

nDash

Instruction Manual

Table Of Contents

Installation.....	5
Cable Routing	5
Attaching Windshield Mount	5
SD Memory Card	5
Basic Operation	5
Menu Navigation.....	5
New Vehicle Setup/Find Signals.....	6
Gauge Setup & Navigation	6
Navigating Gauges.....	6
Assign a Signal to a Gauge.....	6
Set Gauge Min/Max Values-optional	6
Set Gauge Low Warning / High Warning-optional.....	7
Warning Sounds- optional.....	7
Setting Signal/Graph Colors- optional.....	8
Global Data Logger	8
Using Device Manager.....	8
Using Zeitronix Products	9
Adding support for Enhanced OBD II DATA	9
Data Logging.....	9
NDashCalculators.....	10
Performance Measurements	10
1/4-mile, 1/8-mile, 0-60mph Test.....	10
User Defined Speed Tests	10
Diagnostic Code Reader	11
Customizing your nDash.....	11
Installing Files From SD Card.....	11

Custom splash screen.....	11
Adjusting Standard/Metric Units	12
Display Dimmer/Display Brightness.....	12
Off / On / Low Power Mode.....	12
Default Power-up Screen	13
NDash Analog Inputs	13
Connections and Wiring.....	13
Analog input driver Setup	13
Linear Analog driver Correction Factor and Correction Offset.....	14
Converting an Analog Voltage into Physical Units.....	14
USING NON-LINEAR CONVERSIONS (XY PAIRS)	15
Updating NDash.....	16
Updating NDash	16
Appendix a: Accessory Cable Pin Out.....	17
Appendix B: CAn expansion Cable Pin Out	18
Appendix C: USER CONFIGURABLE SIGNALS.....	19
Limited Warranty	20

IMPORTANT!

THIS IS A HIGH PERFORMANCE PRODUCT, USE AT YOUR OWN RISK

Do not use this product until you have carefully read the following terms and conditions for the use of this product. The installation of this product indicates the BUYER has read and understands this agreement and accepts its terms and conditions. This agreement takes precedence.

DISCLAIMER OF LIABILITY

E-Motion and its successors, distributors, jobbers, and dealers (hereafter SELLER) shall in no way be responsible for the product's proper use and serviceability.

THE BUYER HEREBY WAIVES ALL LIABILITY CLAIMS.

The BUYER acknowledges that he/she is not relying on the SELLER's skill or judgment to select or furnish goods suitable for any particular purpose and that there are no liabilities which extend beyond the description on the face hereof and the BUYER hereby waives all remedies or liabilities, expressed or implied, arising by law or otherwise, (including without any obligations of the SELLER with respect to fitness, merchantability, and consequential damages) or whether or not occasioned by the SELLER's negligence. The SELLER disclaims any warranty and expressly disclaims any liability for personal injury or damages. The BUYER acknowledges and agrees that the disclaimer of any liability for person injury is a material term for this agreement and the BUYER agrees to indemnify the SELLER and to hold the SELLER harmless from any claim related to the item of the equipment purchased. Under no circumstances will the SELLER be liable for damages or expenses by reason of use or sale of any such equipment. The SELLER assumes no liability regarding the improper installation or misapplication of its products. It is the installer's responsibility to check for proper installation and if in doubt, contact the manufacturer.

IN THE EVENT THAT THE BUYER DOES NOT AGREE WITH THIS AGREEMENT: THE BUYER MAY PROMPTLY RETURN THIS PRODUCT, IN A NEW AND UNUSED CONDITION, WITH A DATED PROOF OF PURCHASE, TO THE PLACE OF PURCHASE FOR A FULL REFUND. THE INSTALLATION OF THIS PRODUCT INDICATES THAT THE BUYER HAS READ AND UNDERSTANDS THIS AGREEMENT AND ACCEPTS ITS TERMS AND CONDITIONS.



Warning: Minnesota and California state laws restrict the method of attachment and placement of objects to the windshield and side windows of motor vehicles (See Minnesota Statutes 2005, Section 169.71 and California Vehicle Code Section 26708(a)). E-Motion does not take any responsibility for any fines, penalties, or damages that may be incurred as a result of disregarding the laws and statutes of the jurisdictions in which a NDash is operated. Similar laws may apply within your province or state. Please verify your provincial or state laws prior to installation.



Warning: When mounting the NDash to the windshield, place the device in a location where it does not obstruct the driver's view of the road and does not interfere with vehicle controls and safety devices or the safe operation of the vehicle.



Attention: Onstar subscribers may notice an interruption in Onstar diagnostic services while using OBD II scan tool devices, including NDash. Normal operation will resume once the device has been removed from the OBD II port.

