

DUO
STAR

mintaka INNOVATIONS

INNOVATORS OF PRECISION BAROGRAPH SYSTEMS

USER'S GUIDE



Mintaka DUO / Mintaka STAR User's Guide
v5.3

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INTRODUCTION

PRODUCT DESCRIPTION

Mintaka DUO (“DUO”) and Mintaka STAR (“STAR”) are electronic barographs that measure atmospheric pressure using two independent, high-precision sensors. The measured pressure can be presented digitally or as a graphic plot of historical values displayed over time ranges of the past 30 minutes on up to the past 120 days. Numerous convenient display options are included to meet special needs of marine navigation, engineering, medicine, and science.

MintakaCommander (Mac & PC) is a software application that connects to the DUO / STAR via USB or WiFi (STAR only) to export and analyze the data, provide additional functions such as command line control of the instrument, and perform firmware updates.

The standard package includes the instrument, a 120V AC to 12V DC power adapter, a 12V DC power cable with a matching DC barrel plug connector for direct wiring to a DC power source (STAR only), a USB cable A-mini B Left Angle (6’), a piece of fastener tape, Quick Start Guide, Menu Map and Pressure Tendency Characteristic Code Reference Guide. The full User’s Guide can be viewed or downloaded at mintakainnovations.com/Support/Manuals & Reference Guides. MintakaCommander can be downloaded at mintakainnovations.com/Support/MintakaCommander.

GETTING STARTED

STEP 1 Power the instrument. There are several options:

- Plug the power adapter into an appropriate (US or International) AC outlet, and connect to the barrel plug on the right side of the DUO / STAR.
- Plug the mini-USB-to-USB cable in on the right side of the DUO / STAR and connect the USB end to a battery pack, AC adapter or computer.
- Directly wire the 12 V DC power cable to a DC power source, and connect the barrel plug to the right side of the STAR. This can also be done with the DUO, however this power cable is not included in its standard package.

The section INSTRUMENT POWER has additional information on power requirements and options.

STEP 2 Use the Control Buttons to change the default settings as required. The Menu Maps show where to change the settings. Detail information on all settings is located in the sections under MENUS, SELECTIONS & THEIR DETAILS.

Control Buttons, quick start version: The section, USE OF THE CONTROL BUTTONS, has additional information on how to use the control buttons.

EXIT: The EXIT button displays and exits from the data screens or selection without making any changes. To view the main menu, press the EXIT button.

+ / - : Moves highlight up / down in menus; navigate up / down selection options; increases / decreases a number; changes graph display range.

SELECT: Activates, selects, accepts the highlighted choice. Use EXIT to move from option to option without making a selection.

Default Settings: mb (same as hPa); feet; knots; Time Zone 0 corresponding to UTC / GMT shown using 24h system; Station pressure; WiFi Access Point Mode (STAR).

The most commonly changed settings are Time Zone, Station pressure and WiFi Access Point Mode (STAR), which are briefly described here. Detailed instructions on making all changes can be found in the [MENU's, SELECTIONS, AND THEIR DETAILS](#) section.

Time Zone: Each instrument has been calibrated and initialized with Universal Time Zone 0 (UT=GMT). After powering on the instrument for the first time, you will see a screen asking you to set the time zone.



Welcome, Set Time Zone Screen

Use [+] or [-] keys to set it, [SELECT] to accept your choice, then a final [SELECT] to store the value.

Station Pressure vs. Sea-Level Pressure (SLP): Although other terms are often used, only two values of atmospheric pressure matter for most applications, station pressure and sea level pressure.

Station pressure is the value of the atmospheric pressure at the location and elevation of the instrument. It is the weight of the atmosphere (per unit area) from the instrument's elevation on up to the top of the atmosphere.

Sea level pressure, on the other hand, is a computed value of the pressure that is intended to represent what your instrument would read at this moment if it could (hypothetically) be lowered to sea level at your location. When inland at an elevation of 300 ft above sea level, it would be the pressure your instrument would read if you lowered it into a hole that was 300 ft deep. As you lower it down, there is more and more atmosphere above it, so the weight of the air above it and the corresponding pressure increases as it lowers. Sea level pressure is always higher than station pressure—unless your barometer happened to be located below mean sea level, which is possible at ground level at a few locations, and often the case in mining applications.

Depending on your application, you will want to display either sea-level pressure or station pressure. Sea level pressure is commonly abbreviated SLP.

If your main interest in atmospheric pressure is related to weather, then you will most likely want to display sea level pressure (SLP), regardless of the location or elevation of your DUO / STAR. Essentially all broadcast or published weather reports are given in terms of SLP, and all weather maps identify the isobars of constant pressure in terms of SLP. Furthermore, if you are reporting your weather observations to another agency or broadcast station, they will expect your reported pressure to be SLP.

Thus if your application is weather related, you will want to use [MENU-Set-up / Sea Level Pressure \(SLP\)](#) to adjust the instrument to show SLP. You can make this adjustment one of two ways, either from a known value of SLP at the time, or from a known elevation of the instrument. The step by step procedure is explained in the [Set-up / Sea Level Pressure \(SLP\)](#) section. It does not matter if you are in a boat with the instrument at 6 ft above sea level or in Santa Fe, NM at 7,000 ft above sea level. The procedure is the same for adjusting the instrument to display SLP.

Other applications of accurate atmospheric pressure do not care at all about SLP. They care only about the actual pressure right at the location of the instrument, which is the station pressure. If you are, for example, tuning an engine, or calibrating a medical instrument in a hospital, or setting controls on a sensitive air conditioner, or documenting life raft leak rates, or setting controls on a regional power station, it is the actual value of the pressure at the test site that matters. The weather causing it and changes introduced by instrument elevation above sea level do not matter. Station pressure applications require no change to the default.

WiFi Access Point (AP) Mode vs. WiFi Station Mode (STAR): Access Point mode (or AP mode) is the STAR's own WiFi network. Station mode is used to connect the STAR to an existing WiFi network.

Additional information and step by step procedures to change to Station mode is explained in the [GPS, WiFi, StarX / WiFi](#) section.

STEP 3 Register online at mintakainnovations.com/Support/Product Registration to activate the 1 year limited warranty, receive customer support, and download MintakaCommander to connect the DUO / STAR to a Mac or PC to view stored or live data, analyze and export stored data, control the instrument and update the firmware.

Note:

Pressure trend arrows will not appear until the instrument has been running for at least one hour.

Pressure Tendency Characteristic Code will not appear until the instrument has been running for 3 hours.

INSTRUMENT POWER

The DUO / STAR requires an external source of power. There are no internal batteries other than a long term (> 10 years) cell that maintains the precision clock timer. The instrument can be powered by any 12V DC source via the barrel plug connector on the right side.

When the instrument is connected to a computer, the power is supplied by the computer through the USB cable. This 5V DC power source via USB connector is the same used by many cellphone chargers and other electronic devices. A standard USB to mini-B USB cable is required for this connection.

Alternatively, you can plug the USB cable into any standard 5V USB power source for portable operation. 12V DC operation can be achieved with a cigarette-lighter style USB adapter or an optional barrel plug power cable can be used to hardwire the device into a vessel or vehicle's DC power system.

A portable USB power pack can be used for mobile applications. The average current used is about 63 mA at 5V. The average current used depends on how frequently the back lighting is being used. At 12V the average current is about 38 mA. See Specifications Summary for details. To preserve the lifetime of the display screen, and to facilitate mobile applications, the screen light shuts off after 1 minute past the last button push. The light comes back on automatically with the touch of any button.

There are numerous USB battery pack options available on the market with various storage capacities. These are very compact units that also serve as backup power for cell phones and other devices. A unit with 6,000 mA-hr capacity will run the DUO / STAR in a portable mode continuously for about 4 days. Disconnecting the power when not in use would extend this greatly.

USE OF THE CONTROL BUTTONS

DUO / STAR functions are selected from the screen menus of options with the aid of four control Buttons: [-], [+], [SELECT], and [EXIT]. In this User's Guide we use the notation [±] to mean either [+] or [-] as needed.

