

EDMS/EDA Release V4.2 Equipment and Software

What you need, where to get it, and how to install it

V4.2 3/6/2018

New: Now Covers the Latest Tibbo and Embedded Data Systems (EDS) Devices

Purpose of This Document

The Willabay Design Environmental Data Management System (EDMS) is a fairly unique type of system that utilizes commercially available devices to monitor environmental conditions such as temperature and humidity. Willabay Design's software product is the software application in one of these devices that is made by Tibbo Technologies in Taiwan. This software application is what we call an Environmental Data Agent (EDA); the thing that collects and manages the environmental data that is obtained from other hardware devices that are part of the EDMS system. These other devices are made in the US by Embedded Data Systems (EDS) in KY.

The purpose of this document is to explain what these devices are and how a potential customer may obtain the required EDMS devices and the Willabay Design software that is needed for the EDA. The equipment cost of each of these devices and the license fee for the EDA software are also covered below.

All of the hardware components are available from existing suppliers as described below. The EDA software that needs to be loaded on your Tibbo device is available directly from Willabay Design using the EDA product purchase link on the Willabay Design website. See the Products/EDMS Software Products tab on our website to get access to this link.

This document now covers the latest available information related to the remote portal aspect of the EDMS system. Willabay Design now supports this part of the EDMS using a few online forms that are accessed from the EDMS Application Support Page on our website.

It is recommended that customers first read through this document and then use the EDMS Setup Guide (see document list below) when they actually install their equipment. This document should give users a taste of how this system is set up and where to purchase the required equipment. An additional System Provisioning and Installation Guide (see document list below) is available for more detail.

Background and Overview of the EDMS System

This section is intended to give new customers a very quick overview of our EDMS system. A more detailed description of the EDMS can be found on the Willabay Design EDMS Product Description Document on our website.

The actual environmental data collection portion of the EDMS system is handled by the Embedded Data Systems (EDS) devices. Their Meshnet line of wireless environmental sensors and an associated Meshnet Controller (MN-CTRL) are a very versatile means of collecting environmental data from remote locations over a proprietary wireless interface. EDS also markets a Meshnet Repeater (MN_RPT) that can increase the wireless range of their sensors.

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



EDS Meshnet Controller (MN-CTRL)



EDS Meshnet Sensor (T, TH, or THX)

Willabay Design's EDA application resides in a commercially available programmable device made by Tibbo Technologies.

At the present time, there are two equipment options for the EDA. These two options are shown in the figures below.



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, Additional Capabilities

The TPP2L shown on the right is available with two separate processor alternatives. The newer Generation 2 device enables us to provide far more functionality in the same enclosure.

Nothing other than environmental data collected by the Meshnet sensors is collected and sent to our servers. What makes the EDMS different from most competitive arrangements is that there is no need to do any online setup for new sensors after they are installed, no required subscriptions or user logins, no monthly fees, and users have full access to the data.

New Features in the V4.1 Release

The target audience for this product was originally property managers, commercial building or business owners, or residential building owners that have a need for an inexpensive means to monitor their property for abnormal conditions such as low temperature or high humidity. However, the system is also an inexpensive solution for a number of other data monitoring applications such as wine cellars, storage facilities, greenhouses, grow rooms, or other similar applications. The EDA product now supports additional EDS equipment in addition to their Temperature Sensor and MN-CTRL Controller. These are EDS’s combined Temperature and Humidity Sensors as well as their Meshnet Repeater device (MN-RPT). The total number of supported EDS sensors and repeaters that could be supported by one EDA in the V4.1 release was very limited.

The V4.1.03 release also allowed the EDA product to be supported on Tibbo's latest version of their TPS System. This was the second generation version of Tibbo's TPP2 platform. It is called a Generation 2 (G2) platform.

Our upgraded software in the remote portal portion of the EDMS system provided for a time and date stamp to be applied to all data measurements. Customers can see the actual time for which the temperature or humidity measurement was made.

New Features in the V4.2 Release

While the previous EDA releases limited the number of sensors that could be used on one EDA, our original design plan was to increase this maximum to at least 16. The new series of G2 devices made by Tibbo provide enough memory to support these additional sensors. EDS has also introduced a new type of Temperature/Humidity sensor that had both a longer range wireless capability and which supported additional wired sensor probes that could be attached to the wireless sensor. This new sensor was called an Expanded TH sensor or THX; with an EDS model number 2040.

The latest V4.2.03 release fully supports this new THX sensor and also provides for a means for which this THX sensor can be used on an EDA that is based on the earlier Tibbo devices we used for the EDA.