INSTALLATION

CABLE ROUTING

The NDash OBD II cable must be routed so that it does not interfere with safe operation of the vehicle.

Cable routing tips:

- Find the OBD II connector first and work the cable to where NDash is to be mounted on the windshield.
- Route the NDash OBD II cable between interior panel grooves to hold the cable as well as conceal it.
- Use wire or zip ties to bundle any excess cable.

Cable routing “Don’ts”

- Don’t let the cable dangle by your feet.
- Don’t let the cable hang free.
- Keep the cable away from the steering wheel and any steering column controls.

ATTACHING WINDSHIELD MOUNT

Mount the NDash on the windshield in a spot that does not obstruct the view of the road or in any way that interferes with the safe operation of the vehicle.

Mounting Suggestions:

- Mount the NDash as low to the dashboard as possible.
- Mounting to the left or in the middle works well.
- It may be illegal to mount the nDash on the windshield in some states

SD MEMORY CARD

Always insert and remove the memory card with the NDash powered off. Insert the card with the gold connections facing towards the screen. Press the card into the NDash until a click is heard. If the card sticks out at all, it has not been pushed in all the way.

To remove, press the card in until a click is heard. Release and the card will eject enough to grab it.

BASIC OPERATION

MENU NAVIGATION

When NDash first starts up, a boot screen will appear. Start will take a few moments to start up.

When this warning screen appears, please read carefully.

To continue, tap the [I Accept] button. If you do not agree to abide by the warning, please disconnect NDash and contact your reseller for a return authorization.

Tapping the [I Accept] button will bring up the gauge screen.

The [<<] and [>>] arrow buttons at the bottom are used to cycle through different gauge layouts.

The [Exit] button in the lower left corner returns the screen to the main menu for accessing all of NDash's features.

NEW VEHICLE SETUP/FIND SIGNALS

The NDash has been designed to be used on any 1996 and newer OBD II vehicle. Vehicles, which the NDash is connected, will typically offer a different set of parameters or signals available.

The New Vehicle setup:

1. Plug NDash into the vehicle.
2. Turn the vehicle's key to the on position. The engine does not need to be started.
3. Turn on the NDash.
4. From the NDash main menu, Tap [Setup], tap [Devices].
5. Tap [Find Signals].
6. Follow the on-screen instructions. When NDash lists how many signals were found, NDash has finished.
7. Repeat steps 1-6 every time NDash is connected to a new vehicle.

*Signals may appear and not function if the New Vehicle Setup is not run when the NDash is connected to a different vehicle

GAUGE SETUP & NAVIGATION

NDash offers the ability to monitor hundreds of vehicle sensors for real time display and data logging. Data sample rates will vary by vehicle. This rate is a fixed amount and the total of active signal being monitored and logged will share this sample rate.

NAVIGATING GAUGES

From the Main Menu tap [Gauges].

Tap on the [<<] and [>>] buttons to view other gauge layout options.

ASSIGN A SIGNAL TO A GAUGE

Be sure the New Vehicle Setup (pg 11) has been completed before assigning signals to a gauge.

1. Tap on the gauge region where the signal will be displayed.
2. Tap on [Signal] area in the black region.
3. Use the [<] or [>] at the top to select the Data group you wish to select your signals from.
4. Use the scroll bar to the right to locate and select the signal you wish to monitor.
5. Tap [Save].

SET GAUGE MIN/MAX VALUES-OPTIONAL

Tap on the [Low Limit] button to set the bottom value for the signal.

Tap on the [High Limit] button to set the top value for the signal.

1. Tap [Low Limit] or [High Limit] will bring up the limits screen
2. Type in the desired value.
3. To make the value negative tap [+/-].
4. Tap [save]
5. Repeat steps 1-4 to set the signal's minimum value.

SET GAUGE LOW WARNING / HIGH WARNING-OPTIONAL

You can also create an upper and lower “redline” region on the NDash. The below gauge has a “redline danger zone” between 5000 and 6000 RPM.

To set a High/Low Warning:

1. Tap on the gauge where a High/Low Warning is to be set.
2. On the Assign Signal screen, tap on [High Warning] or [Low Warning].
3. Type in the desired upper or lower warning level number. Tap [+/-] to make the value negative.
4. Tap [Save].
5. Tap [Save] on the Assign Signal screen to go back to the gauges.

WARNING SOUNDS- OPTIONAL

NDash can also play a pre-installed or user defined audible warning when a signal has entered the upper or lower warning area.

To set a Warning Sound:

1. Tap on a gauge that you want the warning sound to be apparent on.
2. Tap on the crossed out speaker for either the High or Low warning.
3. Tap on the black box next to “Sound” to select the audio clip to be played when the threshold is crossed.
4. The repeat rate is how often the sound will repeat while the threshold is crossed. 0 will repeat constantly.
5. The “State” field will either enable or disable the warning. Tap [Save].
6. Make sure your warning threshold for the high or low warning that you use is set, and make sure your signal for the gauge is specified.

