is used, it won't have the access point credentials and will go through a configuration process:

1. Temporarily switches to AP mode
2. Use a wifi device, e.g. mobile phone to connect to the unit:
    a. On the phone wifi setup select 'F3X Timer' from the available wifi sources
    b. In a web browser, enter 192.168.1.4 as the address to use
    c. A web page will be shown
    d. Select the access point for the timer to use and enter the password and 'OK'
    e. There is a three minute timeout for setting the access point, after which the unit will continue to start without connecting
3. The unit will switch back to Normal mode and attempt to connect to the access point
    a. The URL of the unit's web server will be shown on the startup screen
    b. Reconnect your phone or other device to the same access point
    c. Use a web browser to connect to the web server

AP Mode

If AP mode is selected then the unit will start up its own access point called 'F3X Timer'. To use this:

1. Use a wifi device, e.g. mobile phone to connect to the unit
2. On the phone wifi setup select 'F3X Timer' from the available wifi sources
3. In a web browser, enter 192.168.1.4 as the address to use

7. Bluetooth

Bluetooth can be used to connect a remote button (iTag). The button is used to start/reset a flight (unit as CD) or signal a turn call (unit as a base).

The iTag device should be turned on prior to turning on the unit.

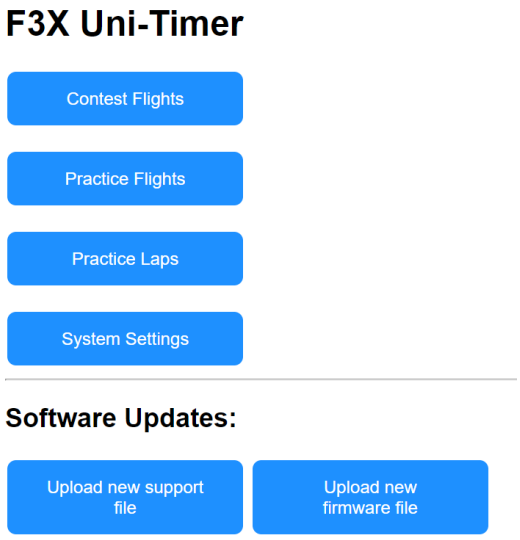
This function is experimental and subject to connection failure.

8. Web Pages

The unit has a web server that provides web pages for controlling and viewing flights, and for configuring the system. The address to use is shown on the startup screen.

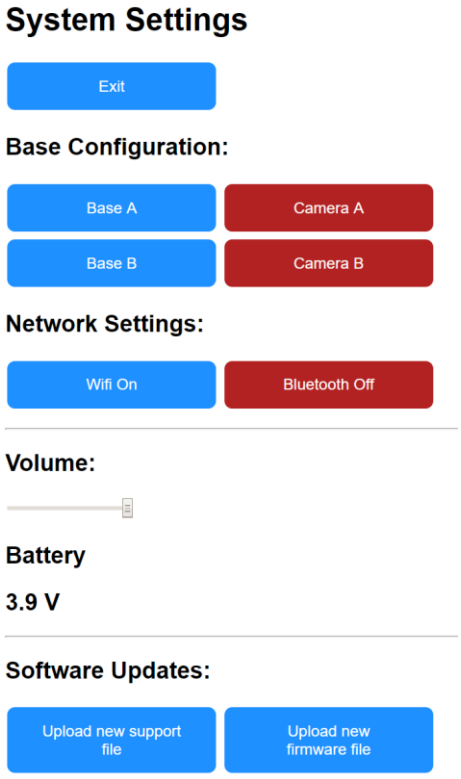
The web pages are in an early stage of development and are not fully functional, but the information shown on the pages is correct.

Main page



System Settings

Shows the current configuration for the bases



Practice Flight

Lap times and Total flight time are shown as the flight progresses

Practice Flights

Exit

Flight Phase

Ready

Lap Times

Lap	Time
Climb	0.0
Lap 1	0.0
Lap 2	0.0
Lap 3	0.0
Lap 4	0.0
Lap 5	0.0
Lap 6	0.0
Lap 7	0.0
Lap 8	0.0
Lap 9	0.0
Lap 10	0.0
Total	0.00

9. Firmware Updates

Updating the firmware is done via a browser. There are two type of files that may need to be updated:

1. Firmware files. The actual code the unit runs. These all have a file extension of .bin, e.g. “F3X UniTimer vx.xx.bin”
2. Support files. The code for the web pages. These all have a file extension of .html, .js, or .css.

Update files will be available from DropBox. To apply them:

1. Down load the files and save to a location on your computer
2. Use the unit in Normal wifi mode
3. Use a web browser and go the unit’s web address
4. From the main page or settings page, select either “upload new support file” or “Upload new firmware file”
5. Select “Choose file” and select the file appropriate file
6. Select “Upload”
7. The system will restart after the upload if a firmware file has been uploaded

Important. Do not mix up the two types of files. It is possible to upload a firmware (.bin) file as a support file. This will unnecessarily fill up storage space on the device (and will take a long time to upload).

10. Base Unit Operation

If configured as a base unit, the menus are only slightly different, e.g. no Base Setup option. The unit will automatically go into the correct flight mode once the CD unit goes to an F3F flight start screen.

Signalling a turn can be done in three ways:

1. Pressing the Red button
2. Using a Bluetooth iTag
3. Connecting an external switch to the expansion port (D1)

11. Expansion Port

The expansion port provides for the following:

1. Two external switches – e.g. a base turn switch on D1
2. Anemometer (not yet implement in software)
    a. Davis 6410, or
    b. Peet Bros Ultimeter Pro
3. External alarm/buzzer (not yet implemented in software)

Connector pins (left to right):

1. Ground
2. 3.3V (for Davis anemometer only)
3. Relay – open collector output for driving a relay for an external buzzer
4. D2 – digital input for anemometer
5. D1 - digital input for anemometer or external switch
6. A1 – analog input for Davis wind direction

12. F3F flights

Practice Flights

Practice Flights provide full timing but are not saved to storage (currently). The sequence for a flight is the following stages:

1. Ready. Press Green button (or Bluetooth iTag) to start.
2. Pre-Launch. 30 second pre-launch countdown. Press Green button (or Bluetooth iTag) to launch.
3. Launched. 30 second climb-out countdown.
4. Out of Course. When signal received from base A, or Green button pressed
5. Started. When entered the course as signalled by Base A or Green button pressed
6. Lap counts
7. Finished

To reset a flight, press the Red button at any point of the flight, or the iTag once the flight is at Launched stage or later.

To return to the Flights menu, press the Yellow button in the flight Ready stage.

Practice Laps

Practice laps provides for continuous laps, with the individual lap time called out. This allows testing of different turn techniques. Press Green button to start. Red button to Reset.

Contest Flights

Currently this is not implemented. It will provide for full contest timing.