EXIT Button

The [EXIT] button exits from the present screen or menu option. From a data screen, it exits to a menu screen, and from a menu screen it exits to a data screen. If you want to interact with the device, the [EXIT] button is the first button to push. If you enter a menu and decide you do not want to change anything, press [EXIT] again to return to the data.

On menu screens with multiple input options, you can also use [EXIT] to exit that option and go to the next without changing anything. These screens include specific OK or Cancel options so you can double check all settings before accepting or exiting that menu.

[+] and [-] Buttons

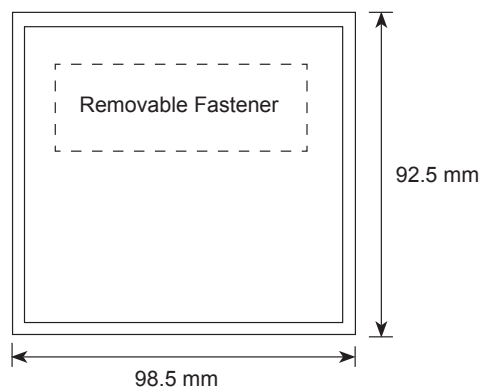
The [±] buttons are used to move a highlighted selection up and down a vertical menu, to navigate selection options, to raise or lower a numerical value, or to change a graph display range.

SELECT Button

The [SELECT] button is used to accept choices displayed on a highlighted section of a menu page, either before or after you change them with the [±] buttons. Pressing the [SELECT] button then either activates the choice you have made or it moves you to the next choice that must be made on that menu screen. Menus with multiple options will then have a Cancel or OK option. Highlight your choice, and press [Select] to execute your selections. The [EXIT] button can be used to move from option to option without making any selection.

MOUNTING

You can mount the DUO / STAR on the wall or bulkhead using a piece of Velcro® or Dual Lock® removable fastener tapes. Removable fasteners have been used for mounting similar devices on vessels at sea for many years.



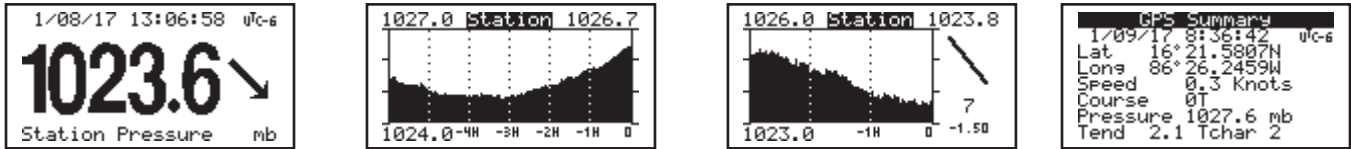
Wall or bulkhead mounting by fastener tape

MENUS, SELECTIONS, AND THEIR DETAILS

MENU MAP

The Menu Map is a consolidated view of the DUO / STAR menus and screens. It is included in the product box and available online at mintakainnovations.com/Support/Manuals & Reference Guides.

SHORT-CUT TO TOGGLE BETWEEN MAIN DISPLAYS / SELECT BUTTON



Press and hold [SELECT] to display and toggle through the main screens:

Pressure Value, Pressure Graph, Pressure Tendency Characteristic Code, GPS Summary (STAR)

SHORT-CUT FOR CONTRAST CONTROL / EXIT BUTTON

If after changing power sources, or for any reason, you wish to adjust the display contrast this can be done by pressing and holding the [EXIT] button to access the [Display, USB](#) screen, then use [+] or [-] to adjust, then use [EXIT] to highlight OK, and press [SELECT]. To exit without changing control, highlight Cancel, and press [SELECT].

MAIN MENU

Press [EXIT] to display this main menu:



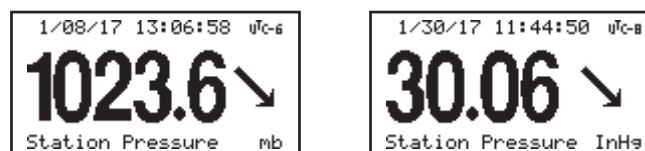
MENU – SHOW VALUES



Selection options are: Pressure, Clock, History and Log Pressure

Show Values / Pressure

[SELECT] Pressure leads to the default display, which shows the date, time, pressure, along with the pressure units and mode of the pressure display (station pressure or sea level pressure, SLP).



Show Values / Pressure (mb and inches)

The pressure values can be displayed in several different units, which can be changed at any time without affecting the recorded pressure history. The default units are millibars, which are the same as hectoPascals. See the [Setup / Units, Timezone](#) section on setting units. The time and date are displayed using and showing the time zone entered in [Setup / Units, Timezone](#). UTC means universal coordinated time or GMT. The unit can also be set to display Sea Level








Pressure, see the [Setup / Sea Level Pressure](#) section. Arrows indicating recent pressure trends are also shown, starting after one full hour of operation.

Pressure Trend Arrows

After one hour of operation, the arrows shown to the right of the pressure value is a graphic indicator of how the pressure is changing to provide a quick visual notice of significant changes. The definitions used to determine which arrows are displayed are consistent with those used by the World Meteorological Organization (WMO). The numerical value of the change over the past 3 hr is called the Pressure Tendency. After a full 3 hours of operation, the tendency values are stored with each recorded pressure. The numerical values can be plotted as a graph or shown in a digital list of the data in the Show Values / History option.

The pressure trend arrows, however, indicate the rate of change on a more timely basis. After 1 hour of operation, the anticipated 3-hr change will be indicated by these arrows, and this value will then be updated every 15 seconds. Thus these arrows are a quick visual description of the rate of pressure change, which can be checked more specifically by referring to the Tendency Code graph display, which is calculated strictly on the difference between present pressure and the pressure 3 hours earlier.

There are various factors that can cause the pressure to change with time, especially on a moving vessel, but a good rule of thumb is any pressure changing Fast can be a valuable sign of a pending change in the weather. Often by the time the change is Very Fast, the weather has already notably changed.

Pressure Trend Arrows		
Symbol	Description	Anticipated 3-hr Pressure Change based on previous 1-hr history
	Stationary	< 1 mb < 0.03 inHg
	Rising	1 - 2 mb 0.03 - 0.06 inHg
	Rising Fast	2 - 3 mb 0.06 - 0.09 inHg
	Rising Very Fast	> 3 mb > 0.09 inHg
	Falling	1 - 2 mb 0.03 - 0.06 inHg
	Falling Fast	2 - 3 mb 0.06 - 0.09 inHg
	Falling Very Fast	> 3 mb > 0.09 inHg

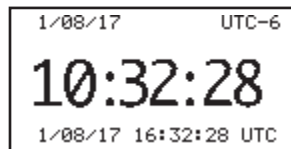
As further description of pressure changes used in numerical weather prediction, the NWS and WMO also define a Pressure Tendency Characteristic Code that describes the 3-hour pressure change (ie decreasing then steady is Code 6). These characteristics, usually read from a barograph trace, are submitted with all official observations. They are then shown in station model reports on weather maps. To assist observers with the often tedious task of evaluating this code, the DUO / STAR offers the unique function of computing these codes automatically, as explained in the [Show Graph / Tendency Code](#) section.

Show Values / Clock



Main Menu / Show Values / Clock

The DUO / STAR includes a high precision clock that can be used for timekeeping as well as recording pressure histories. The time and date can be set if needed in the [MENU-Set-up / System / Time](#) screen. The time zone is set in the [MENU-Set-up / Units, Time Zone](#) screen.



Show Values / Clock

The time of an event can be recorded in the [MENU-Log Pressure / Log Now](#) screen. This records the pressure and the time, but it could be used to document the time of any event, even if the pressure were not of interest at that time. This has numerous applications in marine navigation.

Since weather reports and maps are mostly presented in terms of UTC (GMT) the DUO/ STAR displays the current value of UTC on the clock display, regardless of your primary time zone. This also makes the clock display a valuable addition to the nav station or wheelhouse of vessels at sea. The clock has its own long-term battery, so it will keep accurate time, even if the power to the barometer is removed.

