

Willabay Design Environmental Data Monitoring System (EDMS)

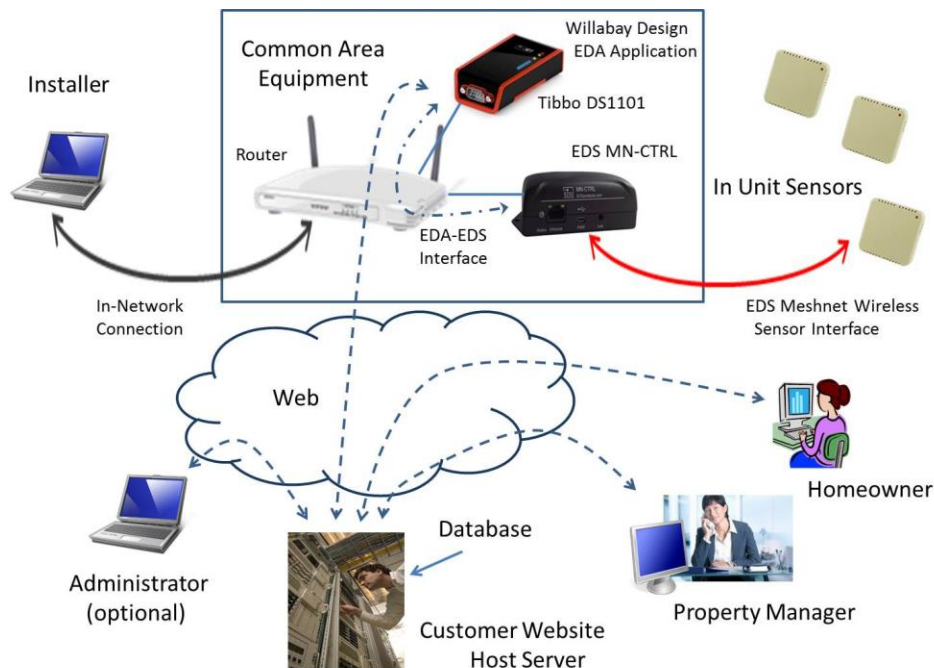
Product Features and Capabilities

V4.2.03, March 2018

Willabay Design's newest environmental monitoring system is called the Environmental Data Management System (EDMS). This system was originally designed for the multi-family home monitoring market; more specifically for condo owners who have property that is vacant for many months during the winter. However, the system is also applicable to a business such as a storage facility, greenhouse, or small cabins where multiple buildings must be monitored and there is a nearby central location for the common controllers.

The required equipment and software for the EDMS system is fully documented in EDMS/EDA Release V4.2 Equipment and Software document as well as the EDMS and EDA Product Description. This document is intended to provide up to date information on the current capabilities and feature content that is now supported on our current EDA release.

All of the hardware components that are used in the EDMS system are readily available devices with product lifetimes that should guarantee device replacement for years. The on-site equipment and interfaces that make up the EDMS system are shown in the diagram below.



EDMS System Used in a Residential Property Environmental Monitoring Application

In the above figure, the equipment that is required consists of the common devices (a router and a pair of controllers) shown in the rectangular box as well as the set of sensors that may be deployed anywhere within radio range of their associated wireless controller (the MN-CTRL in the above figure).

The actual environmental data collection devices that are used in this system are U.S. made products that have been on the market for several years. They are made by Embedded Data Systems (EDS) in Kentucky. Their wireless environmental measurement system consists of a controller, called a Meshnet Controller (MN_CTRL), and an entire line of wireless sensors. Our EDMS application can currently support three types of Meshnet sensors; a Temperature only (T) sensor, a combined Temperature/Humidity (TH) sensor, or a long range extended sensor (THX).

Willabay Design's portion of the EDMS is called the Environmental Data Agent (EDA), a software application that is resident on a dedicated device made by Tibbo Technologies in Taiwan. As of the current release of our EDA product, we are supporting this EDA application on one of several Tibbo devices. Customers may purchase these devices from one of several US suppliers or directly from Tibbo's retail outlet on their website. The EDA software must be purchased directly from Willabay Design using our website. The two Tibbo device alternatives are described in the hardware information section below.

Further information on the required hardware and software that is needed for this EDMS system can be found in our EDMS/EDA Equipment and Software document.

EDMS Features and Capabilities

The EDMS supports the following features that are often found in much more expensive devices that often require monthly access fees on top of the user's standard internet access. Some of these features and capabilities are listed below.