To upload your own sounds:

1. Sound files must have these attributes:

Extension:	.wav
Encoding:	PCM (uncompressed)
Size:	8 or 16 bit signed integer
Sample Rate:	22050, 11025, 5512 or 5513 KHZ
Channels:	Stereo or Mono
Length:	Less than 10 seconds

2. Create a folder on your SD called named “Transfer,” and place file inside folder.
3. Insert the SD into the NDash, and turn the unit on.
4. From the Main Menu tap on [Setup], then [Memory Card], then [Install], then [Sound].
5. Select which sound you wish to install and tap [Install].

You can now specify this warning sound for any High or Low warning in the gauges.

SETTING SIGNAL/GRAPH COLORS- OPTIONAL

Setting different colors for a gauge makes it easier to see, and is especially helpful on the graphing gauge.

To change a gauge's color:

1. color palette in the corner of the box.
2. Tap on a color to select it. Tap [Save].
3. Tap [Save] to return to the gauges.

You will now be able to monitor the sensor activity on that gauge. Repeat the above steps to fill in the remaining gauges. Use the [<<] or [>>] buttons on the gauge screen to view other gauge sets. Only the active gauge screen signals will be monitored and logged.

GLOBAL DATA LOGGER

NDash will monitor and log all signals shown on the active gauge screen. It is also possible to monitor signals not shown on the active gauge screen. This allows the user to view only the most valuable data, while still being able to review all the vehicle data in the log file. The Global Data Logger can silently monitor up to 16 signals and will be logged with the active gauge screen data.

1. Tap on [Data Logging] from the Main Menu.
2. Tap on [Signals].
3. Tap on [Add]. Then [Assign Signal].
4. Select you signal, then tap [Save]. Tap [Save] once more.

USING DEVICE MANAGER

The NDash Device Manager is where the various pre-installed and licensed drivers and non-OBD II inputs can be added or removed for use with the NDash. The Device Manager is an advanced feature which requires the user to be familiar with this manual, so a simple PIN of 2222 is required for entry.

From the Main Menu tap on [Setup], then [Devices], then [Manager].

To add a driver/input:

1. Select an unused port and tap [Add Device]
2. Using the [<] or [>] locate and select the driver you wish to install. Then tap [install].
3. Next select which port the input is located on. You can only have 1 item per port type.
4. If you receive an error of port in use you may need to switch port types or remove an incompatible driver from the device manager.

Now your device will be installed in the slot you specified. All installed devices can be assigned to any gauge.

To remove a driver/input:

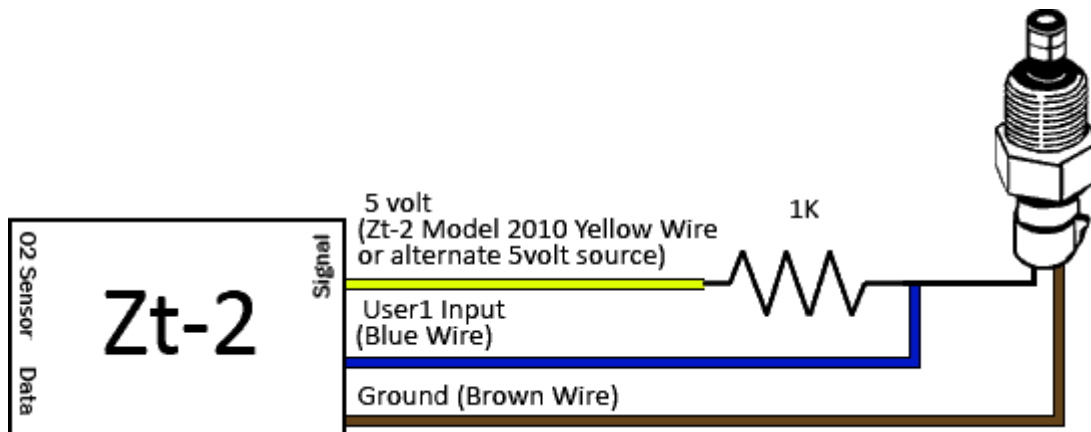
1. Select the Driver/Input and tap [remove].

Removing the driver/input does NOT delete the driver/input from the NDash. You can always add it back in the future.

USING ZEITRONIX PRODUCTS

If you are going to use a Zeitronix wideband, the nDash comes with a Zeitronix driver that uses the serial port to connect digitally to the Zt-2 controller. This is the preferred way to connect the Zt-2 wideband as compared to connecting the wideband voltage to the nDash Analog Input. This allows the nDash to display all of the Zt-2 signals, including the wideband O2 reading.