Show Values / History



Main Menu / Show Values / History

Stored pressure data can be displayed graphically or in tabular format. Show Values / History presents a tabular list of times, pressures, and tendencies that displays all pressures stored.

1/08	15s	UTC-6
10:32:45	1025	1.0
10:32:30	1025	1.1
10:32:15	1025	1.1
10:32:00	1025	1.1
10:31:45	1025	1.0
10:31:30	1025	1.0
10:31:15	1025	1.0

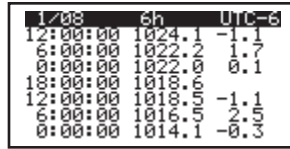
Show Values / History in 15-sec steps

This is a sample of the pressures stored at 15-sec intervals. Use the [±] buttons to page through the list. The numbers on the right are the tendencies at these times. Press [SELECT] to see the following window:



Changing History step size

Use the [±] buttons to change the time step, then press [SELECT] to see the new list. The number of entries stored is also shown.



Show Values / History in 6-hr steps

This sample must have been running for just 96 hrs (6 x 16), as the file can hold 750 data points. Once full, new ones are added at the beginning as old ones are removed at the end.

The DUO / STAR stores past pressures in 11 data files according to the time steps shown:

Barograph and History Display Options			
Data File ID	Time range in graph display	Screen divisions in graph display	Time Step (= update interval)
0	30 min	5 min	15 sec
1	3 hr	1 hr	90 sec
2	6 hr	1 hr	3 min
3	12 hr	2 hr	6 min
4	24 hr	6 hr	12 min
5	2 days	12 hr	24 min
6	4 days	24 hr	48 min
7	12 days	40 hr	2 hr
8	30 days	5 days	6 hr
9	60 days	10 days	12 hr
10	120 days	20 days	24 hr

There are 750 values stored in each data file. They can all be viewed in tabular format from the History display. The data field is selected from the History display. There is an additional tabular history display in 1-hr steps. All stored data can be exported to a spreadsheet with a computer connection, as explained in the MintakaComander User's Guide. These data can also be viewed as a barograph trace over the same time intervals. The graphic display shows the past 120 points in each category. In the barograph (graph) mode, individual pressures can be read digitally using the cursor read.

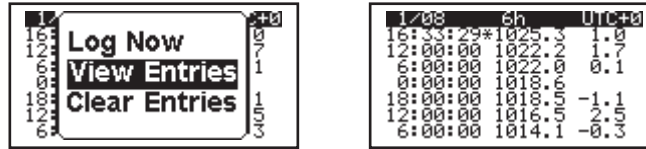
How Data are Accumulated and Displayed

The DUO / STAR reads the pressure once a second in each sensor and then averages 10 consecutive samples and displays that average value on the screen every second. Thus the pressure seen on the screen updating each second is the average of 20 pressure readings, one from each sensor, over the past 10 seconds. If for any reason it might be desired, either of the sensors can be shut off to read the results of just one of them. Every 15 seconds, the value displayed on the screen is stored in the 30-min file, and every 90 seconds the displayed value is stored in the 3-hr file. Likewise, every 3 min an entry is stored in the 6-hr file, and so on. Thus in reviewing the history you see the values measured at the precise times stored with

Manually entered pressures can be removed with the Log Pressure / Clear Entry screen. Manually logged pressures are stored in UTC, even though you might be using a different time zone for the clock and barograph displays.

You can also use this feature to record accurate time to the second of any event, even if the pressure itself is not the motivation for the entry. Need for such a record comes up often in marine navigation.

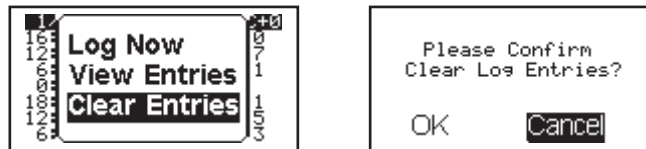
Log Pressure / View Entries



Log Pressure / View Entries and same display as above

This screen shows the list of logged pressures, both automatic and manual. The [±] buttons are used to page through the stored values—a total of 750 points (187.5 days of synoptic times) plus up to 25 manually entered pressures.

Log Pressure / Clear Entries



Log Pressure / Clear Entries and Confirmation screen

To remove the manually added records from the Log, choose Clear Entries. A window appears then to ask for your confirmation, or you can cancel without removing these data from the Log. This Clearing removes the pressure records added manually, but leaves the synoptic time records. All pressures, however, are still stored in the Show Values / History file and in the Show Graph / Pressure plots. Up to 25 manually entered pressures are allowed.

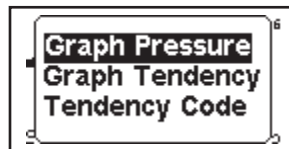
MENU — SHOW GRAPH

Press [EXIT] to display the main menu:



Use the +/- button to highlight Show Graph.

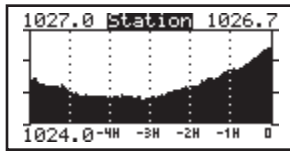
Press [SELECT] to view to Show Graph main menu:



Selections are: Graph Pressure, Graph Tendency and Tendency Code.

Show Graph / Graph Pressure

The first graph range seen will be the last one that was viewed. To change the full range displayed, use the [±] buttons to step through the options.



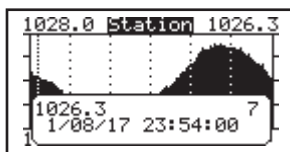
Barograph trace for the past 6 hours. It updates every 12 min. Optional displays are selected by using the +/- buttons. The top right shows the present pressure, which updates every second.

The vertical scale of each barograph display is computed automatically to span the display and shown on the left. In this example, the top of the display is 1027 mb and the bottom is 1024 mb and each horizontal division is 1 mb. The size of the horizontal divisions changes to match the vertical scale.

The present pressure was 1026.7 mb, shown at the top right. This display of present pressure will update once a second. The vertical index lines mark 1-hr intervals in this specific display.

The Station label at the top is a reminder that you are viewing Station Pressure. If the instrument had been set to sea level pressure that label would read SLP as a reminder.

To read digital values from the graph, you can use a shortcut of pressing and holding either the [+] or [-] button. This will display a digital readout window on top of the graph along with a vertical cursor line (close-spaced dots). The [-] button starts the cursor on the right of the screen; the [+] button starts it on the left.



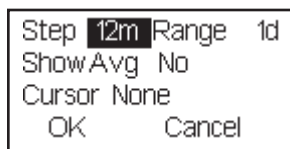
Pressure reading at the cursor position.

The readout shifts position as you move the cursor to keep the trace in view.

The readout shown corresponds to the value at the cursor line. Once the cursor is showing use the [±] buttons move the cursor in either direction. The single digit in the top right (7 at 23:54) is the Pressure Tendency Characteristic Code value, explained later in this Show Graph chapter. It varies between 1 and 8.

Press the [EXIT] to close the readout display.

An alternative way to set the graphic display scale—as opposed to just Show Graph and using [±] buttons—is to press [SELECT] while viewing a graph. This opens a new options screen.



Graph Options Menu from [SELECT] when viewing a graph.

Use [±] to choose the desired range and press [SELECT]. The full range of the graph is shown in the top right of the display. This will change as you change the step to show the corresponding range.

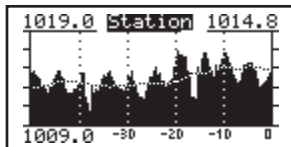
The next step asks to show the 24-hr average or not. For most applications you would choose “No.” The 24-hr average display is most important in the tropics where there is a large semi-diurnal variation in the pressure, discussed below in [Average Pressure Display](#).

The last step is to choose to turn on the digital readout starting with cursor on the Left or Right or None. The default (None) leaves it off; you can always turn it on from the graph by holding down a [±] button.

Average Pressure Display

Another unique feature of the DUO / STAR is the ability to show a running 12-hour average of the pressure. This is of special value at low latitudes where the pressure typically oscillates on a fairly consistent pattern. This semi-diurnal variation is superimposed on all barograph traces in the tropics.

