

HamClock V 2.49 Controls and Symbols

Page 1 of 6

Getting Started

Welcome to HamClock. When first started, you may be asked to calibrate the touch screen, if applicable. Then you have a chance to open the Setup screen. These time out if ignored.

Setup provides two pages of configuration options, the exact choices available will depend on the architecture of your Clock. Typical pages are shown below. Orange text denotes passive prompts for the corresponding white data entry fields to their right. Cyan text denotes on/off choices or other binary options. Tapping on a white data entry field will show a green underbar cursor that shows where the next character will go. Tap **Delete** to erase the last character. Tap the Page number to see a different page. You may tap anywhere any time. When finished, tap **Done**. If any fields do not pass basic checks, they are marked with a red Err and you remain on the Setup screen until these are corrected. Below each page is a virtual keyboard for use on touch screens or with a mouse. On desktop systems, the screen may also be navigated with the keyboard using *tab* to step to the next prompt; *space* to toggle binary options; *escape* to cycle pages and *Return* for Done.

Page 1

- **Call:** enter your call sign, up to 11 characters. This is also how you will login into a dx cluster, if used.
- **DE Lat, Long:** these fields are your station latitude and longitude. You may enter +- degrees or use N/S suffix with Lat and E/W with Long. These fields disappear if IP Geolocate or gpsd are active.
- **IP Geolocate?** If Yes, uses your public IP to set Lat and Long, and removes these prompts. This is usually pretty accurate, but always double-check the results.
- **gpsd?** Allows connecting to a gpsd daemon on your local network for Lat and Long. When active, the Lat and Long prompts are removed and you may enter the host name of your gpsd server. The port is always 2947.
- **WiFi?** This toggles whether to set up WiFi. It is required on ESP clocks so can not be turned off. It is optional on Raspberry Pi and not available on other platforms. When active, type the SSID network name and password in the given fields. On RPi, it is recommended to use this only if you are using wifi only; leave it off if you are using wired ethernet or both.

Page 2

- **Cluster?** This toggles whether you want to connect to a Spider DX cluster (other cluster formats are not supported). If active, enter the internet host name and tcp port number of your preferred telnet cluster in the given fields. A list may be found at <https://www.ng3k.com/Misc/cluster.html>.
- **Units?** Toggle between Imperial and Metric units.
- **CntDn:** count down timer starting value in minutes; activate in Stopwatch page. See page 5.
- **dTemp:** Enter a delta value to be added to the BME280 temperature sensor, if installed. See page 6.
- **dPres:** Enter a delta value to be added to the BME280 pressure sensor, if installed. See page 6.
- **brMin, brMax:** Enter brightness range, if supported, as percent of hardware total. Min must be less than Max.
- **KX3?** Toggle whether to set the frequency of an Elecraft KX3 transceiver when tapping a DX Cluster spot. If active, select the serial baud rate to match the radio RS232 menu setting. See page 6.
- **Flip screen?** Yes will render the display upside down, useful for some cabling situations. Available only on ESP.

```
Call: WBOEW_
IP Geolocate? No
WiFi: SSID: mywifi
      Pass: mybadpassword
DE Lat: 32.00N Long: 111.00W
gpsd? No
Page 1 ...
```

```
Cluster? Spider host: usdx.w1nr.net
Units? Imperial
dTemp: -1.00
brMin: 0
KX3? baud: 38400
CntDn: 2
dPres: 2.000
brMax: 100
Flip? No
port: 7300
Page 2 ...
```

HamClock V 2.49 Controls and Symbols

Cycle Call sign background colors
 Cycle Call sign foreground colors
 Ahead one hour or minute
 Back one hour or minute
 Ahead one day, month, date or year
 Back one day, month, date or year
 Zero seconds
 Stopwatch or remaining count down
 Current version. Red when old. Tap to install.
 Sync to UTC
 Tap to Lock screen on/off; Hold to restart or shutdown RPi

Toggle Mercator or Azimuthal
 Toggle Lat/Long grid, Tropics or none
 Moon phase as seen from surface
 Sun
 Tap to set DX
 DE antipode
 NCDXF beacon
 Long path
 Short path
 Hold to set DE
 CS3B
 4X6TU
 524B
 ZS6DN
 4S7B
 ZL