- See Using Device Manager for how to add the Zeitronix driver.
- **IMPORTANT:** The Zt-2's USER2 channel must be configured by using the Zeitronix ZDL software on a PC, while the Zt-2 is connected to the PC through a serial port. When a temperature sensor is assigned to the Zt-2 USER2 input though ZDL software, an internal pull-up resistor is automatically enabled. No external resistors are required on the Zt-2 USER2 input.
- If any Zeitronix temperature sensors are connected to the Zt-2 USER1 input, or the nDash Analog-1 or Analog-2 ports, those inputs require an external 1 Kohm pull up resistor to +5V. Please see the Zeitronix web page for further details.



- Most Zt-2 signals are mapped to existing signals in the nDash Analog Driver (for Zeitronix sensors connected to the Analog-1 and Analog-2 inputs), or in the Zeitronix Driver (for sensors connected to the Zt-2). Signal calculators will be needed for any unsupported sensors.

ADDING SUPPORT FOR ENHANCED OBD II DATA

To install an Enhanced Driver:

1. Select an unused port and tap [Add Device]
2. Locate and select the enhanced driver you wish to install under the "ECU" screen. Tap [Install].
3. Select [j1962] and then tap [OK].

**If you receive an error of port in use you may need to switch port types or remove an incompatible driver from the device manager. Some Enhanced data can not be used when Generic OBD or other Enhanced Data driver are installed in the Device Manager.

DATA LOGGING

The NDash can log and save all information represented on the gauges from the active screen. The information can be saved as a Microsoft Excel *.csv, or Logworks *.dif file directly to an inserted SD memory card.

To begin data logging:

1. Assign signals to the gauges to data log.

2. Tap on [Start Log]. The signals will be saved to the SD card with a timestamp. The signals will continue to be displayed on the screen even as they are being saved to the card. Once a log has begun the gauge screen can not be changed.
3. To log signals you don't wish to put into a gauge review the Global Data Logger (pg 16).
4. Tap [End Log] when finished logging session. The data is now saved to the memory card.

Note: The NDash records a few seconds of data before the [Start Log] button has been pressed. Therefore, log files may contain a negative timestamp. The amount of negative time varies by vehicle. The amount of negative time is dependant on the amount of data being logged. Newer vehicles offer more data, faster so they will have shorter negative time with more data.

Each time a data logging session is started and ended, NDash saves one file to the SD memory card in a directory called "log." Each saved file has a log prefix. The default prefix is "log", and will be changed by a value of +1 as new logs are added. (ex log_001.csv)

To change the log prefix:

1. From the Main Menu, tap on [Data Logging].
2. Tap on [Log File Prefix]. This screen appears:
3. Type in the desired name of the log file prefix.
4. Tap [Save].

Now all log files will be saved in numerical order with the prefix that was entered.

To view log files:

1. Remove the SD memory card from the NDash.
2. Place the memory card into a SD card reader and attach to your PC.
3. Open the contents of the card. Log files are saved in the "logs" directory on the card. Log files may be opened in Microsoft Excel or any other spreadsheet program that accepts *.csv files.

NDASHCALCULATORS

NDash offers a variety of calculators that can be used to make custom signals using one or more input signals or using user defined values. These calculators come pre-installed on your NDash.

PERFORMANCE MEASUREMENTS

1/4-mile, 1/8-mile, 0-60mph times and many user-defined performance tests can be measured with NDash Using only the speed signal input from OBD II or an external sensor.

1/4-MILE, 1/8-MILE, 0-60MPH TEST

From the Main Menu tap [Performance].

1. Tap on [Setup] then tap [Speed Sig] and locate and select the vehicle speed sensor.
2. Tap [Save].
3. The [Dist Sig] is self-calculated and is speed x time.
4. Tap [Save].
5. Tap [Acceleration Test].
6. Select the performance you would like to test by tapping on it.
7. Tap [Start] to start the test. Results will be saved to the SD if installed.

Follow the on-screen instructions. The results will be posted in the left box at the end of the run.

USER DEFINED SPEED TESTS

Create your own performance tests. To set up a specific test:

1. From the main menu tap on [Performance].
2. Tap on [Setup].
3. Tap on one of the four [User Test] buttons. The “Edit User Test” screen will appear.
4. Tap on [Name]. Enter the name of the test. Example: 0_to_120_feet
5. Tap on [Units] to select a measurement unit. Example: feet
6. Tap on [Start] to set the start value of the measurement. Example: 0
7. Repeat steps 7 and 8 to set Units and Stop value. Example 120 feet.
8. Tap [Save]. Make sure the speed gauge is set and tap [save] once more.
9. At the performance menu, tap on [User Tests]. This screen appears:
10. Tap on [User Test 1].
11. Tap [Start] to start User 1’s test.