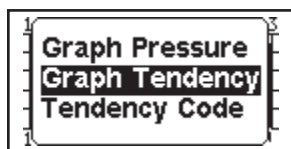
Below is a sample of a diurnal pattern with the pressure average line overlaid on the graph.



Dotted line is the 12-hr running average over 5 days

As with normal display, the [±] button turns on the digital readout with active cursor control, but when in this mode you see both the pressure at the average value at the cursor along with the actual pressure at that time.

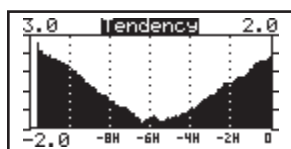
Show Graph / Graph Tendency



Main Menu / Show Graph / Graph Tendency

Pressure tendency is internationally defined as the change in pressure over the past 3 hours. It is usually expressed in mb (hPa). It can be used to anticipate changes in the pressure, and in some cases change in the weather. The graph shows how the tendency is changing with time. The history range and display options are the same as in the pressure graphs.

This graph shows how the change is changing, which can be a valuable aid to forecasting. A steady pressure drop (meaning a flat curve of tendency vs. time) can be a definite warning, but the downward slope on the left side of this graph means the rate of pressure drop is increasing with time. Similarly the fast rising pressure seen on the right side of this graph can portend strong wind in some weather patterns.



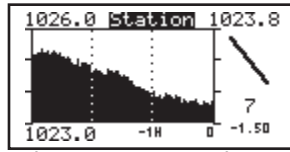
Pressure Tendency graph

Note that if the elevation of the instrument changes, the recorded tendency will reflect how the pressure changed over the last 3 hours, but this will not reflect actual changes in atmospheric pressure. The instrument must remain at a constant elevation for at least 3 hours for this number to be a measure of atmospheric pressure changes. A glance at the pressure graph itself usually clarifies unusual influences on the indicated pressures and tendencies.

Show Graph / Tendency Code

This is a unique function of the DUO / STAR designed to assist weather observers who must report not only the pressure tendency, but also the official Tendency Characteristic Code that describes the nature of the change, such as “Decreasing, then Steady.” Without this custom aid, the Code must be determined from the shape of the past 3-hr barograph trace using a sometimes complex set of criteria.

This characteristic is valuable for all weather watchers, not just the professionals, as it adds more understanding to the numerical value of the pressure tendency itself, as well as extending the interpretation of reports shown on weather maps.



Main Menu / Show Graph / Tendency Code

Example of the Pressure Tendency Characteristic Code display. On the left, we see that the tendency at the present time is -1.5 (pressure dropped 1.5 mb over the last 3 hours), and the shape of the trace is Code 7, in this case meaning decreasing.

There is a mathematical algorithm that defines the Code for any pressure pattern. A pressure change of just 0.1 mb at either end of the 3-hr period can yield a different Code, which illustrates the great value of this automatic function.

On this DUO / STAR screen you see the 3-hour trace that defines the tendency and its characteristic code. The right side of the display shows the present pressure, the characteristic code symbol, the code value, and at the bottom is the value of the tendency itself (difference between present pressure and that of 3 hours earlier). The tendency and the code values are updated every 15 seconds as new data changes the 3-hour history.

The codes are defined in the table on the following page. Each code has an associated WMO assigned graphic symbol. These symbols are shown on weather maps that report observations in a format that is called a station model. Some symbols cover more than one description of the 3-hr trace.

WMO Pressure Tendency Characteristic Codes

Pressure now higher than three hours ago		
<i>Description</i>	<i>Code</i>	<i>Wx Map Symbol</i>
Increasing, then decreasing	0	∧
Increasing, then steady	1	∕
Increasing, then increasing more slowly	1	∕
Increasing (steadily or unsteadily)	2	/
Increasing, then increasing more rapidly	3	✓
Steady, then increasing	3	✓
Decreasing, then increasing	3	✓

Pressure the same as three hours ago		
<i>Description</i>	<i>Code</i>	<i>Wx Map Symbol</i>
Increasing, then decreasing	0	∧
Steady	4	—
Decreasing, then increasing	5	∨

Pressure now lower than three hours ago		
<i>Description</i>	<i>Code</i>	<i>Wx Map Symbol</i>
Decreasing, then increasing	5	∨
Decreasing, then steady	6	∖
Decreasing, then decreasing more slowly	6	∖
Decreasing (steadily or unsteadily)	7	∖
Decreasing, then decreasing more rapidly	8	∧
Steady, then decreasing	8	∧
Increasing, then decreasing	8	∧

MENU – GPS, WIFI, STARX (STAR ONLY)

Press [EXIT] to display the main menu:



Use the +/- button to highlight GPS, WiFi, StarX. Press [SELECT].

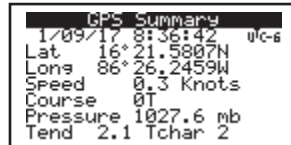


Main Menu / GPS, WiFi, StarX

Selection options are GPS Summary, WiFi, StarX Report and StarX Summary.

GPS, WiFi, StarX / GPS Summary

The GPS module of the STAR provides the latitude /longitude positional information as well as course, speed, and altitude information with each pressure reading. GPS information can be viewed in several ways: on the STAR itself, from the STAR's Home Page using a WiFi connection, and from command line.



Date and time from the GPS satellites (in the current timezone), latitude, longitude, speed, course, pressure, tendency and tendency characteristic code on one screen.

GPS, WiFi, StarX / WiFi

Highlight WiFi, press [SELECT]:



Main Menu / WiFi

The WiFi subsystem provides a method to access and control the STAR via a WiFi connection. The WiFi subsystem can run in one of two modes:

- Access Point mode (or AP mode) is used when the STAR creates it's own WiFi network, or
- Station mode is used when the STAR connects to an existing WiFi network.

Access Point (AP) mode is the default setting.

The WiFi subsystem creates a WiFi network to which a client (computer, tablet or smart phone) can connect and access the STAR. The default network is named "MintakaStar-xxxxxx" where the 'x' field is a hexadecimal number. The default password for joining this network is the STAR's serial number.

Weather Service Mode exception: In the case where the STAR is in Weather Service Mode, the default network is named "MintakaWx" and the PIN is communicated to select personnel by the Port Meteorological Officer(s).

The STAR network will appear in your computer, tablet, or smart phone's WiFi network options. On the Mac, it looks like this:



Mac WiFi Networks Pop-down

To connect to this network, select it in the network options, then type in its password. To view the data in a browser window, type the instrument's IP address, 192.168.4.1, in the address line of any browser window to view the instrument's Home Page.

AP mode is especially useful when away from commercial Internet access sources, for example while at sea, using a tablet for navigation. The section, [Accessing STAR via Web Browser](#), contains additional information on the instrument's Home Page.

To connect to an existing WiFi network the STAR needs the credentials for the network (the network name and password). Within the STAR these networks are known as Favorites. Favorites can be entered via the WiFi Setup Favorites screens described below, via the instrument's Home Page described in the [Accessing STAR via Web Browser](#) section (easiest option), or via command line. The WiFi Reference Guide located at mintakainnovations.com/support, Manuals & Reference Guides includes a list of WiFi Commands.

WiFi Menu selection options are WiFi Status and WiFi Setup.

WiFi / WiFi Status

Highlight WiFiStatus, press [Select]:



WiFi / WiFi Status

The WiFi Status screen displays the details of the current WiFi connection, whether it is its own network or an external network.



WiFi Status Screen

In the example above, the STAR is creating the WiFi network "MintakaStar-348311". The instrument's IP address on this network is 192.168.4.1. The instrument is in AP mode.

If in Station mode, the external network name is displayed along with the IP address of the instrument on that network.

WiFi / WiFi Setup

Highlight WiFi Setup, press [Select]:



Only if the STAR is in Weather Service Mode will the following PIN screen appear. This PIN is communicated to select personnel by Port Meteorological Officer(s).