Southgate: YOTA summer camp in the Americas

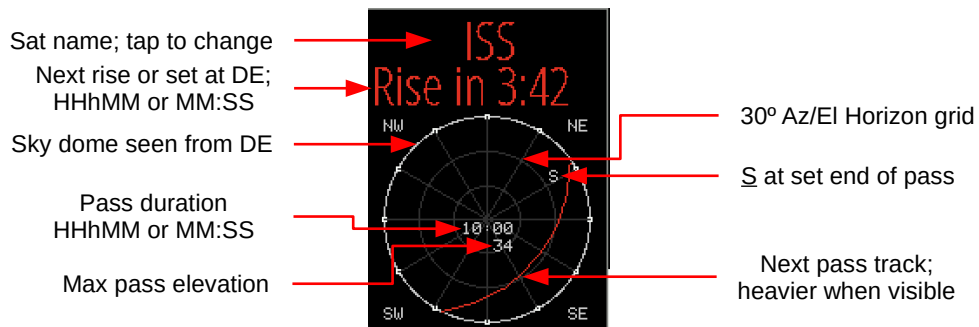
Toggle RSS on/off Mercator projection

Sat name unless in DX pane
 Ground track for one future orbit
 AO-73
 Tap Sat location or name to see Pass
 Concentric circles show where Sat is on horizon, 30° and 60° up

Azimuthal projection

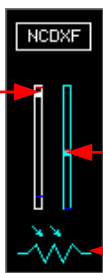
HamClock V 2.49 Controls and Symbols

Page 3 of 6



Display Brightness Control (ESP only)

Optional photoresistor reading



Indicates photoresistor is present

Display brightness, scaled to brMin to brMax. Tap to match current photoresistor reading.

Display On/Off Control (not for GUI)

Dim display if no activity; 0 disable

DE On time

DE Off time



NCDXF Beacons on/off

Map color key

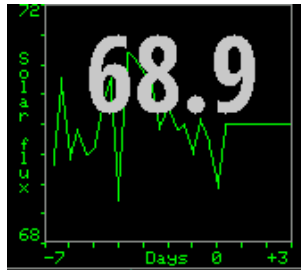


Frequency, MHz

HamClock V 2.49 Controls and Symbols

Tap near top of pane to cycle content options

- Solar flux**
- current value
 - 7 days history
 - 3 days forecast



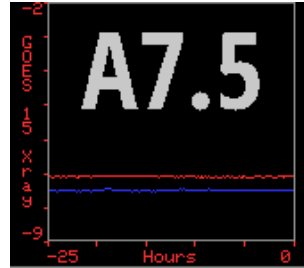
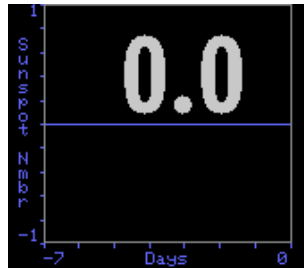
DX Cluster
dxcl.wv1r.com:7300

7298.3	K5TA	0353
3670.0	K0VXU	0353
7221.4	KP2M	0354
3515.5	L28E	0354
7231.4	K2ADA	0354
7027.0	UN7ZU	0354
7178.4	W0R	0354

Scrolling DX Spider cluster spots

- Telnet host:port
- Yellow: Connecting, Green: OK
- Tap a line to set DX
- UTC HHMM
- DX call
- kHz

- Sunspot number**
- current value
 - 7 days history



- GOES 16 Xray flux**
- current event
 - 25 hour history

VOACAP DE-DX path reliability for each band

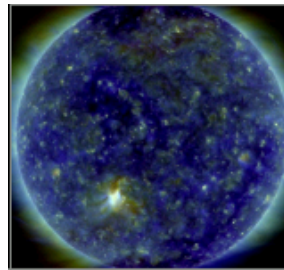
- CW
- Isotropic antennas
- Take Off Angle > 3°
- Short/Long path
- Mean Sunspot number

Tap to cycle power
1-10-100-1000 W

VOACAP DE-DX

80	54%	17	0
40	69	15	0
30	47	12	0
20	0	10	0

100W, CW, iso, TOA>3, SP, S=0



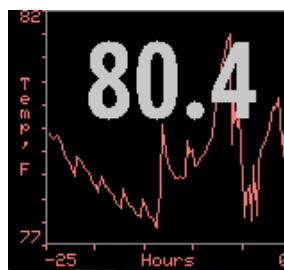
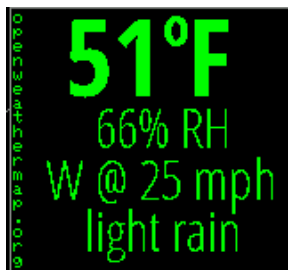
Solar Dynamic Observatory

- Tap to cycle between:
- Composite
 - Magnetogram
 - 6173 A

Tap lower half to switch to optional env sensor

Current weather conditions at new DX

Data from
openweathermap.org

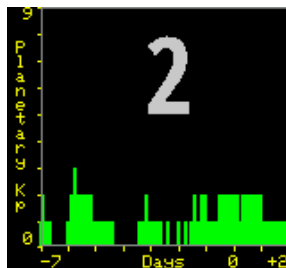


Optional Env Sensor

- Temperature
- Humidity
- Dew point
- Station pressure
- 25 hour history
- tap lower half to cycle plots

