

HamClock V 2.55 Controls and Symbols

Getting Started

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

Setup provides two pages of configuration options. The exact choices available will depend on your Clock platform but all options are shown below for completeness. 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 place 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 more options. 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, a keyboard may be used for text entry and navigation 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, 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, activate this only if you want to make a change; leave off otherwise.
- **Map:** Choose desired base map style when not showing VOACAP propagation models.
- **Log usage?** This allows you to voluntarily send us your HamClock settings to guide further development. All information is anonymous, your call sign is *not* logged.

Page 2:

- **Cluster?** This toggles whether you want to connect to an internet Spider DX cluster or local WSJT-X or JTDX program and whether and how you want spots plotted on the map. See page 6.
- **NTP?** This allows setting any one desired NTP server or using the list of built-in default servers.
- **Units?** Toggle between Imperial and Metric units.
- **CntDn:** count down timer starting value in minutes; activate in Stopwatch page. See page 5.
- **dTemp:** delta value to be added to the BME280 temperature sensor, if installed. See page 7.
- **dPres:** delta value to be added to the BME280 pressure sensor, if installed. See page 7.
- **brMin, brMax:** 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. GPIO must be Active. See page 6.
- **GPIO?** Controls whether the GPIO pins on RPi or ESP are used. Set to Off to insure no interference with other devices that use these pins.
- **Flip screen?** Yes will render the display upside down, useful for some cabling situations. Available only on ESP.

```
Call:   WB00EW      DE Lat: 40.00N   Long: 99.00W
IP Geolocate? No  gpsd? No
WiFi:   SSID: mywifissid      Password:
mywifipw
Map:    Countries      Log usage?  Opt-Out
Page 1 ...
```

```
Cluster? host:      port: 0      Map? No
NTP?    Default set
Units?  Imperial      dTemp: 0.00  brMin: 0
CntDn:  10           dPres: 0.000 brMax: 100
KX3?   No           GPIO?  Off     Flip?  No
Page 2 ...
```

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Cycle Call sign background colors
 Cycle Call sign foreground colors
 Up time, IP and WiFi signal strength – want at least -60 dBm
 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

WBOOEW
 Up 2d 16h IP 192.168.7.113 Ver 2.38
 21:12 09 UTC
 Sat Nov 16, 2019

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
 0H2B
 4X6TU
 5Z4B
 ZS6DN
 4S7B
 ZL

Southgate: YOTA summer camp in the Americas
 Toggle RSS on/off
 Mercator projection centered at 0° longitude

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

Azimuthal projection centered on DE

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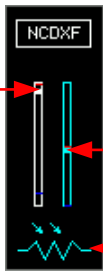
Toggle clocks or calendar → DE: UTC-5 → DE timezone -1/0/+1 hour
 DE North 1 degree → 13:15 Jul 21 → DE West 1 degree
 DE South 1 degree → 40N 99W → DE East 1 degree
 DE grid, toggle alternate → EN00 → DE Sun events In or At

Repeat same DX → DX: UTC+9.5 → DX timezone -1/0/+1 hour
 Choose satellite → 03:50 Jul 22 → DX West 1 degree
 DX North 1 degree → 30S 141E → DX East 1 degree
 DX South 1 degree → QG00 → DX Sun events In or At or Prefix
 DX Grid, toggle alternate → 9036 mi @ 262 km → Path length, miles or km
 Short or Long path

Sat name; tap to change → ISS
 Next rise or set at DE; HHhMM or MM:SS → Rise in 3:42
 Sky dome seen from DE → 30° Az/EI Horizon grid
 Pass duration HHhMM or MM:SS → 10:00 34
 Max pass elevation → 34
 S at set end of pass
 Next pass track; heavier when visible

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 Timer (not for GUI)

Dim display if no activity; 0 disable

DE On time

DE Off time



NCDXF Beacons on/off

Map color key



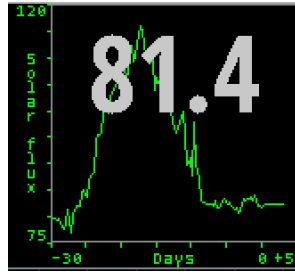
Frequency, MHz

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Tap near top of pane to cycle major options, near bottom to cycle minor options if appropriate

Solar flux

- current value
- 30 days history
- 3 days forecast



DX Cluster
dxcc.wv1r.com:7300

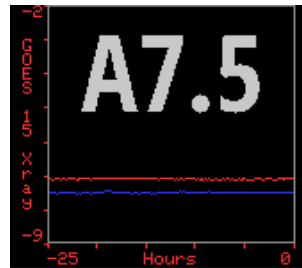
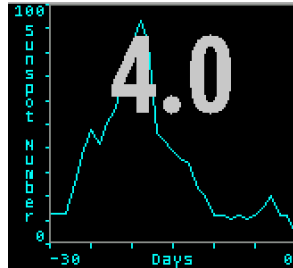
7298.3	K5TA	0353
3670.0	K0UXXU	0353
7221.4	KP2M	0354
3515.5	L28E	0354
7231.4	K2ADA	0354
7027.0	UN7ZW	0354
7178.4	W0RR	0354

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
- 30 days history
- Series 2.0
- from sidc.be



GOES 16 Xray flux

- current level
- 25 hour history

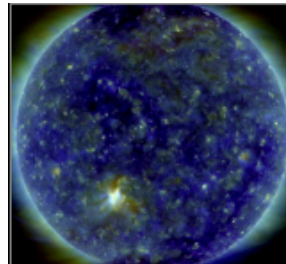
VOACAP DE-DX path reliability for each band