Additional capabilities that are introduced on V4.2 include an increase in the temperature and humidity threshold resolution so that temperature and humidity differences of .1 degree (or .1% RH) could be detected. A number of other improvements were made to the product which allowed the TPP2L(G2) version of the product to support 16 sensors. At the same time, the DS1101 and TPP1L (G1) version's sensor limit was limited to 8 in order to support the long range sensor capability of the THX sensor.

Ease of Installation

While some customers who wish to utilize this EDA product may want to work with an experienced installer who is generally familiar with the installation of network or alarm system equipment, the detailed documentation that is on our website allows individual users to set up and maintain the system themselves. While the EDA and Meshnet Controller configuration tasks are not that complicated for an individual customer to undertake, those who are familiar with network equipment installation and configuration for things like web cameras will be better equipped to handle this task on their own.

Once a customer either purchases the required equipment or has a third party handle the purchase and initial setup, all that is necessary to set up the EDMS is the execution of a few

front-end steps to define your system. You do not have to secure a user login on our site or even provide us with specific customer information other than what is needed to purchase the product. In the future, property managers may be able to partially support the server side of the EDMS system using links from their own websites.

The following steps are necessary to determine the number of devices you will need, purchase the hardware and software, setup the controllers and a remote portal database, and operate the Willabay Design EDMS System. Readers interested in the detailed installation steps should refer to the Willabay Design EDMS Setup Guide. The EDMS System Provisioning and Installation User Guide provides additional details on the administration of the this product.

Site Engineering

The first thing one needs to consider is how many locations you want to monitor. Each location will require a Temperature Sensor (MN-ENV-T) or for those who are interested in monitoring humidity; a combined Temperature/Humidity Sensor (MN-ENV-TH). For applications where the sensors are much further away from the MN Controller, a long range MN-ENV-THX sensor can be used.

The sensors that will be attached to a given MN-CTRL Controller and accessed by the EDA do not have to be the same type; a restriction that was temporarily placed on this product in earlier releases. Note that all of EDS's sensor types support temperature measurement and the TH and THX versions support support temperature and humidity measurement.

After your sensor type selection, you need to determine the number of sensors that you want to support for your site. Each EDA can support up to a total of 16 EDS Meshnet remote devices (sensors and repeaters are remote devices) so you need to base your engineering on how wide of an area you need to cover. Remember that a DS1101 or TPP2L can only support 8 devices.

A system with one Tibbo device serving as the EDA, one Meshnet Controller, and one MN-RPT Repeater can reach sensors that are twice as far away as sensors without a repeater in the mix. You will always need the same number of Meshnet Controllers as you have Tibbo devices for your EDAs. A customer such as a property manager may want to install an EDMS system for a large complex made up of multiple EDA sites; each of which require the above devices. Such a configuration is called one EDMS System. It is also possible to break up a very large complex into multiple systems.

You then need to consider which of the supported Tibbo devices you want to use for your EDA. A typical EDMS System might consist of 2 or 3 EDA sites that support many sensors. At the present time, we are supporting this EDA product on two very different Tibbo platforms. These are the Tibbo DS1101 Programmable Controller and the TPP2L version of Tibbo's newer TPS

system (Both G1 and G2). The DS1101 is less expensive but the TPP2L has a larger LCD screen that we are now using to facilitate installation of the product and for the display of status information. The TPP2L system is available fully assembled or in kit form.

Tibbo products can be purchased directly from Tibbo or from various US distributors. Since the G1 and G2 versions of the TPP2L are generally priced the same, it is strongly recommended to purchase the new G2 version for new applications. In fact, it is not clear how long we will be able to support this product on the original G1 devices.

For each Tibbo device that handles the EDA function, you will need one EDS Meshnet Controller (MN-CTRL). Willabay Design has worked with both Tibbo and EDS for over four years and we chose these devices based a number of critical requirements; including the degree of information and detail that is provided to their customers. You can read every manual online and everything; absolutely everything, is explained in their documentation.

The number of actual sensors that you can support off of one Meshnet Controller is dependent on a number of factors including the distance from the MN-CTRL to its sensor locations and the location of the EDA and MN-CTRL on your property. Typically you will place the EDA next to its required internet access equipment such as a router or IP switch. The EDS controller may need a longer internet cable in order to be located at a more central location relative to its set of sensors. We recommend using a maximum of two repeaters in the system in order to retain the remaining 14 (or 6 for G1 devices) slots for sensors. However, you cannot chain two or more repeaters in series to reach sensors that are far away. If all of the sensors are within range of the MN-CTRL Controller, you do not even need a repeater.