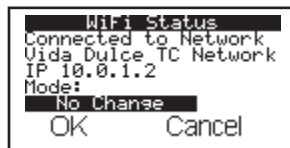
WiFi / WiFi Setup / WiFi Mode

Selection options are: WiFi Mode and Favorites.

Highlight WiFi Mode, press [Select]:



Information about the connected network will appear on the following screen.



In the example above, the STAR is connected to the WiFi network “Vida Dulce TC Network” in Station mode. The instrument’s IP address on this network is 10.0.1.2. The selection No Change is highlighted. Use the +/- buttons to change this selection if needed; other options are Disable and Create Network. Create Network puts the instrument in AP mode.

If in AP mode, the default network name and IP address is displayed. The options are No Change, Disable and Connect to Network.

If a change is made from Station mode to AP mode (Create Network) or AP mode to Station mode (Connect to Network) the STAR will restart. If the STAR is set to Connect to Network, after restarting it will attempt to connect to the selected Favorite network.

What you will see: Upon re-start a PopUp screen is displayed announcing it is attempting a connection. After the WiFi network has been joined a second PopUp screen is displayed. This message will display the IP address of the STAR on that specific WiFi network. To access the STAR by web browser, make a note of this IP address. The IP address can also be found on the WiFi Status Screen. The section, [Accessing STAR via Web Browser](#), contains additional information on the instrument’s Home Page.

WiFi / WiFi Setup / Favorites

Highlight Favorites, press [Select]:



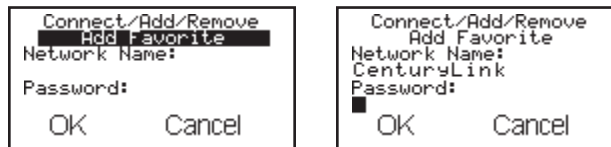
WiFi / WiFi Setup / Favorites

This screen lists the STAR network Favorites, WiFi networks the instrument can join. The STAR can store up to 5 Favorites.



Available Favorite(s)

To add a Favorite, press [SELECT] to display a menu that allows you to Add, Connect To or Remove a Favorite.



Add Favorite Screen , Favorite In the Process of being Added

Use the +/- button to change the highlighted selection to Add Favorite. Press [SELECT]. Use the +/- buttons to enter the network name and password. Continue to press [SELECT] until the cursor highlight OK, press [SELECT] to save the Favorite.

+/- Button Entry Tips:

- Network names and passwords are case sensitive.
- If the character is a number or capital letter, the fastest way to scroll to it is using the + button. If the character is lower-case letter, the fastest way to scroll to it is using the - button. Take your time. Double-check the character is correct before pressing [SELECT]. Once [SELECT] is pressed the cursor will highlight the next space and there is currently no way to edit entered characters.
- The current WiFi chip does not support a 5 Ghz network connection, only a 2.4 Ghz network.

If the STAR is already in Station mode, to connect to a Favorite, highlight it. Press [SELECT], use the +/- buttons to change the selection to, Connect To Favorite. Highlight OK, press [SELECT].

If the STAR is in AP mode and you do this, a screen will appear that says "WiFi must be in Station mode. Press [EXIT] to view the main menu, navigate to the WiFi Mode screen, described previously in this section.

To delete a Favorite, highlight the network name, press [SELECT], use +/- to highlight the Remove Favorite selection. Highlight OK, press [SELECT].

GPS, WiFi, StarX / StarX Report

This section is only relevant when the STAR is connected to a Mintaka STARX.

To view the most recent observation data sent by the Mintaka STARX and received by the STAR, use the +/- button to highlight StarX Report. Press [SELECT].



Main Menu / GPS, WiFi, StarX

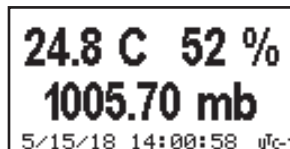


StarX Report Display

GPS, WiFi, StarX / StarX Summary

This section is only relevant when the STAR is connected to a Mintaka STARX.

To view Mintaka STARX measurements, select StarX Summary. Press [SELECT].



StarX Summary Display

The observation date / time is located at the bottom of the screen.

Since this is data from the most recently received report, the StarX Report and StarX Summary screens will update as new reports are received.

MENU – SET-UP

Press [EXIT] to display the main menu:



Set-up options are ones that are not changed frequently. Settings you select here are not changed when you Reset Pressure History, but they are returned to the default values when you select Reset To Factory Settings.

Use the +/- button to highlight Set-up. Press [SELECT].

Only if the STAR is in Weather Service Mode will the following PIN screen appear. This PIN is the same PIN required for WiFi Setup on page 20; it is communicated to select personnel by the Port Meteorological Officer(s).

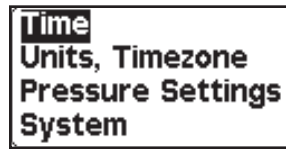


Access Setup PIN

One of two set-up menus will appear depending on the instrument:



Set-up Menu DUO



Set-up Menu STAR

Set-up / Time



Main Menu / Set-up / Time

This displays the date, time and corresponding UTC (same as GMT).

While this screen can be used to set the DUO / STAR to a precise clock time by stepping through the options using the [±] and [SELECT] buttons, it is highly recommended to adjust the time zone and time display (12h or 24 h) in the [Setup / Units, Time Zone](#) screen. And to use Cancel to leave this screen.



If this screen is used to change the time initially displayed, pressing OK on this screen will adjust the clock to the time that is now shown. If the clock time was correct to begin with, choose Cancel to leave without changing the clock time. In other words, if the clock was right, and you just viewed this screen to see what it looks like, and then chose OK, you would lose clock accuracy, because the time shown is not changing as you watch it.

If the clock time is correct and you want to change the time zone, that is best done in the [Set-up / Units, Time Zone](#) screen without affecting the accuracy of the clock time.

All pressures are stored in terms of UTC, so changing the time zone will not affect the pressure records; it will just change the hour associated with each pressure that is displayed. However, the UTC used is based on the clock time and date that you set into the system with this option.

If you change the time or date after collecting data for some period of time, the data history will start from the new time entered, which would cause the time information of earlier data to be inconsistent. On new set-ups, it would be best to reset the pressure history when resetting the time by any significant amount. This does not apply to changing time zones only.

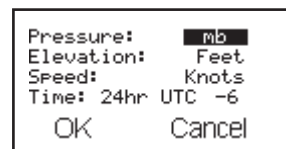
One procedure that might help achieve best accuracy when setting a new time is to set the time on this screen ahead 20 seconds or so, highlight the OK region, and then when the reference time reads 1 second before your set time, press [SELECT].

The DUO / STAR clock should maintain high accuracy over a long period of time and serve as a valuable time reference for other applications.

Set-up / Units, Time Zone



Main Menu / Set-up / Units, Time Zone



This menu is used to set units for pressure and elevation as well as changing the time zone and time display mode (12h or 24h system). The default values are mb (same as hPa), feet, knots (speed) and

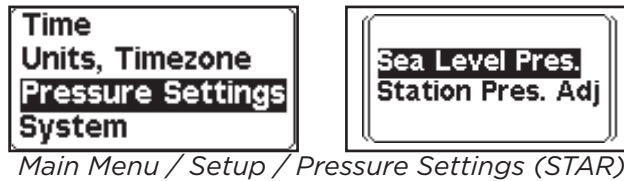
Time Zone 0, corresponding to UTC (same as GMT), shown using a 24h system. You may have already changed the Time Zone from 0 as a part of Getting Started / Quick Start.

The units options include: mb, inHg, mmHg, inH₂O, cmH₂O, kPa, hPa. Elevation is feet or meters.

Use the [±] buttons to change the options for the highlighted section, and then press [SELECT] to move on to the next option. When done, press [SELECT] when the OK is highlighted. (The internal clock time itself can be adjusted as needed in the [Set-up / System / Time](#) screen.)

Set-up / Pressure Settings

On the STAR, Sea Level Pressure (SLP) and Station Pressure Adjustment screens are accessed using the Pressure Settings menu.