EDA Based Features

- Support for standard DHCP, SMTP, and DNS protocols for assigning IP addresses, handling outgoing email, and translating a target web address URL to its specific IP address.
- Support for fixed assigned, static IP addresses for the network connection. This allows users to use router features like Port Forwarding to access the Tibbo devices in their network.
- Supports five fixed port addresses for incoming HTTP access; 64400-64404.
- Support for an extensive set of internal error logging, system recovery actions, and other maintenance features that will keep the EDA application up and running in the event of router issues, internet access problems, or after power outages. Outgoing emails, in particular, are internally monitored to insure they are transmitted to a mail sever accurately.
- The EDA software is capable of detecting extreme temperature or humidity situations and can issue an email right out of the EDA device; directly to a customer's email server. Up to 3 email addresses can be used. These emails include the actual environmental measurements but for security reasons, do not directly identify the location of the alerting sensor. The individuals

receiving the emails need to check the database to see what specific location has an active alert.

- One email alert message is capable of identifying an active alert condition on the entire set of sensors that can be assigned to the EDA at once.
 - This covers every type of alert condition; even low battery and lost sensor alerts.
- There is virtually no maintenance required once the system is set up. Low batteries and even sensors that go off the radar are identified and the remote portal knows about it within minutes.
- In addition to the actual Temperature and Humidity readings, the EDA is also capable of accessing the state of an external IO input that is present on every type of EDS Meshnet sensor. This input can be connected to a water sensor such as Winland's line of WaterBug leak detectors or other similar products. The EDA sends this information to its target server where a customer may access it in the same way that they view their environmental data.
- The EDA only collects environmental data, the above external IO state, and the sensor's battery condition; no other information is tracked other than internal errors that may develop over time. Unlike some other monitoring products that track occupancy, this product is only capable of sending specific environmental data to a target server.
- Supports detection of missing sensors, low battery conditions, and temperature or humidity extremes. This capability is also not sensitive to how many sensors are assigned on one EDA.
- Supports up to 16 sensors that are managed by a single EDA on the V4.2.03 release.
 - The sensors on one EDA no longer have to be the same type (T or TH).
 - This limit is 8 sensors for the original "Generation 1" Tibbo devices.
- A property manager or system administrator can set up a network of host locations, each with an EDA and EDS Meshnet Controller that collectively acts as one system for one complex or portion of one complex. This also works for property managers who rent property in different locations where some of the property may be vacant at times.
 - The only constraint is that each host location needs wired internet access via a router.
- Once the initial system is set up on the Willabay Design server using a simple form, the setup for this system is entirely driven from the sites where the equipment is installed. There is no need to continually update the database in the remote portal as new equipment is installed or modified.
 - Customers can use the same forms to rename sensor locations or even move sensors to a new location that is still covered by the same EDA.
- Full support of all of the configuration aspects of the system using several forms that are accessed from the application's home page. This allows users to set up the sensor count, set specific high and low temperature and humidity thresholds, identify the actual location of each sensor, and assign IP addresses and other internal parameters for the EDA that are used to operate the system.

New Features on the V4.2.03 release

- The latest EDA software release now supports EDS MN-ENV-THX extended TH sensors.
 - This sensor type supports up to three wired 1-wire probes in addition to its standard TH capabilities.
- The EDA supports separate operating modes for this THX sensor; one of which is to actively monitor the 1-wire probes only and not the built-in temperature sensor on the base sensor itself. This is called the NB mode. A standard EX mode configuration supports alert monitoring on up to all four temperature sensors (1 internal, 1-3 external).
 - The mode is defined by a new entry on the Configuration Page.
- If a G2 device (such as the TPP2L(G2)) is used for the EDA, email alerts will include the full sensor name on every sensor that has raised an alert.
- Temperature and Humidity measurement and thresholds are now accurate to within .1 degree or .1% relative humidity.
- The LCD display on the TPP2 versions of the EDA now support 4 pages of status information on the device.
 - This includes errors that are raised during the time the Meshnet data is being processed.

Customer Data Access Portal (Willabay Design Server) Based Features

- A standard MySQL database contains all of the customer's data and the database is private and specific to a given set of properties. This database covers whatever set of EDAs the customer has assigned to their particular network; typically one complex or association, one property manager, or a single owner of rental properties.
- A system setup form is provided to initially assign a specific name to the system and set up the internal server parameters that are needed for a given customer's database. The actual MySQL database activation may be supported by the customer's website administrator or Willabay Design upon request.
 - Willabay Design's currently available database support is limited to our shared database that is now hosted on BlueHost.
- A search form is provided that can be used to locate all sensors that meet a given search criteria such as above or below a specified environmental threshold. This search coverage is over the whole network. This allows a property manager, as an example, to check all of their EDMS equipped units in a complex at once.
- The EDMS system has no actual constraints regarding where the host equipment (EDA and Meshnet Controller) may be located. In fact, a group of homeowners in a neighborhood can get together and buy the necessary equipment to set up a system of their own where they can monitor each other's homes. The same goes for a property owner who may have vacant rentals or the owner of storage sheds in different locations.
- Full access to all of the customer data that is associated with a given community of interest (condo building, complex, property management, etc) is always available free of any subscription fees or other monthly fees that are normally associated with such a service.

EDS Device Information

The EDS devices that are used in this system are shown below.