The sensors used in the EDS Meshnet System are equipped with high power radio systems that are capable of reaching distances longer than most equivalent products at a much lower price. While the new THX sensors can easily reach other buildings, these sensors are a bit more expensive (about \$20) than the standard TH version. These tradeoffs are one of the main reasons we have built the designed the EDMS system around the EDS Meshnet product line. We recommend that prospective customers consult the Setup Guide and our updated EDA Technical Specifications Sheet for additional engineering details.

Ordering the Equipment and Software

Willabay Design has ordered most of our Tibbo devices from the MicroController Shop. This online outlet is one of the best sources for embedded devices and microprocessor based equipment available today. Their website is at <http://microcontrollershop.com>. Search for the DS1101 or TPP2 on their Tibbo products section. If you select the DS1101, you need to make sure it includes the OLED display and a power adaptor. The version of the TPP2 you need is the TPP2L with a TPP2 PCB; either in an assembled box with a very nice LCD display or in kit form.

Note that Tibbo's G2 version of the TPP2 is new and may not be available at all outlets. All of these devices are available on Tibbo's online sales outlet but customers must pay a higher shipping cost.

The DS1101 package will be about \$130 and the TPP2L, with a 12 volt power adaptor and a couple of optional components described below, will be about \$190. Note that the same power adaptor for the DS1101 can be used for the TPP2L but you will need two additional add-on devices from Tibbo to use this power adaptor on a TPS platform. These are the #10 and #18 power related TPS components called Tibbit devices that allow a plug-in adaptor to be used with the TPS system. Without these two Tibbits, the wire lead connector on the TPS device has to be connected to a 5 volt supply. See Tibbo's TPS documentation for more details on this very interesting product line.

The EDA application will work on any version of the DS1101 or TPP2 but the versions with the LCD displays make the installation a lot easier. The TPS system is available in many forms, including a kit for the TPP2 enclosure and LCD display, so be careful if you order this option. While the kit can save you about \$15, it takes a bit of time to assemble.

At this time, the LCD display on the Tibbo DS1101 devices is only used to display the current IP address assigned to the device. This assignment is automatic when the device is powered. The TPP2L has a larger display that displays the IP address information for the network and Meshnet Controller as well as the current status of these products.

The EDS Meshnet Controller (MN-CTRL) and its required sensors must be ordered directly from EDS. Their website page for the Meshnet wireless product is at http://www.embeddeddatasystems.com/MeshNet_c_68.html. You need to order the US/Canada version of the controller and the appropriate power adaptor. Then you need to add the appropriate number of MN-ENV-T, MN-ENV-TH, or MN-ENV-THX sensors from the same site.

The MN-CTRL will cost about \$96 with its power adaptor and the Temperature Sensors(T's) are \$48 each. The standard TH sensors are \$59 on their site and the THX version is currently available for \$80. If you need a MN Repeater (MN-RPT-H), the current EDS price is about \$80 with a power supply. All of these prices are in low quantities. EDS offers very good quantity discounts for bulk purchases; something to keep in mind for those who are considering larger EDMS networks.

The Willabay Design website can be used to order the appropriate quantity of licenses for the EDA software. Each instance of the EDA application is for one Tibbo device and requires its own license. The current price is only \$40 for the EDA software and its license (\$30 for G1 versions). The EDA software purchasing page is under the EDMS Software Products tab on our site. You

need one license per EDA so order the same quantity of licenses as the number of Tibbo devices you have ordered.

Once you have ordered and received all the necessary equipment and obtained your EDA software and licenses, you need to complete the following steps.

Setting up a Remote Portal Database

The remote portal aspect of the EDMS is considerably different than most products of a similar nature. Our experience with various means for monitoring the temperature at second homes has convinced us that a good system has to be expandable, fairly easy to set up, and more importantly, have a secure means for accessing customer data without the need for a subscription service.

Instead of the need for a login account, Willabay Design now has an available set of database setup forms available to our users so that they can set up a database for their use very easily. The only necessary criteria for obtaining an EDMS Customer Account Number (also called a Customer Code) using these forms is that you already have at least one EDA license code that you have purchased using our online outlet. Customers may use one Customer Code for multiple system setups as long as they are the responsible party for each system.

Access to the database startup forms is via a web page on our website. The access link (Remote Portal Instructions) is at <http://www.willabaydesign.com/new-customer-remote-portal-setup-page/>. This process is automated in that Willabay Design can internally set up the necessary MySQL database parameters and tables for each customer's use. This access does not currently require any long term commitment to a subscription service or even a login and password.

Once the system is set up using these forms, the on-site installer will be able to handle the rest of the system setup from their specific onsite locations. The actual host site installation steps outlined below are not that difficult and are typical of today's network based devices that many are familiar with.