Follow the on-screen instructions. The results will be posted on-screen at the end of the run. Example of a results screen:

DIAGNOSTIC CODE READER

To view and clear diagnostic trouble codes:

From the Main Menu tap on [Diagnostics]. This screen will appear:

Note: Use the [<] and [>] buttons at the top to switch between Generic and Enhanced OEM information.

Turn the vehicle’s key to the on position. The vehicle does not need to be running.

Tap [Read Codes]. If the vehicle’s check engine light is on, diagnostic trouble code(s) (DTCs) will be displayed along with a short description of each code.

Fix the diagnosed problem, or make note of it.

To clear the diagnostic trouble codes, tap [Clear Codes]. You will be asked to confirm that you want to clear the codes.

Note: Clearing codes does not solve any underlying vehicle issues.

Tap [Yes] to clear the code(s) and turn the check engine light off.

Tap [No] to leave the code(s) set and leave the check engine light on.

CUSTOMIZING YOUR NDASH

INSTALLING FILES FROM SD CARD

Various files can be installed on to NDash from the SD card. Themes, Splash Screens, Sounds, Config. File, and Licenses can all be installed this way. In order for NDash to see these files when a SD card is inserted, the files must be contained in a folder called “transfer” in the parent directory of the SD card. A user can backup, install, uninstall files and format and eject a SD by navigating to: Main Menu>Setup>Memory Card.

CUSTOM SPLASH SCREEN

The NDash allows users to change the splash screen (the graphic that is displayed when NDash starts) to anything they wish. A user

must first create a image file using image editing software. The image needs to be 480x272 and a .tga file. Most popular image editing programs can save in this format. To install and specify your splash screen after it has been created:

1. Place your splash screen on a SD card in a folder called “transfer.”
2. Insert the SD card into the SD card slot and turn NDash on.
3. From the Main Menu, tap on [Setup], then [Memory Card], then [Install], then [Splash Screen]. Select your image file. A confirmation of installation will be displayed.
4. Go back to the Main Menu and tap on [Setup], then [Display], then [Splash Screen]. Select your image.

When NDash starts, your image will now be displayed before NDash completely starts up.

ADJUSTING STANDARD/METRIC UNITS

NDash offers the ability to automatically adjust a signal to the English standard or metric units.

To Change Units:

1. From the Main Menu tap [setup], [Display], [Units].
2. Select the Units you wish to use and select [Ok].
3. All signals will be adjusted to the selected unit of measure.

DISPLAY DIMMER/DISPLAY BRIGHTNESS

The NDash has a built in light sensor that adjusts the screen brightness according to its surroundings. NDash comes setup to automatically change the brightness of the screen; however, the automatic dimmer can be turned off or set to a specific brightness level.

1. Tap on [Setup] menu
2. Tap on [Display]
3. Tap on [Brightness]
4. Select the desired brightness level.

OFF / ON / LOW POWER MODE

The Off / On/ Low Power mode button is located on the front left corner of the NDash. It has three functions:

- To shut off NDash: Press the button and hold for 3 seconds. A screen will say “Shutting Down.” The screen will go black. The NDash is completely off.

The NDash has an automatic power down feature that shuts down the NDash when the vehicle is turned off. This feature automatically shuts down the NDash when no signals are observed from the OBD II connector.

To enable Auto Power Off:

1. Tap on [Setup] from the Main Menu.
 2. Tap on [Power].
 3. Tap on desired time for shutdown after key is turned off.
 4. Tap [OK].
- To turn on NDash: Press the power button again to power the NDash back up.
 - To put NDash in Low Power Mode: Press and release the button quickly while the NDash is on. The screen will go off, but the unit will still be on. Press the button again and the NDash will instantly come back on. Low power mode saves power, but makes NDash instantly available.

* Auto Power On is not available through the NDash.

DEFAULT POWER-UP SCREEN

NDash allows you to easily change which screen appears on initial power-up of the NDash. This can help make it faster and easier to navigate through the NDash to find the functions you use most.

1. From the Main Menu, tap [Setup].
2. Tap on [Display]
3. Tap on [Startup Page]
4. Choose the Page you would like to have be the startup page, then tap [OK]

The change will be seen the next time the NDash is powered back on.