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

VOACAP DE-DX

80	3%	17	48
40	55	15	15
30	65	12	0
20	72	10	0

100W, CW, Iso, TOA>3, SP, 5=76



Solar Dynamic Observatory

- Tap lower half to cycle:
- Composite
- Magnetogram
- 6173 A

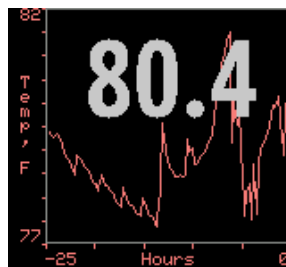
Tap band to select map

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

Current weather conditions

- Left pane can be transient DX or persistent DE
- Right pane can be persistent DX

Data from
openweathermap.org

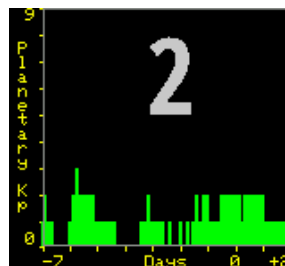


Optional Env Sensor

- 25 hour history
- Tap lower half to cycle:
- Temperature
- Humidity
- Dew point
- Station pressure

Geomagnetic index

- current index
- 7 days history
- 2 days forecast



NOAA SpaceWX

R	0	0	0
S	0	0	0
G	0	0	0

NOAA Space Weather

- now and 3 days forecasts
- scale 0 .. 5
- Radio blackouts
- Solar Radiation Storms
- Geomagnetic Storms

• see <https://www.swpc.noaa.gov/noaa-scales-explanation>

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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 page 2). This can be useful, for example, to show a satellite location or the gray line 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 standard time at these locations. The operator may adjust this manually, if needed, by tapping the UTC offset button to add or subtract one hour.

Count down timer: A count down timer duration may be specified in Setup Page 2. The timer can be controlled in the HamClock 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 7 of this guide for using an LED and a push button switch to monitor and control the timer. GPIO option on Setup Page 2 must be Active for these to function.

Satellite pass: The lower left pane of HamClock is normally used to display information for the DX location. 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 facing north of the next pass. To emphasize this new purpose for the DX pane, the text color changes to match the satellite path color on the map. Within the pass diagram, the set end of the pass is labeled with an S and the pass duration and maximum elevation are displayed. 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 unless you tap on the name to choose a different satellite or tap the map to set a new DX location which restores 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 a bright light intensity then tap on the display scale to set the desired display brightness at that intensity. Then expose the sensor to a dim light and tap again to set the desired brightness at that intensity. These settings may be reversed if desired to make the display brighter in dim lighting and dimmer in bright lighting. Some systems without a photoresistor provide a single slider to manually control display brightness.

On some systems, tapping NCDXF again will provide a menu of clock **On** and **Off** DE times at which the display will be set to brMax or brMin, respectively; set the times equal to disable both timers. **Idle** sets the number of minutes of no user tap 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 each HF ham band can be assigned to any pane. If displayed in the left pane, they reappear after the DX weather information expires. 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. These configuration details are summarized in the table caption. Values are shown in red if the reliability is less than 33%; yellow if less than 66% and green if above 66%. 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 is used matches the bearing selection in the DX pane.

Tapping a band number will set the background to a map showing world-wide propagation from DE on that band at HamClock's idea of the current time, coded red-yellow-green as above. The band button is yellow while updating; gray if successful to provide a persistent indication of the selected band map; or red if an error occurred. The pane values and/or map will update automatically each hour if visible. Tapping the active band number again will restore the normal background. Note the map update takes almost a full minute on ESP so please be patient; RPi is much faster although larger display formats will be proportionally slower.

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Notes

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 7 for wiring info. HamClock makes no attempt to confirm transmission so if the radio does not respond, tap the DX spot again. The GPIO option on Setup Page 2 must be set to Active for this to work.



Moon: Any pane can display the current moon phase and additional information with respect to DE. The corners display Azimuth and Elevation in degrees; range as a fraction of mean distance; and range rate in m/s with positive indicating motion away from the observer.

This pane is intended only to provide basic situational awareness. The underlying algorithms are only approximate and the image does not reflect changes in orientation due to libration.

DX Cluster: The Cluster control on Setup page 2 may be toggled On to allow entering the *Cluster host* (or IP) and *port* number of a DX Spider cluster node. Other cluster systems, such as AR-Cluster, are not supported at this time. A good list is at <https://www.ng3k.com/Misc/cluster.html>. When set up correctly, spots from the cluster will be automatically listed in the DX Cluster pane and optionally displayed on the map as they occur. Tapping an entry in this list will set DX to that location. As a special case, the exact names **WSJT-X** or **JTDX** may be entered in Setup for the *Cluster host*. This will cause HamClock to connect with these popular programs. When properly set up, each time you double-click to work an FT8 station in WSJT-X, the station will appear in the DX Cluster pane of HamClock and automatically define DX to its location. Note the HamClock can only utilize FT8 messages that include the DX station's grid square. To complete this setup, you must do two things:

- 1) Open the WSJT-X application, open the *Reporting* preferences tab and set *UDP Server* to the broadcast address of your local network. For example, if your station network uses mask 255.255.255.0 and addresses such as 192.168.1.XXX, set the WSJT-X *UDP Server* to 192.168.1.255. If you are using other software that connects to WSJT-X UDP reports it must be changed to use this value as well.
- 2) While on the *Preferences* tab, also note the value for WSJT-X *UDP Server port number*. Then set the HamClock *Cluster port* to match this value.