EDS Meshnet Controller (MN-CTRL)



EDS Meshnet Sensor (T or TH)

The administration of the EDS Controller and its related sensors is supported entirely by the MN-CTRL and is completely independent of the necessary steps to set up and administer the EDA equipment. In addition to the MN-CTRL shown above, the EDA supports an optional EDS Meshnet Repeater (MN-RPT-H). This is a very useful device that is used to extend the range of the wireless sensors. The MN-RPT behaves somewhat like a wireless sensor and is the same size as the MN-CTRL. The various wireless sensors can home in on either their host controller or a repeater, whichever provides the best signal for it to operate.

Any of the EDS Meshnet System products can be purchased directly from EDS on their website at http://www.embeddeddatasystems.com/MeshNet_c_68.html. The EDS site also contains full documentation on their products including manuals on each device.

EDS customers who typically buy web based environmental monitoring products from EDS usually have access to (or develop on their own) a server based software package that can be used to administer the data that is sent to their server from one of EDS's web based controllers.

The EDA application that is resident on a Tibbo device is the Willabay Design equivalent of a portion of the server based software that other EDS customers would need to access their data. That is why we call this application an agent; it acts like a server in some respects and is able to collect information from the MN-CTRL and send that data to a target server. The server scripts simply store that data in a MySQL database. The customer's specific location information, such as a building or unit name, that is resident in the database is obtained from the EDA during the installation phase; at the same time the devices are installed.

Tibbo Device Information

One of the reasons Willabay Design has chosen Tibbo as our platform supplier of choice is because the company has a history of introducing new devices that are fully compatible with devices they have made in the past. This means that a customer's software purchase is protected. They will always be able to acquire a new Tibbo device that meets their needs and that will run our EDA product. Tibbo's product

lifetimes and general trend towards less expensive and more functional devices was also a plus. This is especially true in the case of their TPS product line.

The two available options for the EDA device are shown below. These devices may be obtained from any US supplier or direct from Tibbo via their website. One excellent source is the MicroController Shop at <http://www.microcontrollershop.com/default.php?cPath=385>.



Tibbo DS1101 Programmable Controller

Tibbo TPS (TPP2L Version) with LCD

Device: Tibbo Technologies DS1101	Device: Tibbo Technologies TPS-TPP2L
Size: 2.5 " x 3.5 " x 1 "	Size: 4 "x 4 "x 1.5 "
Features: Small LCD Screen	Features: Large LCD Screen with space for additional information
Mounting: Can be wall mounted or DIN rail mounted	Mounting: Can be wall mounted or DIN rail mounted

Equipment details for the Tibbo devices that can be used for the EDA are listed below.

Tibbo Device Options

- Tibbo’s DS1101 programmable controller
This device is a very attractive product with the capability of displaying its IP address on an optional small LCD screen. It also has LED indicators that are needed for the EDA application. Tibbo offers this device without a display but in our opinion, the LCD display is very handy during the EDA software installation and setup phase.

It is likely that Tibbo will be updating this device in the near future or perhaps replacing it with a comparable G2 equivalent. If that happens, we will try to support such a new device as soon as possible.

- Tibbo’s TPP2 version of their very flexible TPS system (TPP2L)
This product is available in kit form or fully assembled. The basic “barebones” version of this product is more expensive but it is fully assembled and with the optional LCD screen.

This device is now available with both the original processor and with a new board that has Tibbo's new G2 processor. We recommend that all new customers opt for the G2 device.

The TPS version of our EDA application now utilizes the optional LCD screen for a variety of functions; mostly during the setup phase of the system. As such, we have elected to require this feature if the TPP2 is the customer's choice for the EDA device. Since the TPP2 has an available 12 volt supply option, we recommend that customers include these added "Tibbits" if a customer is interested in this option. Without this option, the device needs a 5V supply.

Please reference our EDMS/EDA Release V4.2 Equipment and Software document for full details on what you need to purchase. This includes the precise information on the above power options. Information on Tibbo's TPS system can be found on the link below.

TPS Products: http://tibbo.com/store/tps/barebone_tps.html

As we continue to improve and expand the functionality that is offered in our EDMS system, it is expected that we will expand our use of Tibbo's TPS platform for our products, including this EDA application. A possible future addition of a set of output relays to the TPP2 would allow for an external alarm or other signal to be raised when an alert condition is detected.

Additional EDMS and EDA Application Information

Please refer to the extensive additional information on our website for additional EDMS related product information. We have a detailed product description, set of customer FAQ questions, and installation and configuration information under the EDMS product section of our website.

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Other Documentation

EDA Product Notes (supplied with the software)

EDMS/ EDA Release 4.2 Equipment and Software (available on our website)

EDMS Setup Guide (available on our website)

EDMS System Provisioning and Installation User Guide (available on our website in the EDMS Support section)

EDMS Product Description (on our website)

EDA Technical Specifications Sheet (on our website)

EDMS FAQs –Typical Questions and Answers (on our website)