Geomagnetic index

- current index
- 7 days history
- 2 days forecast



HamClock V 2.49 Controls and Symbols

Page 5 of 6

Notes

Time: The time shown in large white letters always refers to the HamClock's idea of UTC. If the UTC button is black-letters-on-white-background it really is UTC. But the operator may modify this value by tapping on various locations (see chart on page 2), for example to show a satellite location at some moment in the past or future. Doing so causes the UTC button to become white-on-red and say "OFF" as a stark reminder the HamClock is no longer tracking real UTC. Tapping the UTC button will return abruptly back to real UTC. The times shown in the DE and DX panes are best-effort estimates of local time at those locations but no attempt is made to correct for daylight savings time. The operator may adjust for this manually, if needed, by tapping the DST button to add one hour.

Count down timer: A count down timer duration can be specified in Setup Page 2. The timer can be controlled in the Stopwatch page. If active, the time remaining is also shown in lieu of the stopwatch icon on the main page and may be restarted with a tap; hold 3 seconds to enter the Stopwatch page. See page 6 for using an LED and push button switch to monitor and control the timer.

Satellite pass: The lower left pane of HamClock is normally used to display DX information. But if you tap on the DX label you may select one of several popular satellites. After making your selection, this pane is repurposed to display the satellite name; the time until next rise or set; and a diagram showing the overhead view of the next pass. To emphasize this new purpose, the text color also changes to match the satellite path color on the map. Before the satellite rises, the time is a countdown showing time until the next rise. Once the satellite rises, the count changes to the time remaining until set. When it sets, the next pass is calculated and the cycle repeats like this forever. Tap on the name to choose a different satellite or tap the map to set a new DX and restore the pane to displaying its information.

Display brightness: If a photoresistor is installed on an ESP HamClock, toggling NCDXF will replace the beacon key with two vertical scales, the one on the left showing the current display brightness and the other the current photoresistor reading. Brightness is scaled from, and limited to, brMin to brMax from Settings. To calibrate a desired brightness response, start by exposing the photoresistor to the nominal bright light intensity then tap on the display scale to set the desired display brightness at the bright light level. Then expose the sensor to the nominal dim light intensity and tap again to set the desired brightness at the low light level. The two settings will be marked on the scales for reference, the bright settings in red and the dim settings in blue. Note the settings may be reversed if desired to make the display brighter in dim lighting and dimmer in bright lighting. On ESP or RPi, tapping NCDXF again will provide a menu of clock **On** and **Off (Dim on RPi)** DE times at which the display will be set to brMax or brMin, respectively; set the times equal to disable. **Idle** sets the number of minutes of no user activity after which the display will change to brMin; set to zero to disable. All values may be adjusted up or down by tapping above or below their respective digits. The photoresistor only affects brightness while the display is ostensibly On.

VOACAP: A table of path percentage reliability predictions from DE to DX for all HF ham bands can be assigned to either the left or center plot pane. The predictions use VOACAP configured for CW mode, isotropic 0 dBi antennas on both ends, take-off angle greater than three degrees, quiet location noise (-153 db) and the current mean sunspot number. The power can be adjusted by tapping in the lower left corner of the pane to cycle between 1, 10, 100 and 1000 W. Whether short or long path matches the bearing selection in the DX pane. Configuration details are summarized in the table caption. If displayed in the center pane, the predictions are always visible; if displayed in the left pane, they appear after the DX weather information expires.