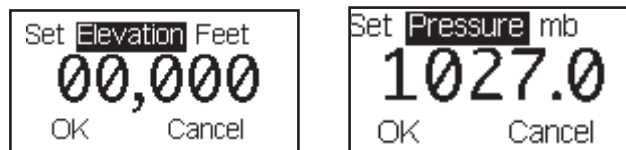


Set-up / Pressure Settings / Sea Level Pressure (SLP)



Main Menu / Set-up / Sea Level Pressure

There are two ways to set the DUO/ STAR to display Sea Level Pressure (SLP). You can use a known value of the SLP at the present time and location of the instrument, or you can use the known elevation of the instrument at its present location. The choice is made using the [±] buttons when the SLP menu first appears, which will change the mode in the highlighted area.



Set SLP by elevation offset or by known SLP. Use [±] to toggle the choice, then press [SELECT] to move the cursor where the data are entered.

Set Sea Level Pressure by Elevation

After selecting Elevation, the first digit on the left of the elevation input will be highlighted and ready to change. Use the [±] buttons to set this digit correctly, and then press [Select]. After all digits are entered correctly, highlight OK and press [SELECT].

You can move the highlight with [SELECT] or [EXIT]. Likewise to cancel the operation, highlight Cancel and press [SELECT]. For example, from the above screen, to enter 130 ft, you would press [SELECT] twice to get to the hundreds digit, then press the [+] key once, then [SELECT], then [+] key three times, then [SELECT], and again [SELECT] to enter the final 0, and one more [SELECT] to highlight OK and a final [SELECT] to record your elevation.

The proper elevation to use would be the elevation of the ground at your location plus the additional height of the instrument above ground level. This additional height above the ground is called the Removal Correction. This will then correct the pressure to sea level, and store that elevation.

Once this elevation has been entered, your display screens will be labeled SLP, which is a reminder that you are reading the equivalent sea level pressure. To return to Station Pressure, repeat the process and enter all zeros for the elevation offset.

This correction can be entered when the instrument is at any location, but the displayed sea level pressure would only be correct when the instrument is located at the elevation entered and stored in the unit.

The accuracy of the displayed SLP depends on the accuracy of the elevation offset that is entered. The pressure changes at a rate of 0.44 mb per 12 ft, so an error of 6 ft would cause a display error of about 0.2 mb. Accurate ground elevations can be found from a topographic map (viewer.national-map.gov) or from online services like Google Earth.

If you are installing the instrument on a vessel at sea and wish to read SLP as accurately as possible, then you may be able to assume that mean sea level is indeed the level of the water and the Removal Correction is the distance from water level to the instrument installation, which is the only correction needed. If your vessel is in tidal waters, however, mean sea level may not coincide with the water level. Mean sea level is nearly equal to the mean tide level which is halfway between mean low water (MLW) and mean high water (MHW). The Removal Correction in this case would be the same Removal Correction (instrument to waterline) plus the MSL Correction of $(Tide - MHW) + (MHW - MLW)/2$. Full correction is: Removal Correction + MSL Correction.

Set Sea Level Pressure by Pressure Value

The alternative way to set the instrument to SLP is to set it directly to a known value of the SLP at your location at the time you choose to set it. The procedure for entering the digits is the same as described for entering an elevation, only the highlighted selection is Pressure.

Commercial weather broadcasts on radio or TV are a good starting point for obtaining accurate sea level pressure for your location, but they may not be as dependable as more primary sources. Online sources of accurate SLP are:

- Weather maps at <http://www.opc.ncep.noaa.gov>
- Metar reports at <https://www.aviationweather.gov/adds/metars>
- Buoys and Lighthouses at <http://www.ndbc.noaa.gov>

After entering a SLP here, all other pressures reported in the instrument will be marked SLP as a reminder that you have entered this offset.

When you change the display from Station Pressure to SLP by entering the correct SLP, it is equivalent to entering the corresponding elevation for the instrument. Thus when you return to the Set SLP by Elevation menu you will see the equivalent elevation has been filled in. To return the instrument to reading Station Pressure, simply change that elevation offset back to all zeros.

Set-up / Pressure Settings / Station Pressure Adj.



Main Menu / Set-up / Station Pressure Adjust menu.

Adjusting the station pressure readout is equivalent to calibrating the DUO / STAR relative to another pressure determination at the same time and elevation that is believed to be more accurate. This is a completely different process from adjusting the instrument to read SLP, which is not related to the inherent accuracy of the pressure reading, but just an offset of the values shown.



The station pressure adjustment changes the base readout of the instrument and should only be made if you have reason to believe the internal sensors of the instrument have drifted off of their initial calibration. All barometers will drift to some extent over time, and such an adjustment is nor-

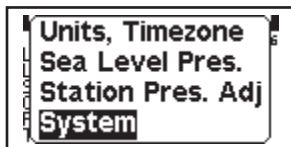
mal procedure for all instruments, aneroid and electronic. What varies among instruments is how often they might need calibration and how much offset is needed.

In the Station Pressure Adjust screen, the pressure at the time you showed the menu is displayed to the maximum precision of the instrument. *This pressure is not updated by the sensors during the time this menu is in view.*

Use the [±] and [SELECT] to change the To Read value of the pressure to match the known SLP at your present time location. The new pressure will be displayed as you enter the correction. Input errors are not critical. Just correct any typo until it shows properly. Once this shows the pressure you wish to have, highlight OK and press [SELECT].

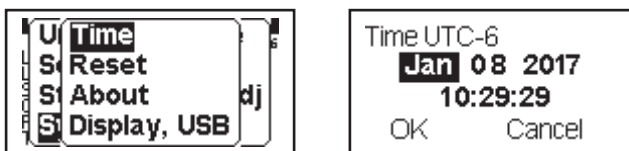
The offset you enter here will be removed if you Reset to factory settings, so if you have chosen to enter one, it could be useful to record it before resetting to factory settings. This setting is not affected by Reset pressure history.

Set-up / System



Main Menu / Set-up / System Menu

Set-up / System / Time



Set-up / System / Time

Same screen and functionality as described in Setup / Time previously for the STAR, just accessed via the System menu on the DUO.



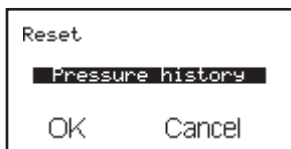
It is highly recommended to adjust the time zone and time display (12h or 24 h) in the Setup / Units, Time Zone screen. Please review the information in the previous section Setup / Time. Press Cancel to exit this screen.

Set-up / System / Reset



System / Reset

There are two Reset options, Pressure History and To Factory Settings. Toggle between them with the [±] buttons.



Reset screen

Reset Pressure History

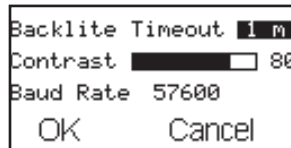
This removes all records of pressure history including the log of synoptic pressures and those manually entered into that list and all tendency data. When you make this selection, you are presented with the option to confirm this choice or cancel. Resetting the pressure history will not change any of your set-up choices and will not change the SLP Elevation Offset nor any Station Pressure Offset that might have been entered. Pressure change arrows will then not be active until 1 hour after this selection; pressure tendency will be available after 3 hours.

Reset to Factory Settings

This Reset option returns the DUO / STAR to all of the settings and configuration it had when it was shipped from the factory. All pressure history will be erased, along with all Set-up choices that might have been entered. The time zone is set back to UT Time Zone 0, but the time and date running in the clock are not changed. A warning screen with a reminder of the above with the option to cancel is presented if this choice is selected.

Set-up / System / Display, USB

This screen can also be accessed by pressing and holding the [Exit] button.



Set-up / System / Display, USB

Backlight Timeout controls the length of time the DUO / STAR LCD back light is on after there has been activity on the device; for example, pushing buttons. Use [±] to increase / decrease it.

Contrast controls the brightness of the display. Use [±] to increase / decrease it. Occasionally the display will appear to be blank although the DUO / STAR is functioning correctly. This is because the display contrast has been set to zero.