NDASH ANALOG INPUTS

NDash has two analog inputs available on the accessory connector. They accept a 0-5v DC signal and are compatible with most automotive sensors. These signals can be displayed on the gauge screens along with any other input. They can be rescaled from the 0-5v scale into Fahrenheit, PSI, Air-Fuel ratios, or whatever the voltage represents. The analog inputs on NDash have a 24.7 kilo ohm input impedance and may not be accurate when connected to a device with a high output impedance. For example, a narrowband O2 sensor output cannot be connected directly to an NDash because the output impedance of the sensor is in the mega ohm range.

To use the two analog signals, install the [Analog] driver in the device manager.

A linear conversion is for measuring signals that have a constant input voltage change for a given change in what's being measured. An example is a sensor that has a 0.1V output change for every temperature degree it's measuring. 3 terminal sensors that have a voltage input, a voltage output, and ground are often linear sensors.

A non-linear conversion is for measuring signals that do not have a constant input change for a given change in what's being measured. An example is a NTC (negative temperature coefficient) type resistive temperature sensor, which is very common in vehicles. The NTC temperature sensor will change resistance by a few ohms per degree at high temperatures and many thousands of ohms per degree at cold temperatures. 2 terminal resistive temperature sensors are usually non-linear.

CONNECTIONS AND WIRING

Connect the analog input signal you wish to measure to either Analog In 1 or Analog In 2 on the NDash. See the end of this manual for the I/O cable wiring table.

ANALOG INPUT DRIVER SETUP

To setup an analog sensor in NDash (sensor pre-wired to accessory cable assumed)

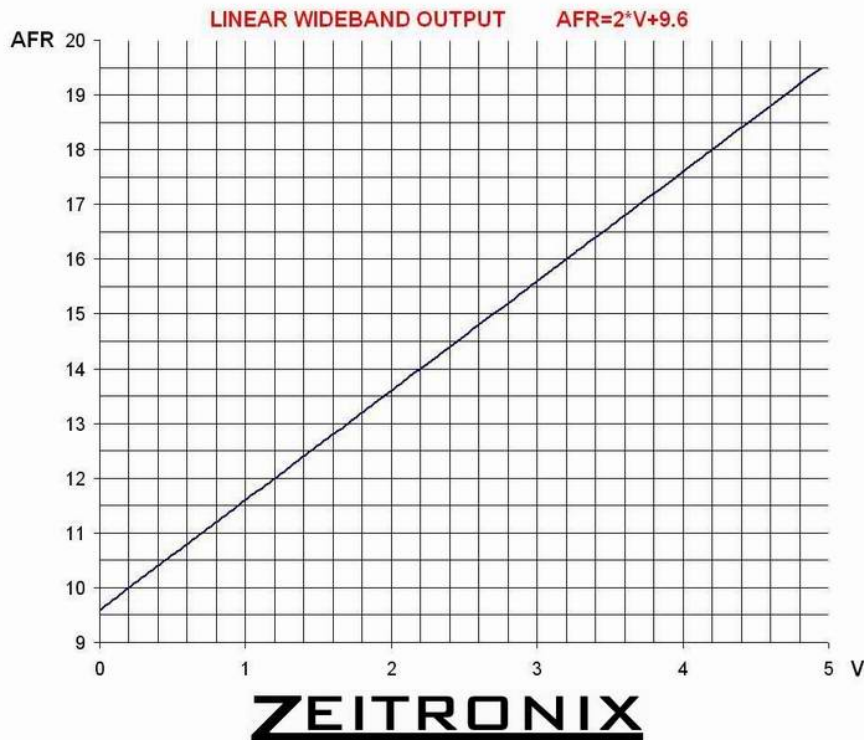
NDashFrom the NDash Main Menu tap on [Setup], then [Devices], then [Manager].

1. A NDash typically comes in original packaging with analog sensors pre-populated in the Device Manager. If you do not see "Analog Input" in any of the driver slots (a-h) then tap on an empty slot and tap [Add Device].
2. Use the [<] or [>] buttons at the top to find the "Other" heading. Tap on [Analog Input] to highlight and tap [Install].
3. Your analog channels are now specified as a input in the Device Manager (Signal names are Analog #1 Volts and Analog #2 Volts) and can be assigned to any gauge to be viewed as voltage. To understand how to scale the signal to a specific unit see the next section.

LINEAR ANALOG DRIVER CORRECTION FACTOR AND CORRECTION OFFSET

For this example, we will assume we have a Zeitronix Zt-2 wideband AFR sensor connected to the Analog #1 input. (Tip: For Zeitronix products that support it, the Zeitronix digital serial output should be used with the nDash Zeitronix driver instead, because it is more accurate and easier to configure than using the analog input. This is just an example).

The documentation for the Zt-2 (2006+) describes it's analog output as follows:



We see the formula desired is $2*V+9.6$. The factor of 2 is called the "Correction Factor" and the 9.6 is called the "Correction Offset". Refer to the actual sensors user manual for Correction factor and offset values. This is a simple linear formula.