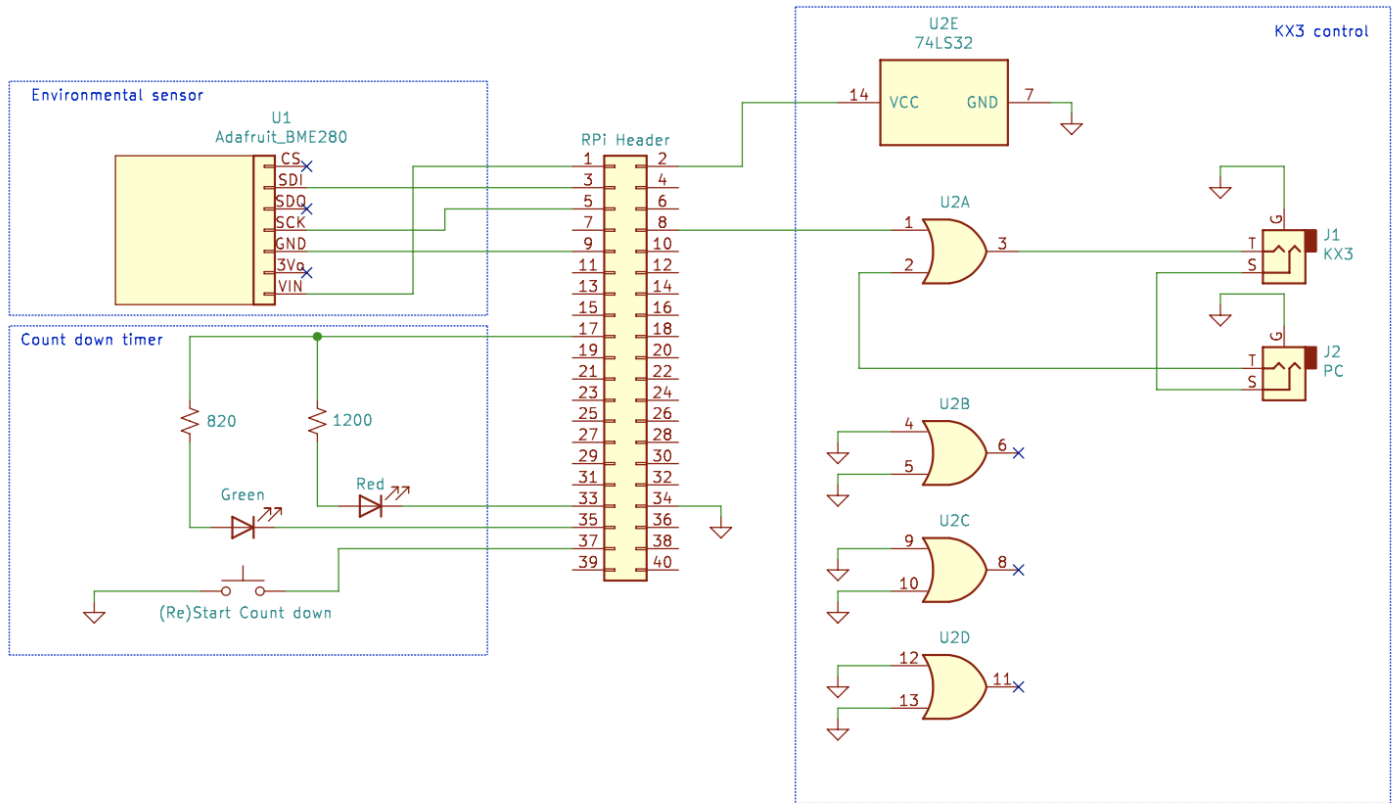
Maidenhead grid squares: The grid squares displayed for DE and DX are based on full precision internal latitude and longitude, not these values as displayed to whole degrees. This can lead to ambiguity for western and southern values. For example, consider a latitude of 40N and longitude of 100.1W, or -100.1. This is in grid DN90. But this location will be rounded to whole degrees and displayed as 40N 100W which is in grid EN00. HamClock allows you to tap on the grid to display either value depending on your intended purpose. Note this ambiguity does not happen for eastern longitudes. Fractional internal values can be created when setting location using fractional input on the Setup screen, from IP Geolocation, from the web server interface, or from gpsd. Setting a location by tapping on the map will always result in integral internal values and thus have no ambiguity.

Elecraft KX3 frequency control: You can connect an Elecraft KX3 ACC1 Tip to an ESP Huzzah (pin 15) or RPi (pin 8) so when you tap a DX Cluster spot the frequency is assigned to transmit VFO A. This may work with other Elecraft radios with CAT control but this has not been tested. See page 6 for wiring info. HamClock makes no attempt to confirm transmission so if the radio does not respond, tap the DX spot again.

HamClock V 2.49 Controls and Symbols

Page 6 of 6

Optional Raspberry Pi HamClock connections. The options are not interrelated and may be chosen as desired.



- The BME280 is a temperature, pressure and humidity breakout board, Adafruit <https://www.adafruit.com/product/2652>. This also works on the ESP8266 HamClock using Huzzah SDA, SCL, 3V and GND.
- The LEDs and SPST pushbutton switch work with the count down timer. Tap the switch to start or restart. The color indicates the time remaining: Green when running; flashing Green when 1 minute remaining; flashing Red when timed out. The LEDs may be separate or a combined LED such as Adafruit <https://www.adafruit.com/product/159>. This option is not available on the ESP8266 HamClock.
- The KX3 control is shown in conjunction with a PC connection. If both the PC and RPi transmit at the same time, there will be no physical harm done but the messages will interfere and likely have no effect. If a PC connection is not required, connect the KX3 Tip directly to RPi pin 8. This also works on the ESP8266 HamClock using Huzzah pin 15.

MAKE THESE CONNECTIONS AT YOUR OWN RISK, THE AUTHOR TAKES NO RESPONSIBILITY FOR DAMAGES.