In the future, a commercial venture such as a property management firm may want to purchase dedicated MySQL databases themselves and even generate their own custom forms to access our internal set of scripts that manage the server side of the EDMS system.

Configuring the EDS MN-CTRL and its Sensors

All of the necessary steps to set up an EDS Meshnet System are covered in their manuals which are available online on their product pages. Customers may also utilize our Setup Guide or Technical Specifications Sheet for more details including several specific configuration steps relating to how you have to name a few internal MN-CTRL parameters. If this is your first

installation, It is best to have both documents available during the EDS portion of your installation.

It is recommended that the installer who is setting up these devices on site first power up the MN-CTRL and then proceed with the Tibbo device setup. This is especially true if you are using Tibbo's TPP2L platform for your EDA since the TPP2L's LCD screen will let you view IP addresses for both the EDS Meshnet Controller (MN-CTRL) and the EDA. Once you know the MN-CTRL's IP address, you can proceed with the full Meshnet portion of the setup.

Configuring the Tibbo Device

As you may have already learned from other documentation, the Tibbo devices are a bit different than most commercially available embedded products. The Tibbo device requires its own firmware and a separate application that is supplied on what is called a pcode file. It is this pcode file that is sent to you when you purchased the EDA license. The Tibbo device will come preloaded with a version of the device firmware but the purchaser needs to make sure that the existing firmware is compatible with the release of the EDA application you have purchased. Willabay Design maintains a set of compatible Tibbo firmware files for each released product and the zipped product file that you receive from our FastSpring based online outlet will always include the appropriate version of the firmware. Both the firmware and application can be loaded onto a device using a toolset that is freely available from Tibbo. This tool is called the Tibbo Device Explorer (DE). . Tibbo's DE can be obtained free of charge from Tibbo at <http://tibbo.com/downloads.html>.

A new user will need to get familiar with how to download and install Tibbo's free DE tool so that you can load the EDA application on your newly purchased Tibbo device. If the Tibbo device that you purchased comes with an earlier version of the firmware, you need to first load the required firmware before you load the EDA application. We have used this software on Windows XP and Windows 7/8/10. Customers who have access to or want the Tibbo Integrated Development Environment (TIDE) can use that product to load the software as well. Either the DE or TIDE will get you up and running quickly. The other necessary steps are all covered in the Setup Guide. Our current EDA release V4.2.03 has been built on Tibbo's 5.04.04 release of TIDE and will need a 5.xx release of the DE as well.

One other item that needs to be mentioned is that when a user or installer first loads the Tibbo application on their device, it is possible to protect that device against intentional or accidental changes with a user defined password. The use of this password protection is highly recommended and is supported by the DE.

Once you have the Tibbo device loaded with the EDA application, all you need is to connect the hardware to your router and configure the EDS equipment and EDA using the instructions in

our Setup Guide and the EDS manuals. You will need the EDMS customer number and database table information that you obtained when you executed the setup forms as well as the appropriate license code for each instance of the EDA software. Customers who wish to create an additional EDMS System using the same Customer Code can will need a provided DB Access Code that they receive via email when they first set up their environment.

You must be careful to use a separate license code for each individual EDA device (DS1101 or TPPP2L). The license codes were supplied via an email when you purchased the EDA software. A separate EDA software registration step is required before you can actually use the product. Once the license code is used with one device, you cannot re-use that license for another installation of the software on another device.

All of the details about how to configure the EDS Meshnet Controller and the EDA application on the Tibbo device can be found in the EDMS Setup Guide and the EDMS System Provisioning and Installation User Guide referenced below. If users have any other questions, simply email Willabay Design at info@willabaydesign.com and ask.

Special Note on the EDA Software and How to Protect your Site

One of the reasons that Willabay Design has opted to develop this EDMS concept using Tibbo's products is the ease for which the software can be written and tested using the TIDE development environment. While end users can certainly opt to write their own programs for the devices they purchase, the official EDA software application is proprietary and the actual source will not be released. While we have considered the Open Source model for distributing this product, Willabay Design feels that is not quite the way to go with a security product such as this.

The EDA software is sold on a license basis as-is. There are no warranty's or guarantees on how it may work in a specific user environment. This product has been undergoing development and testing for several years and we feel it is robust enough to meet the needs of property managers as well as other users who may find the EDMS product very useful in monitoring environmental conditions at various remote locations.

David G Yost

Willabay Design LLC

Other Documentation

EDA Product Notes (supplied with the software)

EDMS Setup Guide (available on our website in the EDA Software Product Ordering section)

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

EDMS Product Description (on our website)

EDMS Product Features and Capabilities(on our website)

EDA Technical Specifications Sheet (on our website)

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

Willabay Design Website: <http://www.willabaydesign.com>