CONVERTING AN ANALOG VOLTAGE INTO PHYSICAL UNITS

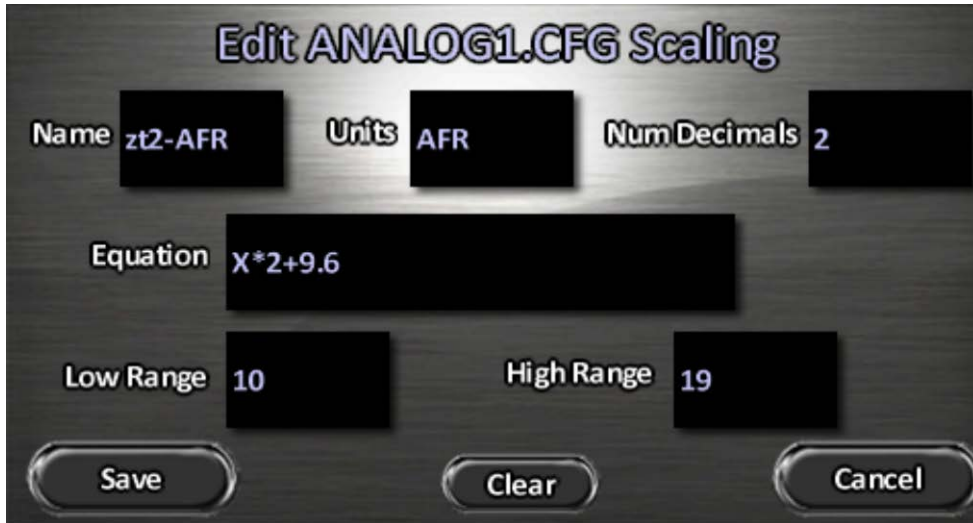
Navigate to "Parameters" by tapping on [Setup] from the Main Menu, then [Devices], then [Parameters]. Use the arrows at the top to find the "Analog Input" driver. Select the either ANALOG1.CFG or ANALOG2.CFG depending on which analog channel is connected to the device. Press the [Change...] button to modify the config for that channel.

These Scaling Parameters are used when converting an analog signal into physical units:

- **Equation:** The equation to use for conversion. X represents the analog signal in volts. So if your linear conversion was:
$$\text{Corrected Value} = \text{Correction Factor} * \text{Raw Voltage} + \text{Correction Offset}$$
Where Correction Factor was 2.0 and the Correction Offset was 9.6 you would enter the Equation as:
$$X*2.0+9.6$$
- **Name:** Abbreviation to identify corrected signal. Used as a gauge label and displayed on the assign signals screen.
- **Units:** Physical units for the calculation. Any automatic Imperial/Metric occurs afterward. For example, if a calculation results in °C the number could be automatically converted to °F before display. Use DegC for °C and DegF for °F.
- **Low Range:** Default minimum value; used for round gauges and graphs. You can override this for each gauge on the assign signals screen
- **High Range:** Default maximum value; used for round gauges and graphs. You can override this for each gauge on the assign signals screen.

- **Num Decimals:** How many decimals to display. Leaving this blank or entering 0 will display 1.256 as 1. Entering 1 will display 1.256 as 1.3. Entering 2 will display 1.256 at 1.26.

Here is the above Zt-2 example fully configured:



USING NON-LINEAR CONVERSIONS (XY PAIRS)

To use non-linear signals, an XY pair file named f_name.config extension must be installed from the SD card, where "name" is user chosen. For example, f_aat.config could be a transfer function for an Ambient Air Temperature probe. Then in the equation editor, touch the [Fx Edit] button and select the appropriate .config file. The formula used by default is f_name(X) but advanced users could modify it with any valid equation, like 5.4*f_name(X+4.3).

The format of the XY pair file is:

<p>The X values have to be strictly increasing assuming 0-5V. The Y values can be non-linear.</p> <p>The X and Y values can be separated by spaces, commas, or tabs (and possibility any other non-numeric character).</p> <p>Whitespace is generally ignored except it can be used as the XY separator.</p> <p>The semicolon character (;) is used to indicate that the rest of the line is a comment and will be ignored.</p> <p>There is a limit of 32 pairs of XY data per file.</p> <p>To install the file, the file should start with _f and have a .config extension. Using your PC, put it in the "transfer" folder of the SD card, then use the [Setup]/[SD Card]/[Install]/[Config] File menu to install it onto the</p>	<pre> ; Example XY Pairs #1 ; Function for example AFR where ; 5V = 22 AFR and 0V = 2AFR 0.0, 2.0 5.0, 22.0 ; Example XY Pairs #2 ; X Y for example non-linear sensor 0.000 50 ;This is a line comment 0.162 125 0.221 160 0.251 125 0.512 99 0.751 85 0.940 77 1.285 66 2.011 49 2.158 46 3.913 11 3.947 10 4.193 1 4.622 0 </pre>
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unit.	
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UPDATING NDASH

NDash's software is field updateable. The software necessary to update the NDash is on the included CD. It can also be downloaded from <http://www.e-motionproducts.com> in the "Support" area.