Press [SELECT] to accept the change(s).



Baud rate is the rate the DUO / STAR communicates to a computer over a USB connection. This should always be left at 57600. If it is changed, the DUO / STAR may not connect to a computer. If no changes have been made to backlight timeout or contrast, press Cancel to exit this screen.

Set-up / System / WxService Mode (STAR ONLY)

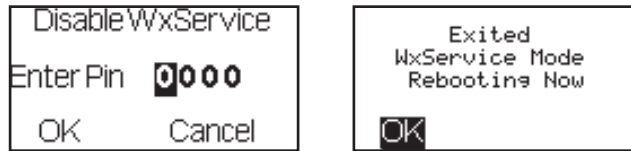
WxService Mode places the STAR in a mode that requires a PIN to make changes to all settings in the Set-up menu, plus the WiFi Set-up settings. This PIN is required to set the mode to On, and again to Off.

The default mode is Off.

The WxService Mode PIN is the same for all STARS; it is communicated to select personnel by the NOAA / NWS Port Meteorological Officer(s).



Set-up / system / System Enable WxService



Set-up / System / Disable WxService

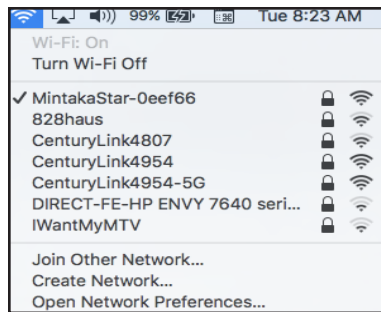
Note: The STAR will re-boot each time WxService Mode is activated/deactivated.

OPERATIONS

Accessing STAR via Web Browser

An innovative feature of the STAR is web browser access by computer, tablet and smart phone via a WiFi connection, its own or an existing one.

If the STAR is in Access Point (AP) mode, the default setting, the WiFi network is named “MintakaStar-xxxxxx” where the ‘x’ field is a hexadecimal number. The default password for joining this network is the STAR’s serial number. After joining the network, the STAR network will appear in your computer, tablet, or smart phone’s WiFi network options. On the Mac, it looks like this:



Mac WiFi Networks Pop-down

Select this network to connect your computer, tablet, or smartphone to the instrument, then type the instrument’s default IP address, 192.168.4.1 in the address line of any browser window to view the instrument’s Home Page.

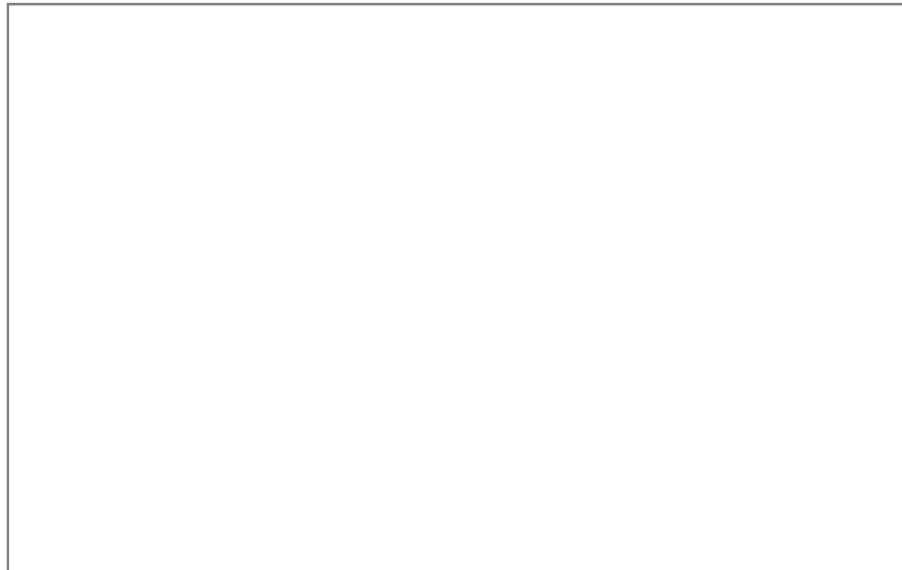
If the STAR is in Station mode and connected to a WiFi network, use the WiFi Status screen to view the network name and the instrument’s IP address on that network. Connect a computer, tablet or smartphone to this network and type this IP address in the address line of any browser window to view the instrument’s Home Page.



Mintaka Star V 3.0.6522 Revision B Serial Number DN02M83C AP 'MintakaStar-29456d'

Commands:

- [Pressure Graph](#)
- [Current Observation](#)
- [StarX Status](#)
- [Show Recent Samples](#)
- [Download Samples](#)
- [Data Logging](#)
- [GPS Status](#)
- [WiFi](#)
- [NMEA Broadcasts](#)
- [Barometer Summary Info](#)
- [Time](#)
- [Setup](#)

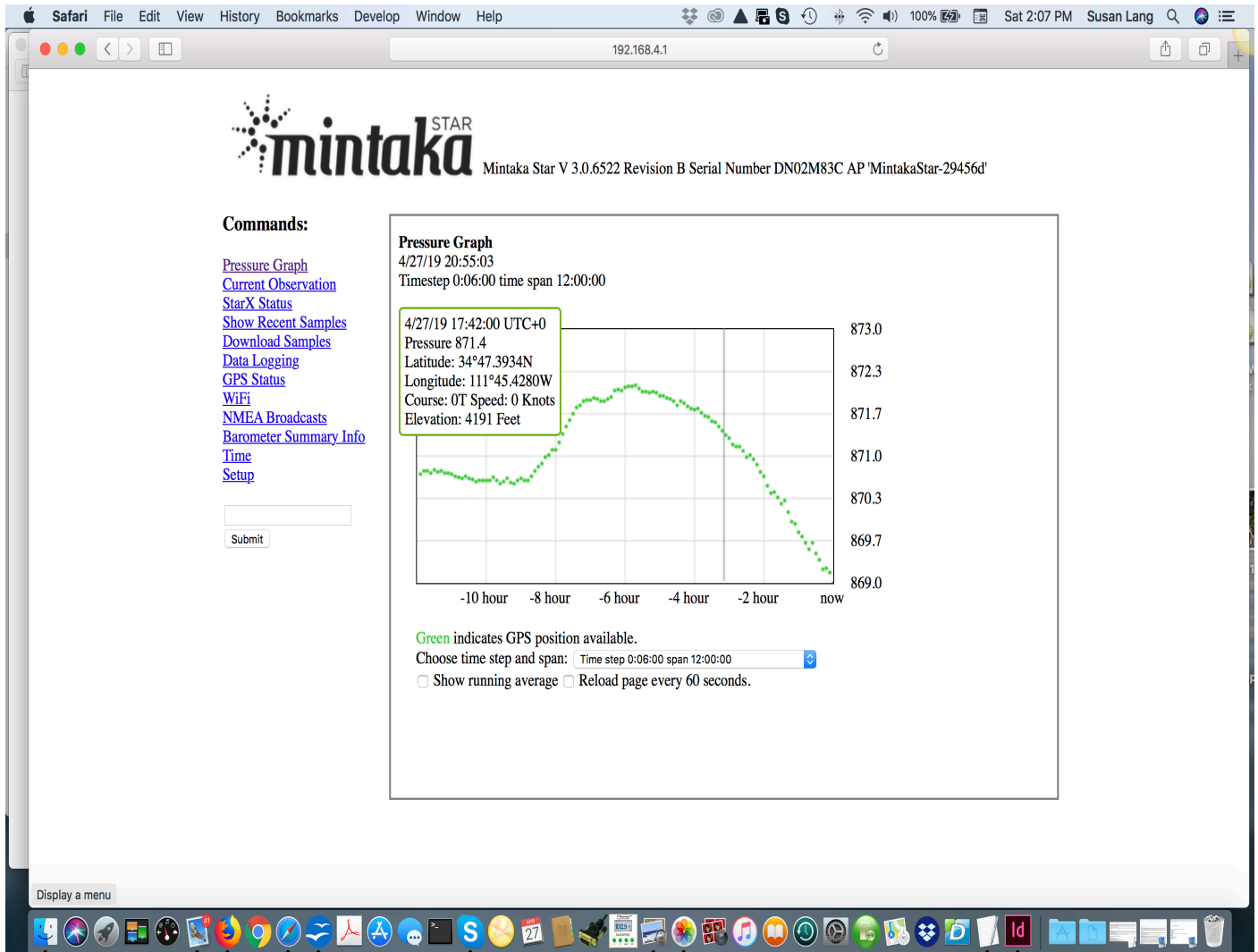


Example Home Page On Initial Connection

Select a command in the left column. The result will display the output in the box on the right. The commands provide the following:

[Pressure Graph](#) provides a graph of pressure over a past time period. The desired time period can be selected in the displayed pressure graph.