UPDATING NDASH

WARNING: Do not power NDash from the PC with the USB ports on the right. Permanent damage to your NDash can occur.

To update NDash:

1. Establish an Internet connection on your computer. The NDash Recovery Tools requires Internet access throughout the update process.
2. Connect the USB cable to the single USB port located on the **left** side of NDash. Any other USB port will not work. Connect the opposite end of the USB cable to the computer's USB port. **Note:** This USB port is used only for updating the NDash.
3. NDash's screen will display: "USB link established Boot Halted. You may now attempt to recover." This message is normal.
4. On the computer Click on Start select Programs > E-Motion Inc. > NDash Update Tool. This program starts:
5. NDashClick on your NDash's serial number to highlight.
6. Click "Update firmware."
7. Follow the prompts

APPENDIX A: ACCESSORY CABLE PIN OUT

1	Red	Vehicle Power In/Out	If NDash is connected via OBD II cable, this is the source for vehicle power. If OBD II is not connected, vehicle power must be applied here. Warning! Do not attempt to power any device from this output that draws more than 500ma of current. Failure to observe this restriction could result in permanent un-repairable damage to your NDash.
2	Orange	Serial Port 1 Rx	Connect to pin 3 of PC DB-9
3	Yellow	Serial Port 2 Tx	Connect to pin 2 of PC DB-9
4	Blue	Serial Port 2 Rx	Connect to pin 3 of PC DB-9
5	Brown	Serial Port 1 Tx	Connect to pin 2 of PC DB-9
6	Black	Case Ground	1Meg Ohm to Gnd. For cable shielding. Do not use as a Ground.
7	White	Analog input 2	0.0 to 5.0 Volt input
8	Pink	5V @ 500ma Output	Resettable fuse protected.
9	Green	Analog input 1	0.0 to 5.0 Volt input
10	Shield	Ground	This is the signal ground. Connect to pin 5 of PC DB-9

Note: For future compatibility tie 6 and 10 together.

APPENDIX B: CAN EXPANSION CABLE PIN OUT

Color	Function	J1962 Pin #
Black	J1850-	10
Brown	J1850+	2
Red	ISO-L Line	15
Yellow	Unswitched Power	16
Green	ISO-K Line	7
Blue	CAN-L	14
Gray	CAN-H	6
White	Signal Ground	5

APPENDIX C: USER CONFIGURABLE SIGNALS

The Analog driver supports four (4) user-definable signals. To configure them use the Device Manager [Parameters], use the left/right arrows to select the Analog Input driver and edit any of the USER1, USER2, USER3, or USER4 signals.

Each signal has parameters .X to select which signal is represented by X in the formula, .Y to select which signal is represented by Y in the formula, and .CFG which defines the formula/scaling, name, units, and number of decimal places.

For each user signals, each of the 4 signals can configure what signal is used for their X and Y signals, for example, the USER1.SIGX and USER1.SIGY values specify which signals mean X and Y for USER1 signal.

Example: If you assign USER1.SIGX to MAP and USER1.SIGY to BARO and then for the USER1.CFG equation, use X-Y, then USER1 will display (MAP – BAROMETRIC PRESSURE) which is BOOST.

LIMITED WARRANTY

E-Motion, Inc. guarantees that every NDash is free from physical defects in material and workmanship under normal use for one year from the date of purchase. If the product proves defective during this warranty period, Contact your NDash distributor in order to obtain a Return Authorization number and form. When returning a product, mark the Return Authorization number clearly on the outside of the package and include a copy of your original proof of purchase and the form.

IN NO EVENT SHALL E-MOTION, INC.' LIABILITY EXCEED THE PRICE PAID FOR THE PRODUCT FROM DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THE PRODUCT, ITS ACCOMPANYING SOFTWARE, OR ITS DOCUMENTATION.

E-Motion, Inc. makes no warranty or representation, expressed, implied, or statutory, with respect to its products or the contents or use of this documentation and all accompanying software, and specifically disclaims its quality, performance, merchantability, or fitness for any particular purpose. E-Motion, Inc. reserves the right to revise or update its products, software, or documentation without obligation to notify any individual or entity. Please direct all inquiries to:

Warranty is void if the NDash case is opened.

Warranty is void if NDash is used in a manner not consistent with reasonable care.