The same Home Page with cursor rollover data display showing date, time, pressure reading, latitude and longitude:



[Current Observation](#) provides the current GPS information along with the current pressure, tendency and tendency code.

[StarX Status](#) displays status information of a paired Mintaka STARX. In most cases, there will not be one and the page will display the following: No recent reports from any StarX devices have been received.

[Show Recent Samples](#) displays the result of the 'd -1 5' command, returning the most recent 5 stored samples from all of the storage file.

[Download Samples](#) allows you to specify a collection of pressure samples and associated data and download the information to a browser window. From there you can save the samples as a text file or copy and paste the information into other applications.

[Data Logging](#) displays logged data entries. By default they are shown with the data entries that are recorded every 6 hours (midnight, 6:00, 12:00, 18:00 UTC), the synoptic time entries, but these can be suppressed so that only the logged entries are shown.

Date	Time (UTC+0)	Pressure	RunAvg	Tendency	TChar	Latitude	Longitude	Cov
4/26/19	0:00:00	870.887268	-	-	-	34 47.3941N	111 45.4285W	0
4/26/19	6:00:00	873.433716	-	1.1	1	34 47.3909N	111 45.4312W	0

[GPS Status](#) displays the status of the GPS.

WiFi displays the status of the WiFi system, WiFi Access Point Credentials, the ability to add Favorite(s) and change the instrument to Station Mode.

Commands:

- [Pressure Graph](#)
- [Current Observation](#)
- [StarX Status](#)
- [Show Recent Samples](#)
- [Download Samples](#)
- [Data Logging](#)
- [GPS Status](#)
- [WiFi](#)
- [NMEA Broadcasts](#)
- [Barometer Summary Info](#)
- [Time](#)
- [Setup](#)

Submit

WiFi Status
Creating network (Access Point mode) 'MintakaStar-29456d', password 'DN02M83C', IP Address is 192.168.4.1, listening on port 80. MAC address 5e:cf:7f:29:45:6d

Access Point Credentials
Network name is 'MintakaStar-29456d' and password is 'DN02M83C'
No Change

Network Favorites
No network favorites are defined.
 Add a Favorite

WiFi Mode
WiFi is creating it's own network.
Make no Change

Submit

NMEA Broadcasts provides the ability to configure the broadcast of NMEA pressure and/or GPS messages.

Commands:

- [Pressure Graph](#)
- [Current Observation](#)
- [StarX Status](#)
- [Show Recent Samples](#)
- [Download Samples](#)
- [Data Logging](#)
- [GPS Status](#)
- [WiFi](#)
- [NMEA Broadcasts](#)
- [Barometer Summary Info](#)
- [Time](#)
- [Setup](#)

Submit

NMEA Configuration
Configure broadcast of NMEA pressure or GPS information.

Pressure Sentences
Choose sentences to output.
 MDA
 XDR
 TurboWin
 TurboWinG
 TurboWinH

Choose frequency: Other 0 seconds.

Via: WiFi (UDP Port 10110), USB (Console)

GPS Sentences
Choose sentences to output.
 RMC - time, latitude, longitude, course, speed,
 GLL - time, latitude, longitude,
 GGA - time, latitude, longitude, altitude,
 GSA - satellites used,
 GSV - Satellites in view,
 VTG - Course and speed.

Choose frequency: Other 0 seconds.

Via: WiFi (UDP Port 10110), USB (Console)

Submit

[Barometer Summary Information](#) displays the result of the 'i' command.

[Time](#) outputs the current time according to the Mintaka STAR's clock and compares it to the time from the GPS satellite system if a GPS fix is available.

[Setup](#) allows you to set up the barometer by setting the time, hour clock, timezone, units, elevation offset, station pressure adjustment, screen contrast, and baud rate for USB connections.

[Command](#) field allows one to enter an arbitrary command and display the output. For example, entering 'h' will display a list of all the commands and their documentation.

The companion manual, [MintakaCommander User's Guide](#) includes command line interface syntax and commands. Additionally, the [Mintaka STAR WiFi Reference Guide](#) includes command line commands specific to those instrument's WiFi subsystem.

Displays Following Power Interruption

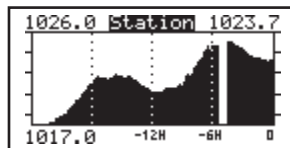
The DUO / STAR clock has its own long term battery so timekeeping is not interrupted when power is removed from the unit. Without power pressures are not being recorded but the clock is still running. Thus the several data files of pressure records need to be updated when power is applied. This takes just seconds, and will be indicated by a progress bar on the screen. The longer the power-out period, the more data files that will update.



Progress bar shown during file refresh after a time without power.

The pressures stored and displayed in a graph after a power off period depend upon the period of time the power was off. If the power is off for less than 15 minutes, the pressure is recorded as constant, equal to its value at the time of power off. If the power is off for more than 15 minutes, the pressure is recorded and displayed as zero, meaning no data. Thus short interruptions of power will not notably disrupt the graphs, but longer periods will show a gap.

A graphic plot of pressures over a time range that includes a period without power more than 15 minutes will record the pressure as zero with a corresponding gap in the plot and tabular history of pressures, as shown below.



Graph with Power-off Gap >15 min

DUO / STAR display after the power was off for more than 15 minutes. Tendency data shown normally in the far right requires 3 hours of data, so values shown will not be accurate until 3 hours of continuous operation. Note too that the elevation must remain constant during the 3-hr period for the tendency to be correct.

Power interruptions of less than 15 minutes show graph and tables at a constant pressure. The graph will be flat during that short period of time.

Maintenance

The Mintaka DUO / STAR precision barograph requires no regular maintenance. The case can be cleaned with a damp cloth and mild soap.

Limited Warranty

Barber Creations, LLC / Mintaka Innovations products are warranted to be free of defects in materials and construction and, when properly installed and operated, will be free of defects for a period of one (1) year from the date of purchase, subject to noted exclusions. Liability is limited to repair or replacement of the defective item.

Warranty exclusions - damage attributable to: improper installation; lack of reasonable care; improper use; acts of nature; abuse; to opening/closing the enclosure backplate; ordinary wear and tear; and being repaired or altered by others than our authorized representatives.

Please register your product registration at mintakainnovations.com/support, Product Registration.

Specifications Summary

Dimensions (L x W x H):

Mintaka DUO 3.8" x 1.3" x 3.6" (98.5mm x 33mm x 91.9mm)

Mintaka STAR 3.8" x 1.38" x 4" (98.5mm x 35mm x 101mm)

Power: 12V DC and 5V via mini USB

DC barrel connector: 5.5 mm OD; 2.1 mm ID; center pin positive

Pressure Sensors:

Operating pressure range 500 to 1080 mb

Operating elevation 18,000 ft (5,500 m) above sea level to 1,800 ft (550 m) below sea level.

Accuracy <1 mb over full pressure range at -20C to +50C

Long term drift <1.0 mb/year, at -20C to +50C

GPS sensor (STAR):

Build on high performance, low power Sony CXD5603GF chip set

Ultra high track sensitivity -165dBm

Extremely fast TTFF at low signal level

Built in high gain LNA

Low power consumption (10ma@3.3v)

NMEA 0183 compliant protocol

66 search channels and 22 simultaneous tracking channels